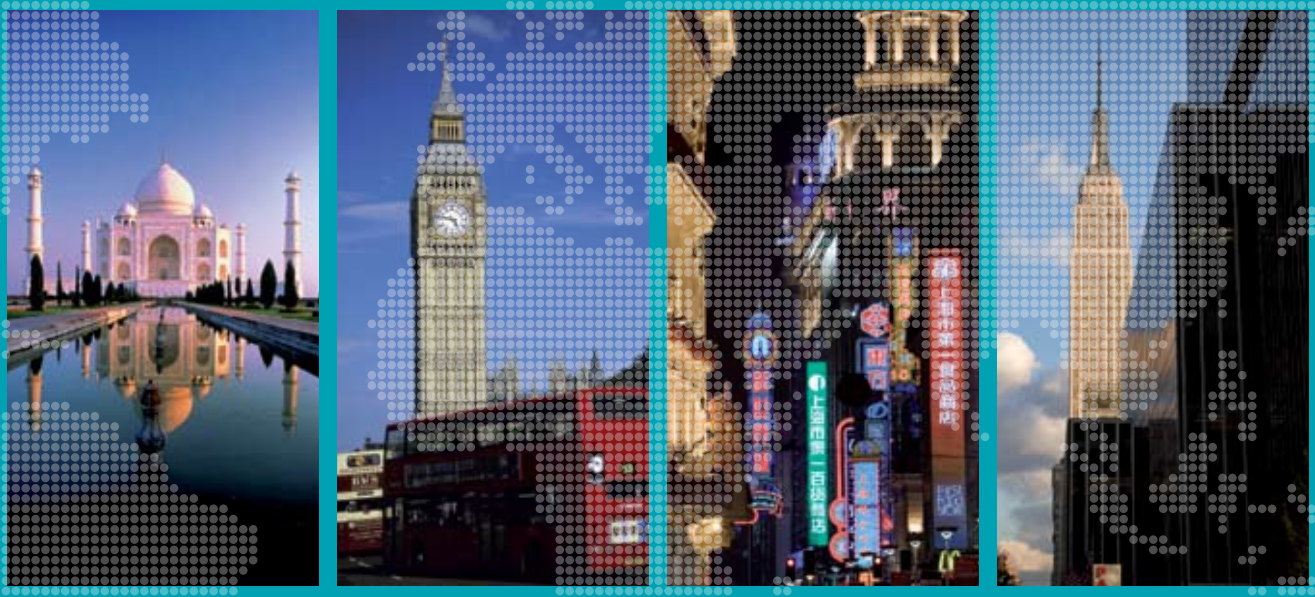
WORLD ECONOMIC FORUM

COMMITTED TO IMPROVING THE STATE OF THE WORLD

Globalization of Alternative Investments

Working Papers Volume 1

The Global Economic Impact of Private Equity Report 2008



The *Globalization of Alternative Investments Working Papers Volume 1: The Global Economic Impact of Private Equity Report 2008* is published by the World Economic Forum. It is the result of collaboration with faculty at various academic institutions.

The Working Papers in this volume are the work of the authors and do not represent the views of the World Economic Forum.

World Economic Forum
91-93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland
Tel.: +41 (0)22 869 1212
Fax: +41 (0)22 786 2744
E-mail: contact@weforum.org
www.weforum.org

REF: 150108

World Economic Forum USA Inc.
3 East 54th Street
17th Floor
New York, NY 10022
Tel.: +1 212 703 2300
Fax: +1 212 703 2399
E-mail: forumusa@weforum.org
www.weforum.org/usa

World Economic Forum
Geneva, Switzerland

World Economic Forum USA Inc.
New York, USA

January 2008

Globalization of Alternative Investments

Working Papers Volume 1

The Global Economic Impact of Private Equity Report 2008

WORLD ECONOMIC FORUM

COMMITTED TO IMPROVING THE STATE OF THE WORLD

Contributors

CO-EDITORS

Anuradha Gurung
Senior Project Manager and Global Leadership Fellow, World Economic Forum USA

Josh Lerner
Jacob H. Schiff Professor of Investment Banking at Harvard Business School

CORE RESEARCH TEAM

Lead Academic:

Josh Lerner
Jacob H. Schiff Professor of Investment Banking at Harvard Business School

Core team members:

Ann-Kristin Achleitner
Head of the KfW Endowed Chair in Entrepreneurial Finance and Scientific Co-Director of the Centre for Entrepreneurial and Financial Studies (CEFS), Technische Universität München

Francesca Cornelli
Professor of Finance, London Business School

Lily Fang
Assistant Professor of Finance, INSEAD

Roger Leeds
Research Professor and Director of the Center for International Business and Public Policy, School of Advanced International Studies (SAIS), Johns Hopkins University

Per Strömberg
Associate Professor of Finance, Stockholm School of Economics and Senior Research Fellow, Swedish Institute for Financial Research

Numerous researchers contributed to this volume of Working Papers and are listed accordingly in the respective work.

ADVISORY BOARD

Chair:

Joseph L. Rice, III
Chairman of Clayton Dubilier & Rice, Inc.

Vice Chairs:

Michael Klein
Chairman and Co-Chief Executive Officer Markets and Banking, Citi Inc.

R. Glenn Hubbard
Dean and Russell L. Carson Professor, Columbia Business School

Board Members

Piero Barucci
Professor, Autorità Garante della Concorrenza e del Mercato

Wim Borgdorff
Managing Partner, AlpInvest Partners

Ulrich Cartellieri
Former Board Member, Deutsche Bank

Nick Ferguson
Chief Executive, SVG Capital and Chairman, SVG Advisers

Gao Xiqing
Vice-Chairman and President, China Investment Corporation

Philip Jennings
General Secretary, UNI GLOBAL UNION

Joncarlo Mark
Senior Portfolio Manager, CalPERS

Yoshihiko Miyauchi
Director, Representative Executive Officer, Chairman and Chief Executive Officer, Orix Corporation

Alessandro Profumo
Chief Executive Officer, Unicredit Group

Kevin Steinberg
Chief Operating Officer and Head of the Centre for Global Industries (New York), World Economic Forum USA

David Swensen
Chief Investment Officer, Yale University

Mark Wiseman
Senior Vice President, Private Investments, CPP Investment Board

FROM THE WORLD ECONOMIC FORUM

Max von Bismarck
Head of Investors Industry, World Economic Forum

Anuradha Gurung
Senior Project Manager and Global Leadership Fellow, Investors Industry, World Economic Forum USA

Kevin Steinberg
Chief Operating Officer and Head of the Centre for Global Industries (New York), World Economic Forum USA

Contents

Preface

KEVIN STEINBERG
Chief Operating Officer and Head of the Centre for Global Industries (New York), World Economic Forum USA

MAX VON BISMARCK
Head of Investors Industry
World Economic Forum

The World Economic Forum is proud to release this first volume of Working Papers from our Globalization of Alternative Investments project. This report is the culmination of a year-long partnership between leading international scholars, industry practitioners, other distinguished experts and stakeholders, and our organization. We hope that these Working Papers represent a first step to providing a comprehensive and robust fact-base related to the global economic impact of private equity to enable a rich series of further discussions and analyses.

Through recent years, alternative investment asset classes such as private equity have become increasingly important pools of capital in the global financial system. Private equity activity in particular (defined as equity investments by professionally managed partnerships that involve leveraged buyouts or other equity investments with a substantial indebtedness) has accelerated noticeably. The research finds that the total value of firms (both equity and debt) acquired in leveraged buyouts is estimated to be $3.6 trillion from 1970 to 2007, of which $2.7 trillion worth of transactions occurred between 2001 and 2007. The asset class has grown in scale such that by 2005 about 2% of non-government US employees worked for firms that received private-equity investment, and in global scope such that a majority of private equity transactions now take place outside the United States. Simultaneously, many private equity firms have expanded dramatically in size and global reach, and the sector has attracted attention from many other players, such as politicians, regulators and organized labour.

Just over two years ago, in recognition of the increasingly important role and impact of private equity and other alternative asset class investors on the global environment, the World Economic Forum launched its first new industry group in over 10 years, focused on the Investors Industry.t The objective was to take advantage of our organization's multistakeholder platform and link these industry players with the diverse constituents already engaged with the Forum. Over 30 companies from the sector have since joined the World Economic Forum's Investors Industry Partnership, committing to discuss key issues on a global and cross-sectoral basis and engage in dialogue, research and action to address them.

The research on the "Global Economic Impact of Private Equity" represented in this first volume of Working Papers was undertaken as part of the World Economic Forum's Globalization of Alternative Investments project, which is the first mandated by the Investors Industry Partnership. The analyses and case studies herein were designed to help bring a common, rigorous fact-base to a set of complex issues related to private equity and its economic impact in order to contribute to a healthy financial ecosystem. Some are provocative and raise as many questions as they answer. All are meant to encourage a practical and policy-based dialogue on the role of private equity firms and investments. They raise policy issues about innovation, employment and governance, and provide examples and data from both the developed and developing world. Collectively, they provide as detailed and comprehensive an overview of private equity activity as is available today.

The Working Papers are, to our knowledge, an unprecedented endeavour linking active practitioners, leading academics, institutional investors in private equity and other constituents (such as organized labour) and boasts involvement from many parts of the globe. The core research team, led by Josh Lerner, Jacob H Schiff Professor of Investment Banking at Harvard Business School, included:

- Ann-Kristin Achleitner, Head of the KfW Endowed Chair in Entrepreneurial Finance and Scientific Co-Director of the Center for Entrepreneurial and Financial Studies (CEFS), Technische Universität München
- Francesca Cornelli, Professor of Finance, London Business School
- Lily Fang, Assistant Professor of Finance, INSEAD
- Roger Leeds, Research Professor and Director of the Center for International Business and Public Policy, School of Advanced International Studies (SAIS), Johns Hopkins University
- Per Strömberg, Associate Professor of Finance, Stockholm School of Economics and Senior Research Fellow, Swedish Institute of Financial Research

In a matter of only 10 months, this group oversaw the four large-scale analytic studies and six case studies contained herein.

Intellectual stewardship and guidance was provided by an actively involved Advisory Board, chaired by Joseph L. Rice, III, Chairman of Clayton, Rice & Dubilier, with Michael Klein, Chairman and Co-Chief Executive Officer Markets and Banking, Citi Inc., and R. Glenn Hubbard, Dean and Russell L. Carson Professor, Columbia Business School, serving as Vice-Chairmen. An illustrious group of experts completed the Advisory Board, including:

- Piero Barucci, Professor, Autorità Garante della Concorrenza e del Mercato
- Wim Borgdorff, Managing Partner, AlpInvest Partners
- Ulrich Cartellieri, Former Board Member, Deutsche Bank
- Nick Ferguson, Chief Executive, SVG Capital and Chairman, SVG Advisers
- Gao Xiqing, Vice-Chairman and President, China Investment Corporation
- Philip Jennings, General Secretary, UNI GLOBAL UNION
- Joncarlo Mark, Senior Portfolio Manager, CalPERS
- Yoshihiko Miyauchi, Director, Representative Executive Officer, Chairman and Chief Executive Officer, Orix Corporation
- Alessandro Profumo, Chief Executive Officer, Unicredit Group
- Kevin Steinberg, Chief Operating Officer and Head of the Centre for Global Industries (New York), World Economic Forum USA
- David Swensen, Chief Investment Officer, Yale University
- Mark Wiseman, Senior Vice President, Private Investments, CPP Investment Board

While not necessarily endorsing any of the specific conclusions reflected in the analyses or case studies, the Board provided detailed feedback, and helped ensure the integrity of the work by acting as a sounding board for the independent academics. The opinions herewith are solely the views of the authors and do not reflect the opinions of the Advisory Board or the World Economic Forum.

On behalf of the World Economic Forum, the project was ably led by Anuradha Gurung, who served as both project manager and as co-editor of this volume together with Josh Lerner.

The release of this volume of Working Papers on the economic impact of private equity has been timed to coincide with the World Economic Forum's Annual Meeting 2008, where public discourse is planned on related issues. In addition, our Annual Meeting in Davos will officially launch a series of regional meetings over the course of 2008 in various parts of the world, as well as an informal set of discussions with various key stakeholders. We hope this set of analyses and case studies will provide a foundation for these discussions.

This volume is but a beginning. Based on the structured discussions and public debate, we anticipate additional work and analyses will be both productive and necessary. The Advisory Board has expressed its interest in continuing these productive efforts; the academic team has already proposed further research; and the Investors Industry Partners have relayed their enthusiasm for not only using this work as a basis for engagement, but also expanding it to better explore some of the still unanswered questions. On behalf of the World Economic Forum, we therefore thank all involved in creating this first set of Working Papers for their tremendous contributions to this valuable work, and relay our earnest hope you will continue your involvement in our future efforts.

Letter on behalf of the Advisory Board

JOSEPH L. RICE, III
Chairman, Clayton, Dubilier & Rice, Inc.
Chair of the Advisory Board for the World Economic Forum Globalization of Alternative Investments Project

The increasing privatization of economic activity around the world is at the forefront of public attention.

The private equity industry's tremendous growth has understandably sparked both interest and concern from several quarters. While private equity's constructive influence in fostering the renewal of US corporations 20 years ago is well documented, its more recent impact in the US, as well as in Europe and emerging markets, which now surpass the US in private equity activity, has not been as comprehensively analysed.

Recognizing that private equity, along with other alternative investments, has matured significantly since the 1980s, as part of its project on the Globalization of Alternative Investments, the World Economic Forum has taken the lead on a research initiative to examine the impact of private equity ownership on long-term investment, employment, corporate governance and other important measures of economic health. At the same time, the Forum has committed to serve as a catalyst to engage industry participants, policy-makers and other key stakeholders in an ongoing dialogue about the alternative investment asset class.

The Working Papers that are included in this volume represent the initial findings from the private equity research commissioned by the Forum. The various studies were conducted by a renowned group of scholars representing academic institutions in North America, Europe and Asia. An Advisory Board of distinguished international experts representing labour, industry, finance, government and pensioners was assembled by the Forum to help guide the project and provide the academic team with practitioner perspective.

While the members of the Advisory Board do not necessarily endorse the conclusions reflected in the papers, they recognize that the body of analysis produced by the Forum's academic team is among the most comprehensive and relevant ever undertaken on private equity. Literally thousands of buyout transactions going back as far as 1970 have been analysed. The large-sample studies on the effect of private equity ownership and innovation are unprecedented in their scope and the findings suggest fruitful avenues for additional research and analysis.

The Forum and the academic team are to be commended for beginning what will hopefully be a multi-year effort to build a solid factual basis for assessing private equity globally and from which sound conclusions and public policy recommendations can eventually be made.

One of the biggest challenges ahead for the private equity industry will be to act responsibly with the enormous amount of capital entrusted to it in the past several years. In this regard, the insights from the Forum-sponsored research will be instructive to all of us – whether investor, industrialist, employee or policy maker – in better understanding the governing dynamics of the asset class.

On behalf of the Advisory Board, I would like to express our thanks to the academic team for their important contribution and to encourage the Forum to continue its efforts to build more understanding and thereby increase public confidence in private equity investment activity.

Members of the Advisory Board for the World Economic Forum Globalization of Alternative Investments Project

Chairman:
Joseph L. Rice, III, Clayton, Dubilier & Rice, Inc.

Co-Vice Chairs:
R. Glenn Hubbard, Columbia Business School
Michael Klein, Citigroup International plc

Board Members:
Piero Barucci, Autorità Garante della Concorrenza
e del MercatoWim Borgdorff, AlpInvest Partners
Ulrich Cartellieri, Former board member at Deutsche Bank
Nick Ferguson, SVG Capital plc
Gao Xiqing, China Investment Corporation Limited
Philip Jennings, UNI GLOBAL UNION
Joncarlo Mark, CalPERS
Yoshihiko Miyauchi, Orix Corporation
Alessandro Profumo, Unicredit Group
Kevin Steinberg, World Economic Forum USA
David Swensen, Yale University
Mark Wiseman, CPP Investment Board

Executive summary

JOSH LERNER
Harvard Business School

ANURADHA GURUNG
World Economic Forum USA

INTRODUCTION

In the past few decades, the private equity industry has grown both in terms of size and geographic reach. Despite the growing global impact of private equity, there is limited research on these developments that stakeholders can reference. It is, perhaps, not surprising that in markets as diverse as China, Germany, South Korea, the United Kingdom and the United States, important questions have arisen about the impact of private equity on employment, managerial time-horizons, the overall health of companies and the economy more generally.

RESEARCH PROJECT OVERVIEW

While the leveraged buyout transactions of the 1980s were scrutinized in a number of important academic analyses, it is fair to acknowledge that the studies examining buyouts 25 years ago had two important limitations which the current research has attempted to address. First, the bulk of the older research focused on a relatively small number of transactions in the US and, to a lesser extent, in the UK. But the buyout market today is no longer primarily a US and UK phenomenon, as evidenced by this research. Non-US private equity has grown to be larger than US private equity in the last few years, with growth in Continental Europe being particularly pronounced. The second limitation of the older research on private equity relates to the fact that the industry has grown and evolved since the 1980s. Almost all of the published studies have focused on the industry's formative years.

The World Economic Forum's research project on the "Global Eonomic Impact of Private Equity" sought to analyse private equity transactions, meaning equity investments by professionally managed partnerships that involve leveraged buyouts or other equity investments with a substantial amount of associated indebtedness (as opposed, for instance, to venture capital investments in start-ups). The goal was to complete a rigorous study of the impact of these investments around the world, prepared by a tightly organized consortium of leading international scholars.

This volume of Working Papers comprises a series of (I) large-sample studies and (II) case studies.

Several key choices were made at the outset of the project. Given the tight one-year time-frame for the research, the project drew on already existing databases about the private equity industry (such as Capital IQ, Dealogic and VentureXpert), as well as information from complementary databases compiling information on such activities as bankruptcy, employment and patenting. Inevitably, this meant that the large-sample studies in this volume of Working Papers focused primarily on the most developed markets, with particular emphasis on the UK and US. It is our intention that this study serve as an initial effort, and that subsequent efforts will entail greater scrutiny of proprietary documents from market participants, as well as a greater focus on emerging private equity sectors.

The large-sample studies covered the following broad topics:

a) the demography of private equity firms: the number, duration and outcomes of these transactions

b) the willingness of private equity-backed firms to make long-term investments, with a particular emphasis on investment in innovative activities

c) the impact of private equity activity on the employment of existing establishments, as well as the tendency to open new facilities

d) the consequences of private equity investment for the governance of private firms

The research team also complemented these studies with a variety of case studies, which examined these issues and others. Reflecting a desire to gain a more global perspective, these studies focused on companies across a variety of geographies, with a particular emphasis on Germany, the UK and emerging private equity markets such as China and India.

I. KEY FINDINGS: LARGE-SAMPLE STUDIES

A. Key findings: Demography study

The first study examines the nature of the 21,397 private equity transactions that could be identified between 1970 and 2007, as well as the outcome of these transactions.

The study had three broad goals. The first is to provide descriptive evidence on the growth and changing nature of the private equity market, going beyond the previous analysis of US going-private transactions. In the process, the research team builds the most comprehensive (to their knowledge) database to date on worldwide leveraged buyout (LBO) transactions,

which can be used for further research of this phenomenon. Secondly, the study analyses the extent to which leveraged buyout transactions are successfully exited, and whether exit success has varied across time periods, regions and deal characteristics. Thirdly, and most importantly, the study focuses on the longevity, or "staying power", of leveraged buyouts.

Among the key findings are the following:

- Private equity investment activity has accelerated. More than 40% of the buyouts in the sample have taken place since 1 January 2004. The total value of firms (both equity and debt) acquired in leveraged buyouts is estimated to be $3.6 trillion over the sample period, of which $2.7 trillion worth of transactions occurred between 2001 and 2007.

- Public-to-private transactions, which have been the focus of earlier buyout research and media attention, only account for 6.7% of all transactions. Measured in terms of dollar value, public-to-private transactions represent 28% of the firms acquired. The vast majority of buyouts are acquisitions of private firms and corporate divisions.

- Non-US private equity activity has grown to be larger than that of the US in the last few years. The growth of Continental European buyouts has been particularly pronounced. Still, LBO transactions outside North America and Western Europe are relatively few and only account for approximately 12% of global LBO transactions in number and 9% in value over the period from 2001 to 2007.

- The caricature of buyouts occurring in old and declining industries does not reflect the rise of buyout activity in high-growth, "high-tech" sectors in the last decade. In fact, buyouts have always taken place in a wide range of industries, although mature industries such as chemicals, machinery and retailing still provide popular buyout targets.

- IPOs account for 13% of private equity investment exits, and this exit route seems to have decreased in relative importance over time. The most common exit route is trade sales to another corporation, accounting for 39% of all exits. The second most common exit route is secondary buyouts (24%), which have increased in importance over the last decade consistent with anecdotal evidence.

- 6% of buyout transactions end in bankruptcy or financial restructuring. While this number implies a lower success rate compared to bankruptcy rates among US publicly traded firms, it also suggests that buyouts have a lower average default rate than US corporate bond issuers, and substantially lower than the default rates among average junk bond issuers.

- Private equity investors have a long-term ownership bias. 58% of the private equity funds' investments are exited more than five years after the initial transaction. So-called "quick flips" (i.e. exits within two years of investment by private equity fund) account for 12% of deals and have decreased in the last few years.

- The number of businesses operating under private equity ownership has grown rapidly. The number of firms entering LBO status has been substantially higher than the number of firms leaving LBO status over time every year since 1970. As a result, at the beginning of 2007, close to 14,000 firms worldwide were held in LBO ownership, compared to fewer than 5,000 in 2000 and fewer than 2,000 in the mid-1990s. The LBO organizational form seems more long term than temporary: almost 40% of all LBOs remain in this organizational form 10 years after the original leveraged buyout was announced. In addition, the length of time firms remain private has increased in recent years.

B. Key findings: Long-run investment study

This study was motivated by the lively debate about the impact of private equity investors on the time horizons of the companies in their portfolios. The private status, according to some, enables managers to proceed with challenging restructurings without the pressure of catering to the market's demands for steadily growing quarterly profits, which can lead to firms focusing on short-run investments. Others have questioned whether private equity-backed firms take a longer-run perspective than their public peers, pointing to practices such as special dividends to equity investors. They suggest private equity investors are likely to encourage steps that boost short-run performance at the expense of sustained corporate growth.

In this study, one form of long-run investment was examined: investments in innovation. Innovation offers an attractive testing ground for the issues delineated above due to various factors. These factors include the long-run nature of R&D expenditures, their importance to the ultimate health of firms and the extensive body of work in the economics literature that has documented that the characteristics of patents can be used to assess the nature of firms' technological innovation. Moreover, patents can be used to study both public and private firms, which is important when studying private equity transactions.

The authors examine the impact of private equity investment on the patenting behaviour of 495 firms worldwide with at least one successful US patent application filed from three years before to five years after a later-stage private equity investment.

Key findings include:

- Firms that undergo a buyout pursue more economically important innovations, as measured by patent citations, in the years after private equity investments. In a baseline analysis, the increase in the key proxy for economic importance is 25%.

- Private equity-backed companies maintain comparable levels of cutting-edge research. Post-buyout, these businesses display no deterioration in the extent to which their research is basic or fundamental, as measured by patent originality and generality.

- The quantity of patenting does not appear to systematically change after private equity transactions.

- Innovation becomes more targeted post-buyout. The patent portfolios of firms become more focused in the years after private equity investments.

- Private equity-backed firms concentrate on core technologies. The increase in patent importance, as denoted by patent citations, is greatest in the patent classes where the firm has had its historic focus and where it increases its activities after the private equity investment.

C. Key findings: Employment study

The impact of private equity on employment arouses considerable controversy. Critics have claimed huge job losses, while private equity associations and other groups have released several recent studies that claim positive effects of private equity on employment. While efforts to bring data to the issue are highly welcome, many of the prior studies have significant limitations, such as the reliance on surveys with incomplete responses, an inability to control for employment changes in comparable firms, the failure to distinguish cleanly between employment changes at firms backed by venture capital and firms backed by other forms of private equity, difficulties in disentangling organic job growth from acquisitions, divestitures and reorganizations at firms acquired by private equity groups, and an inability to determine where jobs are being created and destroyed.

In this study, the research team constructed and analysed a dataset in order to overcome these limitations and, at the same time, encompass a much larger set of employers and private equity transactions. This study examines US private equity transactions from 1980 to 2005. The study utilizes the Longitudinal Business Database (LBD) at the US Bureau of the Census to follow employment at virtually all private equity-backed companies in the US, before and after private equity transactions. Using the LBD, it was possible to analyse employment at both the firm level and establishment level. Establishments in this context means the specific factories, offices, retail outlets and other distinct physical locations where business takes place. The LBD covers the entire non-farm private sector and includes annual data on employment and payroll for about 5 million firms and 6 million establishments, including 5,000 US firms (target firms) and 300,000 establishments (target establishments) that were the subject of a buyout. Employment at target establishments was tracked for five years before and after the private equity transaction, irrespective of whether these establishments are owned and operated by the target firm throughout the entire time period around the private equity transaction. Each target firm and each target establishment is matched against other firms and other establishments that are comparable in terms of industry, age and size. These comparable firms and establishments served as the control group.

Among the key results were:

- Employment grows more slowly at target establishments than at the control group in the year of the private equity transaction and in the two preceding years. The average cumulative employment difference in the two years before the transaction is about 4% in favour of controls.

- Employment declines more rapidly in target establishments than in control establishments in the wake of private equity transactions. The average cumulative two-year employment difference is 7% in favour of controls. Just as was the case before the private equity transaction, growth at controls is higher in the three years after the private equity transaction. In the fourth and fifth years after the transaction, employment at private equity-backed firms mirrors that of the control group.

- Post-transaction, buyout establishments seem to create roughly as many jobs as peer group establishments. Gross job creation (i.e. new employment positions) in the wake of private equity transactions is similar in target establishments and controls. The difference in net employment is attributable to higher gross job destruction rates in targets.

- Firms backed by private equity have 6% more greenfield job creation than the peer group. Greenfield job creation in the first two years post-transaction is 15% of employment for target firms and 9% for control firms. It appears that the job losses at target establishments in the wake of private equity transactions are partly offset by substantially larger job gains in the form of greenfield job creation by target firms.

D. Key findings: Governance study

The final study examines the boards of companies which have been taken from public to private ownership to learn more about the governance model of private equity investors. There has been almost no scrutiny of these boards or comprehensive analysis of how they differ systematically from those of public companies.

This study constructs a new dataset, which follows the board composition of all public-to-private transactions in the UK from 1998 to 2003. Out of 142 such transactions, 88 were sponsored by at least one private equity fund. The research team looked at the change in the composition of the board when the company became private and any subsequent change throughout the period in which the private equity fund was still involved. The public-to-private transactions were compared to private equity transactions where there was no private equity sponsor: i.e. pure management buyouts (MBOs), or buyouts backed by non-financial sponsors.

The key findings are as follows:

- When a company goes private a fundamental shift in the board composition takes place. The board size and the presence of outside directors are drastically reduced. The authors do not find a significant difference in the change in the board size of MBOs and LBOs, but the composition is very different. In the case of private equity deals, outside directors are replaced by individuals employed by the private equity sponsors. In the case of pure management buyouts, the outside directors disappear and only management is left.

- Private equity board members are most active in complex and challenging transactions. Private equity groups appear to adjust their board representation based on the anticipated challenges in the investments (for instance, companies that showed a particular need for monitoring even when they were public).

- The presence of LBO sponsors on the board may also depend on the "style" of the private equity firm: certain firms rely less on their own partners or employees and more on outsiders. If more than one PE firm is sponsoring the investment, then the proportion of LBO sponsors on the board is larger, presumably because each sponsor wants to have a representative on board.

- Private equity investors remain actively engaged with their portfolio businesses in the years after the transaction. The percentage of LBO sponsors sitting on the board only slightly decreases over time post-transaction.

II. KEY OBSERVATIONS: CASE STUDIES

The large-sample studies were complemented by in-depth analyses of a total of six private equity transactions in Western Europe (namely, Germany and the UK) and the emerging economies in Asia (namely, China and India). These case studies are intended to highlight particular transactions as illustrative examples, rather than be representative of all private equity-backed transactions in these regions and sectors.

A. European cases

In Europe, the authors focus on one transaction in Germany (Messer Griesheim) and one in the UK (New Look). When the Messer Griesheim deal closed in 2001, it was the largest private equity deal in Germany and the largest industrial buyout in Europe at the time. The company was owned by pharmaceutical giant Hoechst and the founding family. Goldman Sachs and Allianz Capital Partners bought out Hoechst, with the family remaining as a shareholder. As a divisional buyout of a large industrial company, the case study represents a typical case of firm restructuring in Germany at that time. The case offered three interesting areas for analysis: First, employment was a key topic, since the major restructuring efforts and divestitures undertaken post-buyout implied reductions in employment. In addition to analysing sheer employment numbers, additional indicators regarding employment were identified and analysed, allowing for a rich discussion on this complex topic. Secondly, Messer Griesheim offered an interesting setting to discuss the impact of private equity on corporate governance through the interplay between family owners, industrial companies and private equity investors. Thirdly, the opportunity for a family to regain control over parts of its original company via private equity was investigated within the case study.

In April 2004, New Look was taken private through a buyout supported by Apax Partners and Permira; it represented one of the largest UK buyouts in that year. First, a key area of analysis was the impact on corporate governance through the public-to-private transaction. The case offered a rich base for a discussion of the impact of private equity on strategic decision-making and corporate governance. A comparison was undertaken of New Look's corporate governance while the company was still publicly listed to the period when it was privately held. Secondly, as with the Messer Griesheim case, employment development post-buyout was an important topic of study. Thirdly, the refinancing undertaken after the buyout was analysed, as significant payouts to the equity holders, as well as a recapitalization, took place within three years post-buyout.

B. Chinese cases

The two China cases, China Glass Holdings and Little Sheep, profile two different types of private equity investment in China: the former is a buyout transaction, but with uniquely Chinese characteristics that reflect the country's legal and economic realities; the latter is a classic growth capital private equity investment. Leverage was not a factor in either transaction. Yet both cases present strikingly similar stories of some key factors that are critical for private equity success, especially in emerging market environments where the industry is far newer and less well established than in North America or Europe. Rather than focusing on the financial analytics of private equity transactions, these cases concentrate primarily on the post-investment role played by the two private equity funds as they worked closely with senior management of their portfolio companies to build value, enhance competitiveness and strengthen their capacity to gain access to international capital markets.

The case of China Glass Holdings describes the privatization and subsequent restructuring of a state-owned glass manufacturing enterprise that was purchased in its entirety by Hony Capital, a Chinese private equity fund which ultimately successfully completed an IPO on the Hong Kong Stock Exchange. In sharp contrast, Little Sheep tells the story of an entrepreneur whose hobby turned into one of the largest and best-known restaurant chains in China. Unlike the new and wholly Chinese Hony Capital, 3i Group plc, the private equity investor in Little Sheep, is a well-established global private equity firm founded 60 years ago in Britain. 3i enabled Little Sheep to tap into industry and management expertise that enhanced its ability to professionalize its business practices.

C. Indian cases

The two India cases, Subhiksha and Bharti Tele-Venture, provide insights into why India has attracted more private equity investment recently than any other emerging market country. Total investments increased almost 700% between 2004 and 2006, from $1.1 billion to $7.5 billion, and 2007 is expected to be another record-breaking year. This meteoric growth has been fostered by a combination of country-specific factors including India's sustained rapid economic growth, burgeoning domestic consumer markets, established public equity market and human capital and competitiveness in high-growth sectors.

Within the context of these favourable factors, the cases focus on private equity transactions in two high-growth, but unsettled sectors of the Indian economy: retail (the Subhiksha case), and mobile telecom (the Bharti Tele-Ventures case). Both these transactions involved minority rather than control investments by the private equity firms involved, i.e. ICICI Venture in the Subhiksha and Warburg Pincus in the Bharti Tele-Ventures transaction. ICICI Venture is one of India's largest and most successful domestic private equity groups, while Warburg Pincus is a global private equity firm founded in New York in 1966. In both transactions, leverage was not a factor. On the contrary, the cases illustrate that for economies like India that are in the midst of major structural changes, there are ample opportunities for more traditional "growth capital" investments in companies that are expanding rapidly, especially in sectors such as retail and telecommunications that are undergoing consolidation.

Putting it all together

While each study has its own distinct focus, and – as acknowledged above – there is a need for further study into various topics and across different geographies, the project has important implications for how to think about the role that private equity plays in the economy. To the authors, four broader (albeit tentative) observations emerge from the works:

- The substantial periods that firms remain under private equity control, the robust long-run investments in innovation as measured by patents and the flexible governance structures (with small boards dominated by managers and investors) appear consistent with the view that the LBO organizational form is a long-run governance structure for many firms.

- The employment study has mixed results. It suggests that employment falls more rapidly at target establishments post-transaction. At the same time, private equity targets engage in more greenfield job creation than controls. Private equity also accelerates the pace of acquisitions and divestitures. These results regarding private equity's impact on employment – as well as those in the innovation study – fit the view that private equity groups act as catalysts for change in the economy.

- The discussion of many aspects of private equity's impact on the economy has been characterized by confusion along many dimensions. As the employment study highlights, the evidence supports neither the apocalyptic claims of extensive job destruction nor arguments that private equity funds create huge amounts of domestic employment.

- Although LBO transactions outside North America and Western Europe only accounted for approximately 12% of global LBO transactions in number and 9% in value over the period from 2001 to 2007, private equity activity in emerging economies is expanding and maturing, particularly for minority and growth capital investments. As illustrated by the cases, there are different sets of dynamics in place for domestic and global private equity players in China and India.

While these studies represent a first step, one of the most important challenges to address is the ongoing need for rigorous and unbiased evaluations of the broader consequences of private equity investments and the potential of this form of ownership to facilitate corporate restructuring globally in a responsible manner. There is clearly a need for further research that is outside the US and Western Europe and that addresses additional questions such as the implications of private equity on productivity and wages. We hope to approach these issues in the next volume of Working Papers.

Part 1
Large-sample studies

The new demography of private equity*

PER STRÖMBERG

Swedish Institute for Financial Research,
Stockholm School of Economics, CEPR and NBER

ABSTRACT

This paper analyses global leveraged buyout (LBO) activity, exit behaviour and holding periods using a data set of more than 21,000 LBO transactions from 1970 to 2007. We estimate the total value of the firms acquired in these transactions to be $3.6 trillion, out of which $2.7 trillion represent LBOs undertaken after 2000. We document a large increase in the geographical and industry scope of LBO transactions over time. Most LBO activity consists of acquisitions of private rather than public firms and LBOs provide a net positive flow of firms to public markets over the long run. We find that LBO holding periods are longer than what has been documented in previous research. Only 8% of firms stay in LBO ownership for less than two years and the median firm stays in LBO ownership for about nine years. Companies that undergo LBO transactions sponsored by more experienced private equity partnerships tend to stay in LBO ownership for a shorter period of time, are more likely to go public and are less likely to end in bankruptcy or financial restructuring.

In his seminal paper "The eclipse of the public corporation", Jensen (1989) predicted that the LBO would eventually become the dominant corporate organization form. With its emphasis on corporate governance, concentrated ownership by active owners, strong managerial incentives and efficient capital structure the LBO form was superior to the public corporation, which had dispersed shareholders and weak governance. A few years later, this prediction seemed premature. First, Kaplan (1991) studied the staying power of 1980s public-to-private LBOs and concluded that the median LBO target remained in private ownership for 6.82 years. In addition, the activity of the LBO market slowed down significantly in the early 1990s. One reason for this, brought forward by Kaplan (1997), was that public corporations seemed to embrace and adopt many of the governance features of the 1980s buyouts, such as higher incentive pay and leaner capital structures, at the same time as institutional owners became more active in governance.

Still, the private equity market has developed significantly since the 1980s period studied by Kaplan (1991) and it is time to revisit this issue. First, the buyout market has grown tremendously in the last 10 years, both in terms of value and number of transactions and has broadened its industry scope significantly. Secondly, an increasing number of buyout transactions seem to be exited through sales to other buyout firms, so-called secondary buyouts. Thirdly, some have argued that the benefits of private ownership have increased significantly in the wake of the sometimes onerous corporate governance regulation imposed in 2001–2002. Finally, private equity has become a global phenomenon, first spreading to Europe and then to other parts of the world such as Asia and Australia. So, maybe Jensen (1989) was not that far off after all.

In this paper we build a dataset of international LBO transactions to study the demography of the private equity market. We have three broad goals. First, we want to provide descriptive evidence on the growth and changing nature of the private equity market, going beyond the previous analysis of US going-private transactions. We document the growth in private equity activity over the period from 1970 to 2007, the variation in deal pricing across time, geography, industries and deal types and the ultimate outcome of these transactions. In the process, we build the most comprehensive (to our knowledge) database to date on worldwide leveraged buyout transactions, which can be used for further research of this phenomenon.[1] Secondly, we analyse the extent to which LBO transactions are successfully exited and whether exit success has varied across time periods, regions and deal characteristics. Thirdly and most importantly, we focus on the longevity, or "staying power", of leveraged buyouts, building on the work of Kaplan (1991). Kaplan's analysis focused on 183 large US-leveraged buyout deals completed between 1979 and 1986. Although this work was original and important, the conclusions from his analysis are limited by the relatively small sample size and the short history of the private equity market at the time of his study. Using our dataset we are able to analyse more than 21,000 transactions undertaken worldwide between January 1970 and June 2007. One shortcoming relative to Kaplan (1991) is that the Capital IQ

* I am grateful to Ulf Axelson, Francesca Cornelli, Steven Kaplan, Josh Lerner and the World Economic Forum's "Globalization of Alternative Investments" Research Team and Advisory Board for valuable comments. Chris Allen, Joakim Bång, Reimo Juks, Geraldine Kim, Jakob Nylin and Sarah Woolverton provided excellent research assistance.

[1] E.g. Lerner, Strömberg and Sørensen (2007), Davis et al (2008) and Axelson et al (2007) make use of this data.

data, on which we base our sample selection, do not enable us to study the capital structures of these transactions.[2]

In order to assess the role of private equity in the economy it is important to understand how long firms stay in LBO ownership. The academic discussion on the longevity of leveraged buyouts can be summarized in two disparate views. One extreme is provided in Jensen (1989), which argues that the LBO organizational firm is a long-term superior governance structure that imposes strong investor monitoring and managerial discipline through a combination of ownership concentration and substantial leverage. Thanks to these benefits, Jensen predicted that leveraged buyouts would eventually become a dominant organizational form, implying that LBO ownership is a long-term optimal structure. The other extreme, represented by Rappaport (1990), views LBOs as a short-term "shock therapy" that allows inefficient, badly performing firms with inferior corporate governance to enter a quick but intense period of corporate and governance restructuring, in order to return to public ownership in a few years. Kaplan (1991) found a median time in private ownership of 6.8 years and concluded that leveraged buyouts are "neither short-lived nor permanent". After these original academic contributions, a common view of leveraged buyouts has been that it is a temporary governance structure, particularly aimed at improving governance in public companies with dispersed ownership structures that have an excess of free cash flow relative to investment opportunities. After management pay-performance incentives are imposed, previous inefficient investments are divested and free cash flow is being paid out to investors, the firm is then ready to return to the public market.[3]

Although this view may have been representative of the LBO boom in the 1980s, it is not clear how well it describes today's private equity market. The number of private equity transactions is an order of magnitude larger in 2007 than it was in the 1980s. The motivation behind leveraged buyouts is no longer primarily about solving governance problems in US publicly traded conglomerates. Rather, LBO transactions occur worldwide in a variety of industries and target both private and public companies. In addition, there seems to be an increase in so-called "secondary buyouts", where one LBO sponsor exits its investment by selling the firm to a new LBO fund sponsor, which could imply that the organizational form is becoming more permanent.

To address these issues we construct a new large-sample database of leveraged buyout transactions, based on the Capital IQ database, which contains 21,397 leveraged buyout transactions across the world over the period 1 January 1970 to 30 June 2007, involving 19,500 distinct firms. We then utilize various other data sources and web searches to track down the ultimate outcomes of these transactions.

We start by documenting the dramatic growth of this industry in the last decade. Out of the 21,397 leveraged buyout transactions that took place from 1970 to 2007, more than 40% took place after 1 January 2004. We estimate the total value of firms (both equity and debt) acquired in leveraged buyouts to be $3.6 trillion over our sample period, of which $2.7 trillion worth of transactions occurred between 2001 and 2007. We also show that public-to-private transactions, which have been the focus of most earlier LBO research, only account for 6.7% of all transactions, representing 28% of the combined values of firms acquired. Most leveraged buyouts are acquisitions of private firms or divisions of other companies. We also show that public-to-private buyouts exhibit higher cyclicality than other types of transactions and that they represent a smaller fraction of activity now compared with during the 1980s. On the other hand, divisional buyouts and secondary buyouts have increased in importance over time.

We also confirm that the LBO market is no longer primarily a US phenomenon. The non-US private equity activity has grown to be larger than that of the US in the last few years, where the growth of Continental European LBOs has been particularly pronounced. Still, LBO transactions outside North America and Western Europe are relatively few and only account for approximately 12% of global LBO transactions in number and 9% in value over the period from 2001 to 2007.

The caricature of LBOs occurring in old and declining industries is no longer true and never really has been. In fact, LBOs have always taken place in a wide range of industries. Although mature industries such as chemicals, machinery and retailing still provide popular buyout targets, the fraction of LBOs undertaken in high-growth, "high-tech" sectors such as computers and biotech, has been growing significantly in the last decade.

We then go on to analyse the holding periods and exits for individual LBO transactions. As is well known, most LBOs are sponsored by private equity funds, which have a limited life and therefore a limited investment horizon, after which they have to exit their investments. The ability to achieve a successful exit before the end of the fund life is considered to be crucial for the financial performance to a private equity investor. The most common exit route, for private equity and management buyout deals alike, is trade-sales to another corporation, accounting for 39% of all exits. The second most common exit route is secondary buyouts (24%), which have increased in importance over the last decade consistent with anecdotal evidence. In contrast, IPOs only account for 13% of exits and this exit route seems to have decreased in relative importance over time.

Around 6% of all leveraged buyout transactions end in bankruptcy or financial restructuring. While this number implies a higher failure rate compared with bankruptcy rates

[2] Axelson et al (2007) provide a recent empirical analysis on the evolution and determinants of capital structure in LBO transactions.
[3] Baker and Wruck (1989) is one of the few more nuanced views of LBO transactions, going beyond the simple going-private, "free cash flow" stories.

among US publicly traded firms, it also implies a slightly lower rate than the average default rates among US corporate bond issuers and substantially lower than the default rates among average junk bond issuers. Hence, given the high leverage in these transactions, bankruptcy rates of LBOs seem relatively modest.

We find that LBOs sponsored by private equity investors exit earlier than deals without financial sponsors, as would have been expected. Still, only 42% of the private equity funds' investments are exited within five years of the initial transaction. LBOs sponsored by more experienced private equity funds exit earlier and funds that are publicly traded (and hence lack a finite horizon on their fund) take a longer time to exit their investments. So-called "quick flips" (i.e. exits within two years of investment by private equity funds) have been widely criticized in recent years. These cases turn out to be quite rare and only 2.9% of investments with financial sponsors are exited within 12 months and only 12% of deals are exited within 24 months of the LBO acquisition date. The incidence of quick flips has also decreased in the last few years. Early exits are more likely for larger transactions, but controlling for size they are less likely for going-private transactions.

Although LBOs sponsored by private equity funds are more likely to experience a successful exit, they are also somewhat more likely to have their investments end up in financial distress, controlling for other factors. Deals sponsored by public funds (that lack a finite investment horizon) are more likely to go bankrupt compared with other investments sponsored by private partnerships. Together with the earlier finding that public funds are less likely to experience a successful exit, this suggests that publicly traded funds are less financially successful compared with other private equity funds.

Finally, we turn to the longevity issue and study the total time in which a particular firm remains in the LBO organizational form. This period will not coincide with the holding period of an individual LBO transaction to the extent that the investment is exited by selling the firm to a new private equity fund, either directly or indirectly through a trade-sale to another LBO-backed company. Of all firms entering LBO status over the 1980–2007 period, 69% are still in the LBO organizational form. The number of firms entering LBO status has been substantially higher than the number of firms leaving LBO status over time every year since 1970. As a result, at the beginning of 2007, close to 14,000 firms worldwide were held in LBO ownership, compared with fewer than 5,000 in 2000 and fewer than 2,000 in the mid-1990s. Compared with the early Kaplan (1991) study, the LBO organizational form seems more long term than temporary and almost 40% of all LBO's remain in this organizational form 10 years after the original leveraged buyout was announced. In addition, holding periods have increased over time. The median firm undergoing the original LBO in the 1980s exited LBO status after six to seven years, while the median LBO firm in the 1995–1999 period was exited in about nine years. Smaller LBOs tend to last longer than larger ones, but controlling for size, going-private transactions remain longer in LBO ownership compared with buyouts of private companies and corporate divisions.

We do not find much evidence that the growth of private equity has been at the expense of public stock markets, however. Among firms entering LBO status over the 1970–2002 period, the fraction of firms exiting LBO status by going public was 11%, which is substantially higher than the fraction of LBOs that originated from going-private transactions, which was approximately 6%. In other words, the flow from private to public equity markets is net positive over the long run. LBOs in economies with less developed financial markets are particularly likely to eventually go public, which suggests that private equity can play a role in promoting stock markets in these countries.

We also find that the likelihood of eventually going public is not substantially higher if the firm had been public before the initial LBO. In other words, most of the LBO firms going public originate from acquisitions of private companies and most of the going-private transactions do not return to public markets. This finding seems inconsistent with the Rappaport (1990) "shock therapy" view of going-private transactions, which views LBOs as a temporary "quick fix" after which the firms return to public ownership again after a few years. Rather, the evidence is more supportive of going-private transactions taking place among firms that are less suitable for the public market over the long run. Overall, our evidence points towards public and private equity markets being complements rather than substitutes.

We believe our study has important implications for how to think about the economic role that private equity plays in the economy. Claims that LBO ownership leads to short-termism and financial failure do not find support in the data, given the substantial holding periods and relatively modest bankruptcy rates. Rather, evidence is more consistent with the view that the LBO organizational form is a long-run optimal governance structure for many firms in a variety of different industries and countries, consistent with the prediction of Jensen (1989).

1. DATA

A. Sample construction

We use the Capital IQ database to construct a base sample of leveraged buyout transactions. We first select all the M&A transactions classified as "leveraged buyout", "management buyout" and "JV/LBO" in Capital IQ that were announced between 1 January 1970 and 30 June 2007. To this sample we add all M&A transactions undertaken by a financial sponsor classified as investing in "buyouts". This results in a sample of about 23,500 transactions. For the purposes of this study, we then exclude acquisitions that were announced but not yet completed, acquisitions of non-control stakes, acquisitions of stakes in public companies that remain publicly traded (PIPES) and other misclassified

transactions. This leaves us with a total sample of 21,397 leveraged buyout transactions over the period 1 January 1970 to 30 June 2007, involving 19,500 distinct firms.

In order to track the ultimate fate of these transactions, we first match this sample with the Capital IQ acquisition database to obtain any subsequent M&A transactions that our LBO firms have been involved in. This gives us information which is used to infer trade-sale exits, divestments and add-on acquisitions. We then match our sample firms with the SDC, Capital IQ and the Cao and Lerner (2006) IPO databases to track down prior and subsequent initial public offerings. Finally, we conduct extensive web searches on a firm-by-firm basis to infer the ultimate outcomes of these transactions.

B. Sample selection issues

Although we believe we have constructed the most comprehensive database of LBO transactions to date, we will still only have a partial coverage of these transactions for a couple of reasons.

First, our sampling methodology does not pick up all the LBO transactions in the Capital IQ database, due to the nature of the Capital IQ classification methodology. For example, one of the more notable LBOs of the 1980s, Campeau's acquisition of Federated Department Stores (see Kaplan 1989c) is in the Capital IQ database but not classified as a leveraged buyout transaction. Also, a substantial number of the transactions by buyout funds are classified as "private placements" rather than acquisitions. In most cases, these are not proper LBO transactions, but rather acquisitions of minority stakes or follow-on investments and for this reason we do not want to include transactions classified as private placements in our sample. Still, there are cases where the distinction is not clear and some of the private placements should probably have been included in the database. To correct these classification errors we would have to check each transaction on a case-by-case basis, which would not be practical given that there are more than 200,000 M&A and private placement transactions in Capital IQ.

Secondly, even when the Capital IQ classification is correct, there are quite a few judgement calls that have to be made. The distinction between a PIPE and minority transaction and a proper leveraged buyout is not always clear. Similarly, some LBO deals are more akin to venture capital investments. We try to err on the side of not including any non-LBO transactions, but this means that some real leveraged buyouts will be excluded as a result. Moreover, we do not include add-on acquisitions by LBO firms as separate LBO transactions, although again the distinction is not necessarily all that clear.

Thirdly, Capital IQ started their data service in 1999 and their coverage has increased over time. Although Capital IQ has been back-filling its data using various sources, their coverage is likely to be incomplete for the earlier part of the sample. To gauge the extent of this attrition, we compare our sample with that used in academic studies on US transactions in the 1980s. In particular, we compare our sample with Lehn and Poulsen's (1989) sample of going-private transactions from 1980 to 1987, Kaplan's (1991) sample of LBOs above $100 million in transaction value from 1979 to 1986, Long and Ravenscraft's (1993) sample of LBOs of independent firms from 1981to 1987 (i.e. excluding divisional buyouts) and Cotter and Peck's (2001) comprehensive sample of buyouts between 1984 and 1989. We summarize the results from this analysis in Table 1.

Overall, the attrition rate seems significant. The worst comparative coverage seems to be with respect to Lehn and Poulsen (1989), where the number of public-to-private transactions in our data is only 16% of the number identified in their paper. In comparison, looking at Long and Ravenscraft's (1993) sample of LBOs of independent companies during the same period, the coverage is substantially higher, i.e. 41%. This seems to indicate that some of the public-to-private transactions of Lehn and Poulsen, most likely the smaller ones, have been (mis)classified as private-to-private transactions in Capital IQ. Moreover, coverage improves significantly towards the end of the 1980s. For the 1984–1989 period, our sample size includes as much as 70% of the number of observations in Cotter and Peck (2001), compared with 41% for the 1981–1987 sample of Long and Ravenscraft (1993). Finally, the largest source of attrition in Capital IQ is among "pure management buyouts", i.e. LBO transactions that are not sponsored by a buyout fund or another financial institution. Looking only at large LBOs with a financial sponsor during the 1979–1986 period, we pick up 62 transactions, compared with Kaplan's (1991) sample of 74 transactions, i.e. a coverage of 84%.

In our efforts to evaluate attrition rates outside the US, we are limited by the scarcity of international studies on leveraged buyouts. Wright et al (2006) report statistics on UK and Western European buyout transactions collected by the Centre for Management Buyout Research at Nottingham University Business School, which allows some suggestive comparisons, also reported in Table 1. According to this paper, there were 167 buyouts in the UK and Continental Europe in 1986, while our Capital IQ sample only includes 28, i.e. 17% of the sample size. Even for the later sample period, Capital IQ only seems to cover 30–40% of UK buyouts, while the Capital IQ coverage of Western European deals is more than four times larger for the period 2001–2005. Since Wright et al do not explicitly state their inclusion criteria, it is hard to identify the sources of these discrepancies. Still, it seems plausible that our sample may under-report smaller UK buyout transactions, but that international coverage is improving over time.

To summarize, in interpreting the results of the analysis below we have to be aware of a few sample selection biases. Given that coverage is improving over time, we are understating the number of transactions that occurred in the 1970s and 1980s, while the coverage from the mid-1990s onwards

should be fairly complete. While the coverage of larger deals with financial sponsors is likely to be higher than 80% in the early parts of the sample, we are missing a substantial number of smaller transactions and transactions without financial sponsors before the mid-1990s. We are likely to cover at least 70% of all US deals after 1984, at least to the extent they could be identified with the databases available at the time. Finally, there are reasons to believe that the coverage of LBO deals outside the United States suffers from even larger attrition rates. Hence, part of the dramatic increase in buyout activity that we document in the last decade may be overstated due to sample selection bias.

2. THE EVOLUTION OF THE BUYOUT MARKET

We start by documenting the evolution of this market over time across deal types, geographies and industries, using our sample of 21,397 leverage buyout transactions. One of the challenges facing this analysis is that information on the value and pricing of deals is missing for a large fraction of deals. A natural measure of the size of a transaction is the Enterprise Value, defined as the price paid for the equity of the acquired company, plus the net debt (debt minus cash) that the company owed at the time of the transaction (i.e. pre-transaction debt). As seen in Table 3, data on enterprise values is missing for 58% of the transactions and pricing information for even fewer of the deals. While Capital IQ contains enterprise values for most public-to-private deals (87% of cases), it is only occasionally available for buyouts of independent private companies (31% of cases). There are also differences in the extent to which enterprise value information is available across time and geographies. To be able to make inferences concerning the value-weighted population, we therefore estimate imputed enterprise values for the observations with missing pricing information. This procedure, which uses a Heckman (1979) regression to estimate enterprise values, is outlined in Appendix 1. We use the imputed estimates whenever the original enterprise value is not available.

Our dataset contains a total of 21,397 leveraged buyout transactions over the period from 1 January 1970 to 30 June 2007. In terms of the enterprise values of firms acquired in LBO transactions, we estimate the total value (in 2007 US dollars) to be $3.9 trillion over this period. Although this estimate relies on estimated enterprise values, this does not seem unreasonable given the magnitude of private equity fundraising over this period. Taking the data from *Private Equity Analyst* magazine and deflating into 2007 US dollars, we estimate the cumulative commitments to US non-venture private equity partnerships between 1980 and 2006 to be close to $1.4 trillion. Although this is less than $3.9 trillion, we should keep in mind that (1) the transactions are leveraged, which is likely to make the enterprise values roughly three times as large as the equity commitment,[4] (2) many buyouts are undertaken without being sponsored by private equity partnerships and (3) US transactions only comprise 45% of the sample (although some of the funds raised by US partnerships are invested in firms outside the United States).

Figures 1A and 1B document the dramatic growth of this industry in the last decade. Out of 21,397 leveraged buyout transactions 1970–2007, more than 40% have taken place since 1 January 2004. Most of these deals, 80%, are "traditional private equity" (PE) deals, where a financial sponsor or LBO fund backs the deal and provides most of the equity capital. About 20% of the transactions are "pure management buyouts", (MBO) where individual investors (typically the management team) acquire the firm in a leveraged transaction. Since the PE deals are larger, MBOs account for a smaller fraction in terms of the value, roughly 8% using imputed enterprise values. Interestingly, while we observe the cyclical patterns of LBO transactions that have been documented in earlier research, where transaction activity is positively correlated with activity in the leveraged loan market, MBO activity does seem not to exhibit this cyclicality.[5] For example, during the downturn in the credit market in 2000–2001, the number of PE transactions dropped by 25%, while the number MBO transactions increased by 250% and accounted for 38% of all buyout activity in 2002 in terms of the number of transactions. Finally, since Capital IQ is likely to be under-reporting deals without a financial sponsor, we are likely to be underestimating the fraction of MBOs, particularly in the pre-1995 period.

Figures 2, 3A and 3B show that going-private transactions, which have been the focus in most previous research, only account for a minor fraction of the number of LBOs undertaken. The corresponding numbers are shown in Table 2. Across the whole sample period, public-to-private deals account for 7% of the transactions, while the bulk of transactions are acquisition of private firms (47%). Since public-to-private transactions are larger than other LBOs, they are more significant in value terms, where we estimate that they account for 28% of the combined enterprise value of LBO transactions. In contrast, independent private firms acquired in LBOs are significantly smaller and hence only account for 23% of the combined enterprise value of all LBOs. The largest fraction of buyouts in terms of value is comprised of divisional buyouts (31% of transactions, 30% of value), where a division of a larger company is acquired in the LBO. The remaining types of transactions are secondary buyouts (13% of transactions, 19% of value), i.e. acquisitions from a financial vendor and acquisitions of bankrupt or financially distressed companies (2% of transactions, 1% of value). The composition of the different buyout types changes over the sample period. Public-to-private activity was relatively high during the 1980s, where it accounted for around 15% of the number and close to 50% of the value of all transactions. Following the demise of the junk bond market in the late 1980s public-to-private transactions

[4] Axelson, Jenkinson, Strömberg and Weisbach (2007) find an average debt to enterprise value ratio of 67%.
[5] See Gompers and Lerner (2000), Kaplan and Schoar (2005), Ljungqvist, Richardson and Wolfenzon (2007) and Axelson, Jenkinson, Strömberg and Weisbach (2007) for evidence on the cyclicality of private equity activity.

dropped significantly, where they accounted for less than 3% of the value of transactions, picked up in the late 1990s and has accounted for around 7% of the number and 35% of the value of transactions in the last few years. One clear trend in the last decade is that divisional and secondary buyouts have increased in importance, relative to the other groups.

Panels B and C of Table 4B show how the geographical and industry composition of LBOs has been changing over time. Figure 2 shows that the LBO market is no longer primarily a US phenomenon. The non-US private equity activity has grown to be larger than that of the US in the last few years, where the growth in Continental European LBOs has been particularly pronounced. Still, despite growing, LBO transactions outside North America and Western Europe are relatively few, accounting for approximately 12% of the number (9% of the enterprise value) of global LBO transactions over the period from 2001 to 2007.

Panel C shows that the caricature of LBOs occurring in old and declining industries is no longer true and never really has been. In fact, LBOs have always taken place in a wide range of industries. Although mature industries such as chemicals, machinery and retailing still provide popular buyout targets, the fraction of LBOs undertaken in high-growth, "high-tech" sectors' such as computers and biotech, has been growing significantly in the last decade. The drop in activity is particularly pronounced in the retail sector, which accounted for almost 14% of the number of transactions in the 1970s and 1980s, compared with less than 6% of transactions in the 2000s. It would be interesting to investigate the reasons for these trends in more detail. One potential explanation is that the changing industry mix of LBOs simply reflects a change in the industry composition in the economy as a whole. Alternatively, it may be the case that private equity firms are deliberately broadening their industry scope beyond the mature, high cash flow, high debt capacity type of industries that they initially targeted. We leave this question for future research.

Finally, Table 3 shows the pricing of the LBO transactions over time and types of deals. Pricing data is only available for a small fraction of the transactions in Capital IQ and only after 1995. Panel B shows that the mean (median) enterprise value to revenue is 2.4 (0.9) and mean (median) enterprise value to EBITDA is 11.0 (8.0). After decreasing in the early 2000s, pricing multiples are at their historical highs for the 2006–2007 period. LBOs of independent private companies and LBOs in Continental Europe seem to be priced lower than other LBO transactions. Still, given the scarcity of pricing data, the conclusions that can be drawn from the pricing data are limited.

3. ANALYSIS OF LBO EXITS

After documenting the evolution of the buyout industry, we now turn to the core issue of this study, namely the longevity of leveraged buyouts. We study two different aspects of this: 1) the holding periods and exits for individual LBO transactions and 2) the duration for which a particular firm remains in the LBO organizational form. In this section we look at the holding periods and exits for individual LBO transactions. As is well known, most LBOs are sponsored by private equity funds, which have a limited life and therefore a limited investment horizon, after which they have to exit their investments. In section 4, we switch to the equally important issue of how long a particular firm remains in the LBO organizational form. These two periods may not coincide, to the extent that an LBO fund exits the investment by selling the firm to a new LBO fund, either directly or indirectly through a trade-sale to another LBO-backed company.[6]

Table 4 shows the frequency of the exits of individual LBO transactions. We distinguish deals sponsored by private equity funds from the pure management buyouts without a financial sponsor, since the latter do not face the same investment horizon restrictions. Given that so many LBO deals have occurred in the last few years of the sample, it is not surprising that 60% of all transactions have not yet been exited. The most common exit route, for PE and MBO deals alike, is trade-sales to another corporation, which account for 39% of all exits. The second most common exit route is secondary buyouts (24%), which have increased in importance over the last decade, consistent with anecdotal evidence.[7] IPOs account for 13% of exits and this exit route has decreased significantly in importance over time, again consistent with anecdotal evidence.

Given the high debt levels involved in these transactions, we would expect that a non-trivial fraction of LBOs end up in bankruptcy. Axelson et al (2007) compare LBO leverage with leverage in a sample of public firms in the same location, industry and year. For their sample of large LBO transactions, they report average net debt to enterprise value of 67% and average net debt to EBITDA of 5.4, compared with 14% and 1.1 for their matched public firm sample. Hence, we would expect bankruptcy rates to be substantially higher for LBOs compared with public firms.

For our total sample, 6% of deals have ended in bankruptcy or reorganization and the frequency of financial distress seems to have gone down over time. Excluding the LBOs occurring after 2002, which may not have had enough time to enter financial distress, the average rate is 7%. Assuming an average holding period of six years, this works out to an annual default rate of 1.2% per year. As a comparison, the annual default rates for US publicly traded firms in Compustat over the 1983 to 2002 period was half this number, 0.6% (Ben-Ameur et al 2005). Even though the LBO default rates are indeed higher than that of Compustat firms, they are lower than the average default rates of corporate bond issuers 1980–2002, which was 1.6%

[6] In addition to the final exit, there may also be partial exits through divestments of assets and divisions along the way. We intend to study these issues in future work.

[7] There seems to be a drop in secondary buyouts over the 2006–2007 period, but very few of these transactions (2%) have been exited by the time of this study.

according to Moody's (Hamilton et al 2006).[8] One caveat is that not all distress cases may be recorded in publicly available data sources and some of these cases may be "hidden" in the relatively large fraction of "unknown" exits (11%).

The univariate sorts indicate that LBOs involving acquisitions of distressed companies seem relatively more likely to once again end up in financial distress and bankruptcy rates are twice as high for this sub-sample. Compared with deals backed by private equity funds, pure MBOs have a somewhat higher incidence of bankruptcy, lower incidence of IPOs and overall significantly lower exit rates looking at average figures.

Financial economists have documented the importance of equity market conditions and development for initial public offering activity. The effect of public market conditions on the composition of exits seems surprisingly small in our sample. Although the fraction of IPO exits dropped somewhat in the 2000–2002 period compared with before, e.g. there was an even larger drop in the late 1990s, when IPO markets were at their historical highs. Similarly, LBOs in the most developed equity markets, the US and the UK, actually have a lower fraction of IPO exits compared with Asia, Australia and other developing markets.

Since these simple comparisons are univariate, they do not control for other variables that may affect exit rates simultaneously, such as the fact that firms may differ in size across time, regions and LBO types. We will address this issue in the multivariate regression analysis below.

Table 5 shows the average holding periods for the individual LBO transactions. Overall, the average LBO lasts between four and five years, conditional on exit. Still, it is important to conduct the analysis on a cohort basis, since older deals are more likely to have been exited. In fact, only 42% of PE-sponsored deals and only 16% of pure MBO deals were actually exited within five years of the announcement of the original transaction. In recent debate, many have argued that private equity funds have become more and more short-term oriented, preferring to quickly "flip" their investments rather than keeping their ownership of companies to fully realize their value potential. In our analysis, we see no evidence of "quick flips" (i.e. exits within 24 months of investment by private equity fund) becoming more common. On the contrary, holding periods of private equity funds over the 12-, 24- and 60-month horizons have increased since the 1990s. Overall, only 12% of deals are exited within 24 months of the LBO acquisition date.

Table 6 reports multivariate regression results on the determinants of exits. We consider a number of different independent variables that can affect exit.

First, the likelihood of a successful exit may depend on the status of the firm pre-LBO. We control for transaction type, i.e. public-to-private, divisional, secondary, distressed or independent private, where the last category is the omitted one (so that the coefficients on the other variables can be interpreted relative to this category).

Secondly, the involvement of a financial sponsor can be important both for the incentives to exit the deal, as well as for the ability to do so. Everything else being equal, financial sponsors may have an incentive to exit the deal earlier than a deal without a sponsor, because of the need for a private equity fund to return capital to its investors. For this reason, we include a variable for the presence of a financial sponsor in the regression. We also consider the possibility of exit rates varying depending on the experience of the private equity fund and include the number of years since the first buyout investment was undertaken by the financial sponsor involved in the deal. (In the case of syndicated transactions, we simply pick the first listed fund in the syndicate when calculating this variable.) We also include a dummy for whether the LBO transaction was syndicated between several sponsors as well as a dummy for whether any private equity fund sponsoring the deal was a publicly traded entity. The latter should face less of an incentive to exit quickly compared with a private partnership with a limited fund life.

Thirdly, we control for the location of the firm acquired in the LBO as well as the time period of the original transaction. Among other things, this controls for the fact that financial market development and liquidity may differ across different regions and across time, which may affect the ability to exit.

Finally, we also include the log of the imputed enterprise value of the original transaction in some of the specifications, to control for the possibility that LBOs of larger companies may exhibit a different exit behaviour compared with smaller LBOs.

Regressions (1) and (4) analyse the determinants of "quick flips", which we define as deals which are exited successfully, i.e. through an IPO, trade-sale to a strategic buyer, or a secondary buyout, within 24 months of the original transaction announcement. The results are somewhat sensitive to whether the imputed enterprise value is included in the regression or not. Everything else being equal, quick flips are significantly more likely for larger LBOs. A one standard deviation change in size increases the likelihood of a "quick flip" by two percentage points. On the other hand, public-to-private deals are less likely to be exited early, which suggests that the size effect is most pronounced among divisional and secondary buyouts. As expected, deals with a financial sponsor are much more likely to be exited early, a difference of between four and five percentage points compared with pure MBOs. Within the deals with a private equity sponsor, public funds are around three percentage points less likely to exit early, confirming that the limited life of private partnerships shortens the holding periods. Finally, the more experienced private equity funds are more likely to do "quick flips" although the magnitudes are

[8] For the subset of corporate issuers that were rated as speculative grade, the average annual default rates were as high as 4.7% for the 1980–2002 period, according to Moody's.

economically quite small. Ten years of experience increases the likelihood of a quick exit by 1.7 – 2.2 percentage points. The tendency to exit early does not differ significantly across regions. Finally, there is no evidence that early exits are increasing over the sample period and the LBOs undertaken in the 2000–2002 period were the least likely to exit early.

We then examine the likelihood of a successful exit over the longer term in regressions (2) and (5), using a horizon of seven years. Again, many of the patterns are similar to the short-term horizon, with larger deals being more likely to have exited successfully. Controlling for size, public-to-private deals are less likely and divisional and secondary buyouts are now significantly more likely to have exited successfully within seven years. The presence of a financial sponsor increases the exit likelihood, especially for sponsors that have longer experience, are not publicly traded and syndicate the investment with other sponsors. With respect to region, LBOs undertaken in the UK and Scandinavia are more likely to have exited successfully compared with other regions. Finally, the time period from 1990 to 1995 seems to have been a particularly successful period in terms of successful exits (although the seven-year criterion only allows us to consider deals undertaken before November 2000).

Finally, regressions (3) and (6) look at the flip side of the issue and consider the determinants of LBOs ending up in bankruptcy or financial restructuring. We only consider LBO deals undertaken by 2002 in the analysis so that the deals have at least five years to eventually file for bankruptcy. In contrast with the successful exits, there is no significant relation between bankruptcy and deal size. Confirming the pattern from the univariate analysis, deals that were originally distressed acquisitions are more than five percentage points more likely to end up in financial distress again. Divisional buyouts, on the other hand, are significantly less likely to end in financial distress. In contrast with the univariate results, deals with financial sponsors are somewhat more likely to go bankrupt when other factors are controlled for, although the economic magnitude is relatively small. Among financial sponsors, the deals undertaken by publicly traded funds exhibit a higher incidence of bankruptcy and restructuring compared with private partnerships. Somewhat surprisingly, given earlier research (e.g. Kaplan and Stein 1993), we find no major difference in the probability of bankruptcy across time periods. Finally, possibly because Capital IQ coverage of corporate failures may be more accurate in the US and the UK, LBOs undertaken in these regions are more likely to end up in bankruptcy and the magnitudes are very large (five and seven percentage points, respectively).

Across the different tests and specifications a few consistent findings emerge. Larger deals are more likely to be exited successfully, although among larger deals the going-private transactions are slower to exit. Deals undertaken by private equity funds exit quicker than pure management buyouts, but they are also somewhat more likely to end in bankruptcy or restructuring. Among the LBOs with a financial sponsor, the deals that are syndicated and undertaken by experienced funds or funds that are not publicly traded are more successful in terms of exit. Finally, distressed investments are the most risky form of LBO deals, with a significantly higher bankruptcy risk compared with other deals.

4. ANALYSIS OF LBO HOLDING PERIODS

Finally, we turn to the issue of the longevity of the LBO organizational form, which has been at the core of the academic discussion of the economic impact of leveraged buyouts. Tables 6 to 9 look at the ultimate holding periods of firms undergoing LBOs, i.e. the time from the initial LBO transaction until the transition out of LBO ownership status. Again, this is a different measure compared with the time until an individual transaction is exited, since firms whose exits involve a sale to another private equity-backed firm remain in the LBO organizational form.

Table 7 considers the transition out of LBO status over time (Panel A) and across different types of LBO transactions (Panel B).

When we extend the sample from the early Kaplan (1991) study, the LBO organizational form seems more long term than temporary. Panel A shows that out of all firms ever entering LBO status over the 1980–2007 period, 69% are still in the LBO organizational form by November 2007. Disregarding the 2003–2007 period, which may have had too short a time to exit, the number is still as high as 45%. For a non-trivial fraction of firms, the LBO status seems more or less permanent. For firms undergoing their original LBO before 1990, 10% are still in LBO status by 2007.

Figure 4A shows the total stock of LBO firms as a function of transitions in and out of LBO ownership. In order to mitigate the effect of missing transactions in Capital IQ, we assume that firms leave LBO ownership if no subsequent M&A, bankruptcy, or securities offering has been recorded within 12 years of the original transaction. As shown in Figure 4A, the number of firms entering LBO status has consistently been substantially higher than the number of firms leaving LBO status over time. At the beginning of 2007, close to 14,000 firms worldwide were in LBO ownership, compared with fewer than 5,000 in 2000 and fewer than 2,000 in the mid-1990s.

Panel B of Table 7 considers transitions out of LBO ownership as a function of pre-LBO status for the subset of firms doing their first LBO before 2003. Of these firms, 45% still remain in the LBO organizational form and the highest fraction is found among firms that were publicly traded before the LBO, i.e. for going-private transactions. In addition, only 13% of the going-private sub-sample eventually return to public markets, which is not all that different from the sample average of 11%. These facts seem highly inconsistent with the Rappaport (1990) view that going-private transactions are a temporary "shock therapy" for public firms. Still, this does not imply that LBOs are

draining public markets of firms. In fact, Panel B shows that among firms entering LBO status over the 1970–2002 period, the fraction of firms exiting LBO status by going public was 11%, which is substantially higher than the fraction of going-private transactions over the 1970–2002 period (6.3%). Hence, the net flow into public markets has been positive over the long run.[9] In other words, most of the LBO firms going public originate from acquisitions of private companies and most of the going-private transactions do not return to public markets.

Panel B also shows that the most common fate of firms transitioning out of LBO ownership is to be acquired by another strategic buyer, which happens to 29% of all doing their original LBO in 1970–2002, which works out to 53% of all firms transitioning out of LBO ownership. Of firms undergoing leverage buyouts, 6% eventually enter financial restructuring or bankruptcy, which again is higher than the Computstat average but seems low given the high leverage used in these deals. This number also disregards the fact that many distressed firms are eventually financially restructured and continue as independent companies. In fact, for 10% (i.e. 49 cases) of all bankruptcies and restructurings, the financial distress is resolved by the firm being reacquired in an LBO transaction. Out of these 49 firms, 36 are still in LBO ownership, 10 were acquired by a strategic buyer and three eventually ended up in bankruptcy a second time.

Panel C of Table 7 considers transitions out of LBO ownership as a function of the location of the acquired firm, again for the subset of firms that underwent their first LBO before 2003. One reason why we might expect differences across regions is because the liquidity and development of local financial markets may affect the propensity of firms to stay in LBO ownership and the types of exit routes that are available. For example, the local availability of capital may affect the likelihood of LBOs failing, or the ability of a potential acquirer to buy the LBO firm in a trade-sale. Similarly, the development of local equity markets may affect the ability of firms to exit through an IPO. Previous research has shown that the UK and the US have the most developed financial markets, while most emerging markets have relatively small and underdeveloped financial markets and institutions (e.g. LaPorta et al 1998 and King and Levine 1993). Hence, we would expect exit patterns in the US and UK to exhibit different behaviour compared with the rest of the world. The support in favour of these hypotheses is quite weak. Although the likelihood of LBO firms eventually going public is somewhat higher in the United States and Canada (13% of firms), it is not significantly different from IPO exits in Asia, Australia and emerging markets (i.e. "Rest of World", 12%). UK LBOs seem more likely to become acquired than those in other regions. Bankruptcy and financial restructuring rates are significantly higher in the US and the UK. These conclusions should be taken with a grain of salt, however, since they only consider univariate differences and do not control for other factors. We return to this issue in the multivariate regression below.

Table 8 considers the ultimate holding periods of LBO firms, taking into account the fact that many firms remain in LBO status even though the original LBO sponsor has exited. The holding periods of LBO firms are remarkably long. The median firm remains in LBO status for more than nine years and only 17% of firms exit LBO status within three years of the original LBO transaction. In addition, holding periods seem to have increased over time. The median firm undergoing the original LBO in the 1980s exited LBO status after 6–7 years, while the median LBO firm in the 1995–1999 period exited after nine years. Deals that were originally sponsored by private equity funds tend to transition out of LBO ownership more quickly and only 32% of the pure management buyouts have transitioned out of LBO ownership 10 years after the original transaction.

Table 9 analyses the factors determining the longevity of buyouts and the likelihood of LBOs eventually returning to public markets, using logit regressions. Similar to the exit regressions of Table 6, we control for pre-LBO firm status, financial sponsor characteristics, original transaction size, location and time period of the original transaction. Regressions (1) through (4) address the likelihood of firms transitioning out of LBO status for different time horizons (three, five and nine years). The factors that determine the longevity of buyouts are largely consistent with the factors that determine exit likelihood (see Table 6). LBOs that originate from divisions of other companies exit LBO ownership significantly faster than other LBOs and are 7% more likely to have exited within nine years. Consistent with the univariate analysis, pure MBOs remain in that orgnizational form longer and are 22% less likely to have exited within nine years. LBOs acquired by more experienced funds and funds that are not publicly traded have shorter longevity, as do syndicated deals. Larger transactions transition from LBO ownership quicker than smaller deals. LBOs undertaken in Continental Europe are less likely to leave LBO ownership. Finally, holding periods seem to have increased significantly over the last 10 years of our sample period. That is to say, the longevity of leveraged buyouts has increased significantly compared with the time when Kaplan (1991) wrote his original study.

Regressions (5) and (6) analyse the likelihood of LBOs returning to public markets. As expected, larger deals are more likely to eventually go public. Interestingly, the presence of a financial sponsor per se does not significantly increase the probability of going public, but the presence of experienced sponsors seems to do so, as does the presence of a financial sponsor syndicate. The development of local equity markets

[9] This argument disregards the fact that many LBOs are buyouts of divisions of public companies, while many trade-sale exits are to public company acquirers. A more complete flow analysis will have to take this into account as well. We intend to pursue this issue in future research, where we will also analyse the acquisition and divestment activity of LBO firms in more detail.

does not seem to be a significant factor predicting "reverse LBOs", as deals in Asia, Australia and emerging markets are significantly more likely to eventually go public compared with other regions, including the US and UK.[10]

Two important economic conclusions emerge from this analysis. First, firms stay in LBO ownership for long periods of time, even in cases when a private equity fund is backing the original transaction, where the median LBO remains more than nine years after the original deal was announced. Secondly, public and private equity markets appear to be complements rather than substitutes. LBOs provide a net positive supply of firms to public markets over the longer run. Moreover, LBOs in countries with less developed markets are more likely to return to public ownership, suggesting that buyouts can play a positive role in improving stock market development in these countries.

5. CONCLUSION

This paper has conducted the first comprehensive study of the worldwide demography of leverage buyouts. We confirm that LBOs have grown dramatically over the last decades, not only in magnitude but also in industrial and geographical scope. We also find that LBOs are a more long-term organizational form than was previously thought. Still, there is no evidence that the increase in LBO activity has come at the expense of stock market development. Rather, the private and public equity markets appear to be more complements than substitutes.

Many important issues still remain to be resolved in order to understand the economic impact of leveraged buyouts. First, although the sample is the most comprehensive one assembled to date, we still find evidence of under-reporting, particularly for the early part of the sample. We will continue to update and build this database in the future, in order to provide a research resource for future private equity research. Secondly, one important part of LBO activity is the substantial number of acquisitions and divestitures that LBO firms undertake after their original transaction, which we have largely ignored in the present study. In order to properly estimate the total size of the buyout market, the M&A activities of LBO firms also have to be taken into account. We intend to pursue this in a future project, using Capital IQ data. Thirdly, we would like to know more about the role of LBOs in the consolidation and restructuring of industries. Finally, we are not able to study the financial performance of leveraged buyouts in any greater detail. Looking at how financial performance is affected by LBOs and how performance varies across transaction types, time periods and countries is an important issue for future research.

[10] See Cao and Lerner (2006) for an analysis of post-IPO performance of LBOs that return to public markets, i.e. "reverse LBOs".

FIGURES

Figure 1A: LBO transactions over time, number of transactions

LBO transactions 1970–2007 in Capital IQ

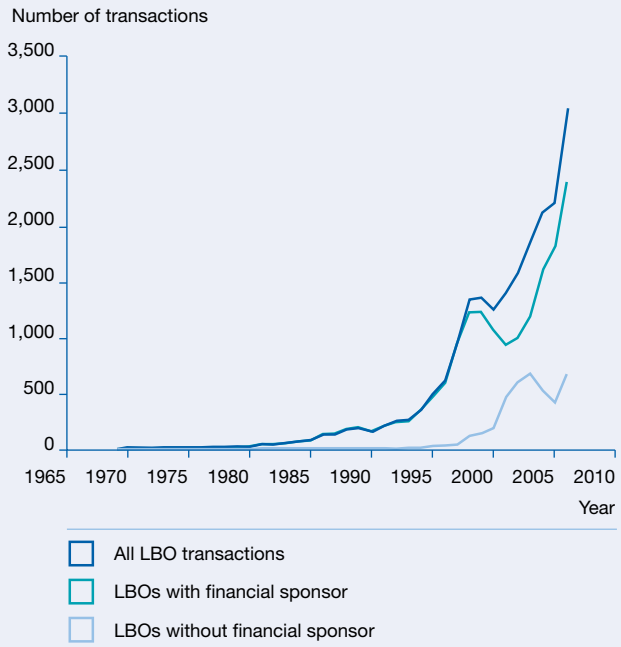


Figure 1B: LBO transactions over time, sum of imputed enterprise values

Types of LBO transactions 1970–2006 in Capital IQ

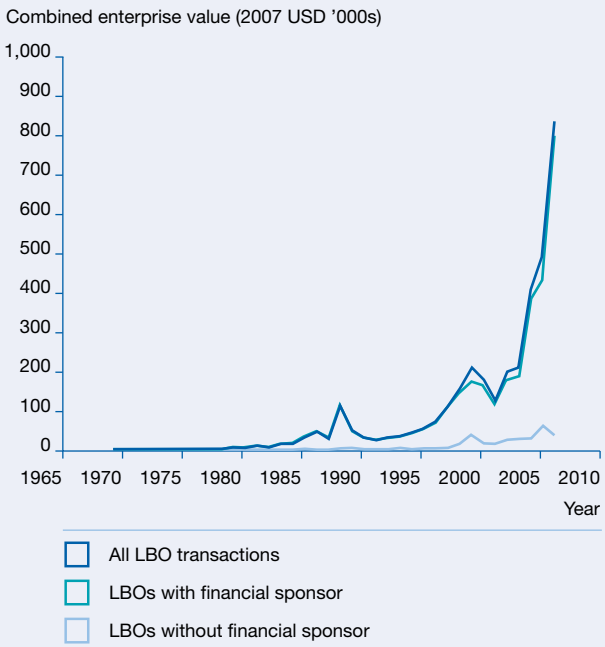


Figure 2: LBO transactions by type

LBO transactions by type

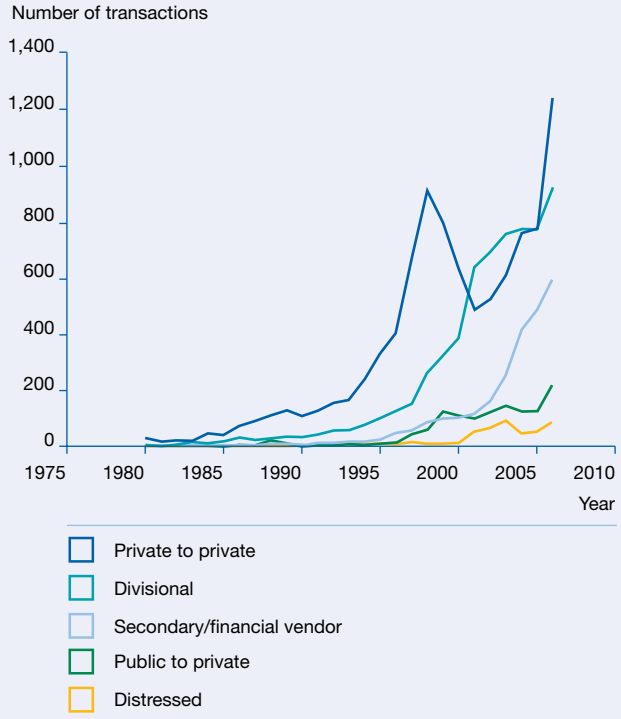
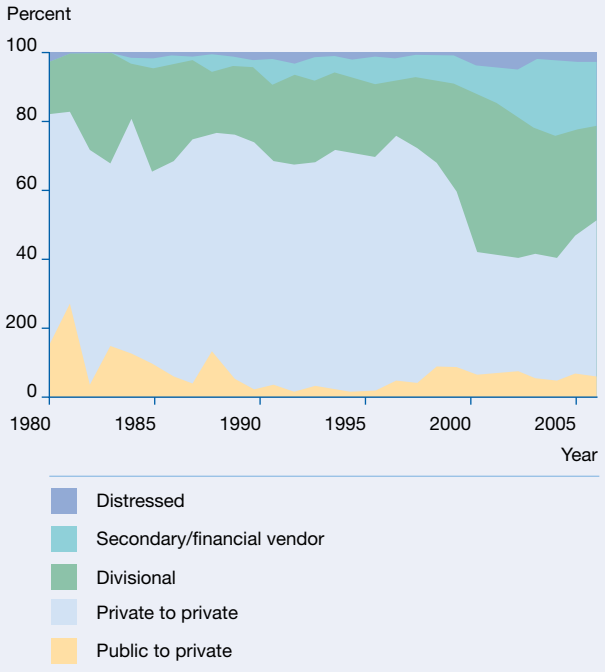


Figure 3A: Composition of LBO transactions over time, equally weighted transactions

Types of LBO transactions 1980–2007



FIGURES

Figure 3B: Composition of LBOs over time, transactions weighted by imputed enterprise value

Type of LBO transactions 1980–2007

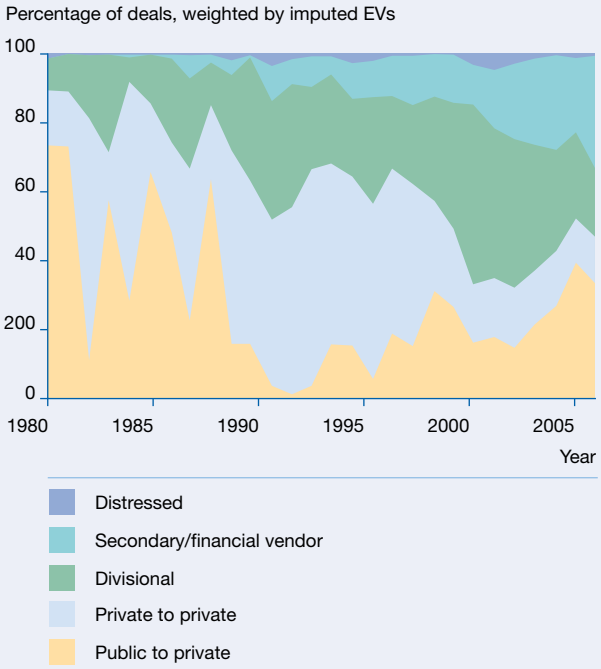


Figure 4A: Number of firms in LBO ownership over time

Number of firms entering and exiting LBO ownership
Jan 1970 to Jan 2007

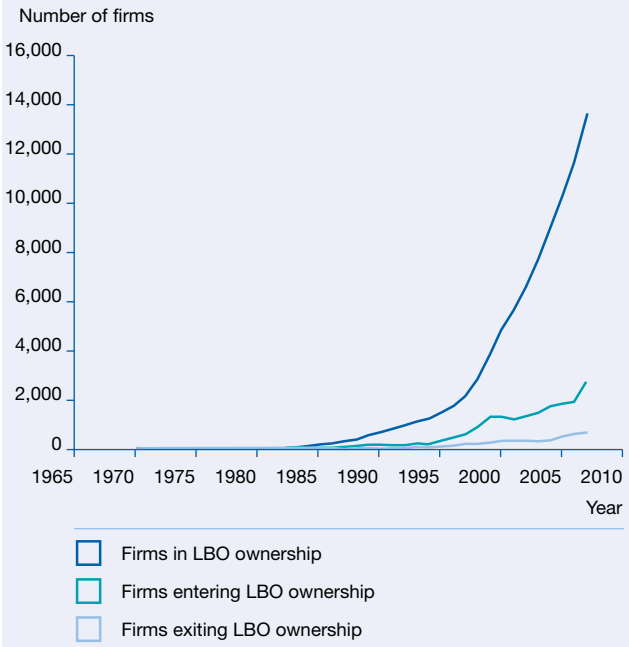
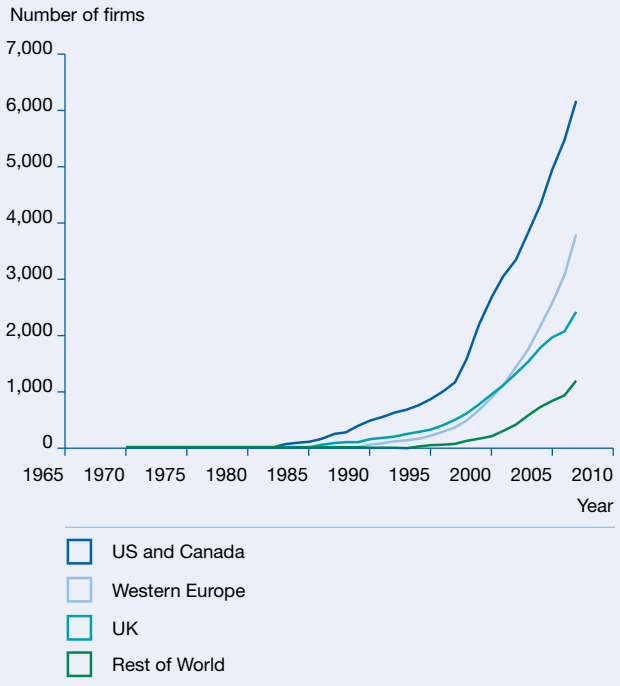


Figure 4B: Firms in LBO ownership by region

Number of firms in LBO ownership
Jan 1970 to Jan 2006



TABLES

Table 1: Capital IQ 1980s coverage analysis

	Comparison study	Comparison study sampling criterion	Sample size, comp. study	Sample size, CIQ data	% coverage
US Public-to-private (P2P) transactions 1980-1987	Lehn and Poulsen (1989)	Going-private transactions according to *WSJ* of firms covered by COMPUSTAT	263	43	16
Large US P2Ps 1979-1986	Kaplan (1991)	LBOs with transaction value above $100 million according to the SDC and Morgan Stanley databases	183	62	34
Large US P2P transactions 1979-1986 with financial sponsor	Kaplan (1991)	Subsample where LBO partnership or merchant bank sponsored the deal	74	62	84
US Leveraged buyout transactions 1984-1989	Cotter and Peck (2001)	LBOs according to *Mergers and Acquisitions* magazine, *Investment Dealers Digest,* and *WSJ*	763	531	70
US Leveraged buyout transactions 1981-1987	Long and Ravenscraft (1993)	LBOs of independent firms identified through the ADP/MLR Publishing M&A database and from other academic studies	600	245	41
UK and Continental European Leveraged buyout transactions in 1986	Wright, Renneboog, Simons and Scholes (2006)	Buyouts recorded by the Centre for Management Buyout Research (CMBOR)	167	28	17
UK buyouts 1996-2000	Wright, Renneboog, Simons and Scholes (2006)	Same as above	3,320	964	29
UK buyouts 2001-2005	Wright, Renneboog, Simons and Scholes (2006)	Same as above	3,576	1,461	41
Continental European and Scand. buyouts 1996-2000	Wright, Renneboog, Simons and Scholes (2006)	Same as above	652	1,073	165
Continental European and Scand. buyouts 2001-2005	Wright, Renneboog, Simons and Scholes (2006)	Same as above	566	2,364	418

Table 2: Magnitude and growth of LBO activity

Table 2A: LBO transactions by deal type

Number of deals

	Financial sponsor		No financial sponsor		All LBO transactions		% of deal types by period	
	N	%	N	%	N	%	1970-2000	2001-2007
Public-to-private	999	5.8%	400	9.5%	1,399	6.7%	6.0%	6.8%
Private-to-private	8,987	52.2%	1,031	24.6%	10,018	46.8%	63.8%	36.9%
Divisional buyout	4,497	26.1%	2,210	52.7%	6,707	31.3%	22.8%	36.3%
Financial vendor	2,329	13.5%	427	10.2%	2,756	12.9%	6.2%	16.8%
Distressed	391	2.3%	126	3.0%	517	2.4%	1.2%	3.2%
Total number of transactions	17,203		4,194		21,397		7,915	13,482
Percentage of total	80%		20%				37%	63%

Million USD (year 2007) amounts using imputed enterprise values (see Appendix I)

	Financial sponsor		No financial sponsor		All LBO transactions		% of deal types by period	
	Total EV, $ million	%	Total EV, $ million	%	Total EV, $ million	%	1970-2000	2001-2007
Public-to-private	972,433	26.8%	132,511	44.3%	1,104,944	28.2%	26.9%	28.8%
Private-to-private	823,699	22.7%	32,110	10.7%	855,809	21.8%	37.2%	14.7%
Divisional buyout	1,069,688	29.5%	97,904	32.7%	1,167 591	29.8%	25.9%	31.6%
Financial vendor	713,218	19.7%	34,243	11.4%	747,462	19.1%	9.4%	23.5%
Distressed	43,753	1.2%	2,334	0.8%	46,087	1.2%	0.6%	1.4%
Total enterprise value of firms acquired	3,622,792		299,102		3,921,894		1,242,629	2,679,265
Percentage of total	92%		8%				32%	68%

TABLES

Table 2: Magnitude and growth of LBO activity

Table 2B: LBO transactions by region

Number of deals

	Financial sponsor	No financial sponsor	% with sponsor	All LBO transactions		% of world total	
	N	N	N		Whole period	1970-2000	2001-2007
United States	8,031	1,628	83.1%	9,659	45.1%	55.1%	34.8%
Canada	334	137	70.9%	471	2.2%	1.5%	3.5%
Continental Europe	3,920	699	84.9%	4,619	21.6%	15.6%	17.6%
Scandinavia	829	140	85.6%	969	4.5%	3.1%	3.6%
United Kingdom	2,889	1,137	71.8%	4,026	18.8%	20.1%	28.7%
Africa and Middle East	180	104	63.4%	284	1.3%	0.7%	2.8%
Asia	398	110	78.3%	508	2.4%	1.5%	2.8%
Australia	183	95	65.8%	278	1.3%	0.5%	2.5%
Eastern Europe	296	93	76.1%	389	1.8%	1.1%	2.5%
Latin America	143	51	73.7%	194	0.9%	0.8%	1.3%
Total	17,203	4,194	80.4%	21,397			

Million USD (year 2007) amounts using imputed enterprise values (see Appendix I)

	Financial sponsor	No financial sponsor	% with sponsor	All LBO transactions		% of world total	
	$ million	$ million		$ million	Whole period	1970-2000	2001-2007
United States	1,814,557	133,973	93.1%	1,948,530	49.7%	64.5%	42.8%
Canada	76,448	4,980	93.9%	81,428	2.1%	1.5%	2.4%
Continental Europe	819,626	44,587	94.8%	864,213	22.0%	13.2%	26.1%
Scandinavia	128,298	20,324	86.3%	148,623	3.8%	2.3%	4.5%
United Kingdom	539,385	62,247	89.7%	601,632	15.3%	15.0%	15.5%
Africa and Middle East	24,777	13,328	65.0%	38,105	1.0%	0.3%	1.3%
Asia	116,440	13,109	89.9%	129,549	3.3%	1.8%	4.0%
Australia	36,070	2,365	93.8%	38,435	1.0%	0.3%	1.3%
Eastern Europe	26,197	2,849	90.2%	29,045	0.7%	0.2%	1.0%
Latin America	40,994	1,340	96.8%	42,334	1.1%	0.9%	1.2%
Total	3,622,792	299,102	92.4%	3,921,894	100.0%	100.0%	100.0%

Table 2: Magnitude and growth of LBO activity

Table 2C: LBO transactions by industry

Distribution of LBO transactions across 38 main industries, ordered by rank in %

	1970-1989	1990-1999	2000-2007	1970-2007	Change
Retail	13.8	6.7	5.7	6.3	-8.1
Software and internet	3.1	5.7	6.2	5.9	3.1
Industrial machinery	5.6	5.8	5.8	5.8	0.1
Advanced industrial equipment	7.6	6.1	5.0	5.4	-2.6
Hotels, resorts and cruise lines, leisure facilities, restaurants	2.7	3.8	5.8	5.2	3.1
Chemicals, industrial, and agricultural products, paper and forest products	7.6	5.8	4.7	5.1	-3.0
Media, publishing, advertising	4.5	5.2	4.7	4.8	0.2
Industrial and commercial services	2.3	4.0	4.7	4.4	2.4
Other services	2.5	4.1	4.2	4.1	1.7
Trading companies and distributors	4.2	4.1	4.1	4.1	-0.2
Food, beverages, and tobacco	4.0	4.5	3.7	3.9	-0.2
Financials	2.1	2.8	4.0	3.6	1.9
Industrial and construction materials	4.9	3.3	3.5	3.5	-1.5
Household non-durables	2.8	4.0	3.2	3.4	0.3
Metals and mining, steel	4.0	3.6	2.9	3.2	-1.0
Automotive	3.5	2.8	3.0	3.0	-0.5
Transportation	2.7	2.2	2.8	2.7	0.1
IT and data services	2.0	2.6	2.7	2.7	0.7
Household durables	5.1	2.5	2.5	2.6	-2.5
Construction and engineering	2.3	2.0	2.8	2.5	0.5
Healthcare products and equipment	2.8	2.9	2.1	2.3	-0.7
Healthcare services and providers	0.3	2.3	2.4	2.3	2.1
Computer and telecommunications equipment	3.4	3.0	2.0	2.3	-1.4
Biotech, pharmaceuticals, life sciences	0.8	2.3	1.5	1.7	0.7
Multi-sector holdings and conglomerates	2.0	2.1	1.3	1.5	-0.7
Infrastructure and utilities	0.4	0.7	1.8	1.5	1.4
Real estate	0.3	0.7	1.7	1.4	1.4
Education, human resource and employment services	0.7	1.3	1.5	1.4	0.7
Energy	1.1	1.3	1.4	1.4	0.3
Telecom	0.3	1.1	1.2	1.2	1.0
Movies and entertainment	0.4	0.7	1.1	1.0	0.7

Table 3: Size and pricing of LBO deals

Table 3A: By time period

	Enterprise Value, 2007 USD				Implied Enterprise Value/Revenues				Implied Enterprise Value/EBITDA			
	Mean	Median	N	Observed	Mean	Median	N	Observed	Mean	Median	N	Observed
1970-1984	287.2	72.8	103	50%				0%				0%
1985-1989	669.1	118.4	304	46%				0%				0%
1990-1994	196.5	74.1	473	41%				0%				0%
1995-1999	216.6	65.4	1,952	42%	2.0	1.0	223	5%	10.6	7.7	169	4%
2000-2002	191.6	34.4	2,110	51%	1.7	0.7	380	9%	10.9	6.1	225	5%
2003-2005	325.6	61.6	2,635	43%	1.7	0.9	695	11%	10.5	7.6	412	7%
2006-2007	601.5	86.8	1,416	32%	3.0	1.1	626	14%	12.0	9.7	335	8%

Table 3B: By LBO type

	Enterprise Value, 2007 USD				Implied Enterprise Value/Revenues				Implied Enterprise Value/EBITDA			
	Mean	Median	N	Observed	Mean	Median	N	Observed	Mean	Median	N	Observed
Public to private	872.0	174.0	1,224	87%	2.8	1.0	881	63%	11.2	7.8	761	54%
Private to private	140.3	35.5	3,076	31%	1.8	0.9	245	2%	11.6	6.5	84	1%
Divisional	274.1	54.0	3,307	49%	2.5	0.7	473	7%	9.4	8.1	120	2%
Financial vendor	376.2	160.1	1,115	40%	1.9	1.2	291	11%	10.8	9.4	161	6%
Distressed	139.4	29.8	271	52%	0.7	0.4	46	9%	13.6	12.1	16	3%
Total	318.3	61.1	8,993	42%	2.4	0.9	1,936	9%	11.0	8.0	1,142	5%

TABLES

Table 3: Size and pricing of LBO deals

Table 3C: By region (2001–2007 only)

	Enterprise Value, 2007 USD				Implied Enterprise Value/Revenues				Implied Enterprise Value/EBITDA			
	Mean	Median	N	Observed	Mean	Median	N	Observed	Mean	Median	N	Observed
United States	389.6	63.5	2,029	41%	1.8	0.9	580	12%	11.2	8.3	413	7%
Canada	308.8	39.0	162	46%	4.1	1.1	70	20%	11.4	8.1	45	13%
Continental Europe	439.0	77.6	1,129	33%	1.5	1.0	417	12%	10.6	7.6	170	5%
Scandinavia	381.1	8.1	206	29%	1.5	1.1	91	13%	9.8	8.5	50	7%
United Kingdom	279.6	36.1	1,315	54%	1.9	0.8	294	12%	12.4	8.5	141	6%
Africa / Middle East	239.5	25.9	126	55%	7.3	1.0	30	13%	9.2	6.2	18	8%
Asia	386.5	109.4	215	55%	9.5	0.9	52	13%	14.4	9.9	33	8%
Australia	224.3	53.9	136	57%	1.8	0.8	30	13%	9.0	8.1	19	8%
Eastern Europe	173.2	27.3	121	40%	1.5	0.7	26	9%	8.4	8.6	4	1%
Latin America	408.0	102.9	58	45%	2.7	2.0	17	13%	10.4	7.1	12	9%
Total	358.5	55.5	5,497	41%	2.2	0.9	1607	12%	11.2	8.2	905	7%

Table 4: Exits of individual LBO transactions

Table 4A: By time of LBO transaction

	Number of exits								% of exits							
All deals	1970-1984	1985-1989	1990-1994	1995-1999	2000-2002	2003-2005	2006-2007	Total	1970-1984	1985-1989	1990-1994	1995-1999	2000-2002	2003-2005	2006-2007	Total
Bankruptcy	13	36	53	260	126	61	3	552	7%	6%	5%	8%	6%	4%	3%	6%
IPO	54	155	233	372	152	143	1	1,110	28%	25%	22%	11%	8%	10%	1%	13%
Sold to strategic buyer	63	215	403	1,288	759	595	43	3,366	32%	34%	38%	39%	39%	41%	38%	39%
Sold to financial buyer	11	82	182	774	595	437	25	2,106	6%	13%	17%	24%	30%	30%	22%	24%
Sold to LBO-backed firm	4	17	34	175	106	94	16	446	2%	3%	3%	5%	5%	6%	14%	5%
Sold to management	1	8	15	53	38	14	1	130	1%	1%	1%	2%	2%	1%	1%	2%
Other / unknown	50	112	128	350	178	105	25	948	26%	18%	12%	11%	9%	7%	22%	11%
No exit (% of all deals)	8	37	110	1,389	2,208	4,683	4,304	12,739	4%	6%	9%	30%	53%	76%	97%	60%)
With financial sponsor	1970-1984	1985-1989	1990-1994	1995-1999	2000-2002	2003-2005	2006-2007	Total	1970-1984	1985-1989	1990-1994	1995-1999	2000-2002	2003-2005	2006-2007	Total
Bankruptcy	13	35	52	249	97	40	2	488	7%	6%	5%	8%	6%	3%	3%	6%
IPO	53	152	232	360	142	133	1	1,073	28%	25%	23%	11%	9%	11%	1%	14%
Sold to strategic buyer	60	211	387	1,258	616	472	27	3,031	31%	35%	38%	40%	37%	40%	35%	38%
Sold to financial buyer	10	77	178	742	521	372	13	1,913	5%	13%	17%	23%	31%	31%	17%	24%
Sold to LBO-backed firm	4	17	34	167	95	78	15	410	2%	3%	3%	5%	6%	7%	19%	5%
Sold to management	1	8	15	50	31	7	1	113	1%	1%	1%	2%	2%	1%	1%	1%
Other / unknown	50	111	127	340	166	86	19	899	26%	18%	12%	11%	10%	7%	24%	11%
No exit (% of PE deals)	6	31	98	1,185	1,268	3,348	3,340	9,276	3%	5%	9%	27%	43%	74%	98%	54%
Without financial sponsor	1970-1984	1985-1989	1990-1994	1995-1999	2000-2002	2003-2005	2006-2007	Total	1970-1984	1985-1989	1990-1994	1995-1999	2000-2002	2003-2005	2006-2007	Total
Bankruptcy	0	1	1	11	29	21	1	64	0%	7%	4%	10%	10%	8%	3%	9%
IPO	1	3	1	12	10	10	0	37	20%	21%	4%	11%	3%	4%	0%	5%
Sold to strategic buyer	3	4	16	30	143	123	16	335	60%	29%	70%	28%	50%	47%	44%	46%
Sold to financial buyer	1	5	4	32	74	65	12	193	20%	36%	17%	30%	26%	25%	33%	26%
Sold to LBO-backed firm	0	0	0	8	11	16	1	36	0%	0%	0%	8%	4%	6%	3%	5%
Sold to management	0	0	0	3	7	7	0	17	0%	0%	0%	3%	2%	3%	0%	2%
Other / unknown	0	1	1	10	12	19	6	49	0%	7%	4%	9%	4%	7%	17%	7%
No exit (% of MBO deals)	2	6	12	204	940	1,335	964	3,463	29%	30%	34%	66%	77%	84%	96%	83%

Table 4: Exits of individual LBO transactions

Table 4B: By LBO type and region (1970–2002 only)

	Number of transactions by LBO type						Percentage of exited transactions					
	Public to private	Private to private	Divisional	Financial vendor	Distressed	Total	Public to private	Private to private	Divisional	Financial vendor	Distressed	Total
Bankruptcy	36	296	97	39	20	488	9%	7%	5%	7%	16%	7%
IPO	69	559	268	59	11	966	16%	13%	15%	11%	9%	14%
Fin. Buyer	120	914	419	169	22	1,644	29%	22%	23%	32%	17%	23%
LBO-backed corporate buyer	16	188	100	27	5	336	4%	5%	5%	5%	4%	5%
Sold to mgmt	9	58	35	12	1	115	2%	1%	2%	2%	1%	2%
Strategic buyer	142	1,538	804	191	53	2728	34%	37%	44%	37%	41%	38%
Other / unknown	28	623	125	25	17	818	7%	15%	7%	5%	13%	12%
							100%	*100%*	*100%*	*100%*	*100%*	*100%*
Total exited	420	4,176	1,848	522	129	7,095	60%	69%	59%	69%	62%	65%
No exit	277	1,876	1,280	240	79	3,752	40%	31%	41%	31%	38%	35%
							100%	*100%*	*100%*	*100%*	*100%*	*100%*

	US and Canada	UK	Continent Europe & Scandin.	Rest of World	Total	US and Canada	UK	Continent Europe & Scandin.	Rest of World	Total
Bankruptcy	330	112	38	8	488	9%	8%	3%	2%	7%
IPO	588	165	147	66	966	15%	11%	10%	19%	14%
Fin. Buyer	763	333	490	58	1,644	20%	22%	34%	17%	23%
LBO-backed corporate buyer	230	52	46	8	336	6%	3%	3%	2%	5%
Sold to mgmt	33	41	36	5	115	1%	3%	3%	1%	2%
Strategic buyer	1,444	630	510	144	2,728	38%	42%	36%	42%	38%
Other / unknown	451	155	161	51	818	12%	10%	11%	15%	12%
						100%	*100%*	*100%*	*100%*	*100%*
Total exited	3,839	1,488	1,428	340	7,095	68%	67%	62%	52%	65%
No exit	1,830	741	862	319	3,752	32%	33%	38%	48%	35%

TABLES

Table 5: Holding periods for individual LBO transactions

	Exited deals only					% of exited and non-exited deals		
All LBO transactions								
	Mean (months)	Median (months)	N	Minimum (months)	Maximum (months)	Exit within 12 months	Exit within 24 months	Exit within 60 months
1970-1984	87	63	118	4	323	1.6%	13.5%	46.0%
1985-1989	80	72	466	2	246	2.0%	11.3%	39.2%
1990-1994	61	52	849	3	204	3.9%	13.8%	52.1%
1995-1999	54	50	2,624	1	145	3.1%	12.4%	39.2%
2000-2002	43	43	1,563	1	89	2.5%	7.5%	33.3%
2003-2005	24	24	1,156	1	55	2.7%	11.0%	
2006-2007	9	10	58	1	17	2.0%		
Total	49	42	6,834	1	323	2.7%	10.7%	38.7%
LBO transactions with an LBO-fund sponsor								
	Mean (months)	Median (months)	N	Minimum (months)	Maximum (months)	Exit within 12 months	Exit within 24 months	Exit within 60 months
1970-1984	87	63	114	4	323	1.7%	14.2%	46.7%
1985-1989	80	72	453	2	246	2.1%	11.8%	40.1%
1990-1994	60	51	830	3	204	4.0%	14.2%	53.3%
1995-1999	54	50	2,550	1	145	3.2%	12.9%	40.9%
2000-2002	43	43	1,367	1	89	2.7%	9.0%	40.4%
2003-2005	25	24	998	1	54	2.9%	12.8%	
2006-2007	9	10	47	1	17	2.1%		
Total	50	42	6,359	1	323	2.9%	12.0%	42.4%
LBO transactions without an LBO-fund sponsor								
	Mean (months)	Median (months)	N	Minimum (months)	Maximum (months)	Exit within 12 months	Exit within 24 months	Exit within 60 months
1970-1984	95	65	4	30	220	0.0%	0.0%	33.3%
1985-1989	86	80	13	27	159	0.0%	0.0%	15.8%
1990-1994	98	96	19	35	198	0.0%	0.0%	16.1%
1995-1999	55	53	74	2	133	1.8%	5.0%	15.8%
2000-2002	40	40	196	1	89	1.9%	4.0%	15.3%
2003-2005	23	22	158	1	55	2.1%	6.3%	
2006-2007	8	8	11	2	17	1.6%		
Total	40	34	475	1	220	1.9%	5.1%	15.6%

Table 6: Determinants of exit success for individual transactions

This table shows the results from logit regressions of the likelihood of a certain exit type on deal and sponsor characteristics as well as country and time fixed effects. "Successful exit" is defined by IPO or acquisition by strategic or financial buyer. "Bankrupt" is defined as bankruptcy or financial reorganization/restructuring. For the deal type the omitted variable is "Independent private firm," and for the time fixed effects the omitted category is "1970-1984." For the dummy variables, the coefficients are the change in probability (in %) of changing the value from 0 to 1, and for the other variables it is the effect of an marginal increase of one unit. P-values are calculated using White robust standard errors (STDE).

Dependent variable:	Successful exit within 24 months			Successful exit within 84 months			Bankrupt by 11/2007 (1970-2002 obs only)		
	(1)			(2)			(3)		
	dY/dX	STDE	P-value	dY/dX	STDE	P-value	dY/dX	STDE	P-value
Public-to-private	-1.30	0.97	0.183	2.64	2.56	0.302	0.56	0.76	0.461
Divisional	1.15	0.59	0.051	11.70	1.46	0.000	-0.83	0.42	0.050
Secondary	2.69	0.91	0.003	16.21	2.47	0.000	0.87	0.77	0.258
Distressed	-1.57	1.57	0.318	1.37	5.51	0.804	5.22	1.96	0.008
Financial sponsor dummy	5.49	0.62	0.000	24.97	2.02	0.000	1.35	0.51	0.007
Yrs of sponsor experience	0.22	0.04	0.000	0.93	0.11	0.000	0.00	0.03	0.895
Syndicated deal	1.53	0.62	0.013	11.91	1.47	0.000	-0.42	0.43	0.331
Public fund sponsor	-3.34	0.66	0.000	-7.87	1.94	0.000	1.28	0.76	0.090
US	1.86	1.10	0.090	3.73	2.83	0.188	5.78	1.51	0.000
Canada	3.10	2.58	0.228	3.83	5.63	0.496	7.26	5.04	0.149
UK	1.16	1.26	0.357	5.10	3.11	0.101	7.26	2.86	0.011
Continental Europe	1.03	1.24	0.404	-0.08	3.10	0.979	0.55	1.59	0.729
Scandinavia	1.52	1.83	0.405	11.17	4.29	0.009	2.76	2.93	0.346
1985-89	-1.88	2.01	0.351	3.08	4.21	0.465	-0.29	1.13	0.801
1990-95	-0.38	2.18	0.861	12.64	3.92	0.001	-0.23	1.08	0.835
1996-99	-2.19	1.98	0.269	2.31	3.76	0.538	0.19	1.09	0.860
2000-02	-5.27	1.74	0.002	2.36	4.03	0.557	-1.21	1.04	0.244
2003-05	-2.38	2.04	0.243						
	N=13,905	Ps.R^2 =	0.03	N=7,915	Ps.R^2 =	0.05	N=10,847	Ps.R^2 =	0.04
	(4)			(5)			(6)		
	dY/dX	STDE	P-value	dY/dX	STDE	P-value	dY/dX	STDE	P-value
Public-to-private	-2.83	0.89	0.001	-5.92	2.60	0.023	0.31	0.80	0.700
Divisional	0.49	0.59	0.404	8.84	1.49	0.000	-0.86	0.43	0.045
Secondary	1.25	0.86	0.144	10.49	2.58	0.000	0.75	0.79	0.341
Distressed	-1.54	1.56	0.323	2.69	5.74	0.640	5.29	1.98	0.007
Financial sponsor dummy	4.32	0.72	0.000	21.35	2.28	0.000	1.30	0.54	0.016
Yrs of sponsor experience	0.17	0.04	0.000	0.68	0.11	0.000	-0.00	0.03	0.982
Syndicated deal	0.82	0.60	0.176	8.71	1.52	0.000	-0.48	0.44	0.281
Public fund sponsor	-2.91	0.68	0.000	-5.43	1.99	0.006	1.36	0.77	0.079
Log EV, imputed	1.07	0.22	0.000	5.24	0.52	0.000	0.10	0.16	0.530
US	1.40	1.09	0.198	0.98	2.88	0.733	5.71	1.51	0.000
Canada	2.76	2.51	0.272	1.88	5.67	0.740	7.28	5.05	0.149
UK	1.50	1.28	0.240	6.42	3.15	0.041	7.21	2.84	0.011
Continental Europe	0.86	1.21	0.480	-1.28	3.11	0.681	0.52	1.58	0.743
Scandinavia	1.18	1.77	0.503	8.57	4.37	0.050	2.67	2.90	0.358
1985-89	-2.33	1.89	0.217	0.47	4.19	0.910	-0.34	1.12	0.763
1990-95	-0.15	2.21	0.945	13.76	3.94	0.000	-0.22	1.08	0.841
1996-99	-1.83	2.00	0.358	4.08	3.78	0.281	0.22	1.09	0.838
2000-02	-4.84	1.76	0.006	4.92	4.09	0.229	-1.18	1.04	0.258
2003-05	-1.99	2.05	0.332						
	N=13,883	Ps.R^2 =	0.03	N=7912	Ps.R^2 =	0.06	N=10,834	Ps.R^2 =	0.04

TABLES

Table 7: Ultimate staying power of LBOs: Transition of firms out of LBO ownership

Table 7A: By the year of the original LBO transaction

	Number of original LBO transactions							Fraction of original LBO transactions							
	All LBO firms														
	1970-1984	1985-1989	1990-1994	1995-1999	2000-2002	2003-2005	2006-2007	1970-2007	1970-1984	1985-1989	1990-1994	1995-1999	2000-2002	2003-2005	2006-2007	1970-2007
Acquired by strategic buyer	65	243	436	1,361	745	540	36	3,426	32%	38%	39%	31%	19%	10%	1%	18%
Independent private company	51	116	138	379	183	107	25	999	25%	18%	12%	9%	5%	2%	1%	5%
Still in LBO ownership form	15	73	224	2,028	2,708	4,550	3,815	13,413	7%	11%	20%	46%	69%	85%	98%	69%
Bankrupt/restruct.	13	46	62	270	119	58	2	570	6%	7%	6%	6%	3%	1%	0%	3%
Went public	59	167	253	407	155	126	0	1,167	29%	26%	23%	9%	4%	2%	0%	6%
	203	645	1,113	4,445	3,910	5,381	3,878	19,575	100%	100%	100%	100%	100%	100%	100%	100%
	Backed by PE fund															
Acquired by strategic buyer	62	238	424	1,331	610	429	23	3,117	32%	38%	39%	32%	22%	11%	1%	20%
Independent private company	51	115	137	366	171	84	19	943	26%	18%	13%	9%	6%	2%	1%	6%
Still in LBO ownership form	12	68	215	1,807	1,719	3,205	2,878	9,904	6%	11%	20%	43%	63%	83%	98%	63%
Bankrupt/restruct.	13	44	61	260	91	38	2	509	7%	7%	6%	6%	3%	1%	0%	3%
Went public	58	163	252	392	145	117	0	1127	30%	26%	23%	9%	5%	3%	0%	7%
	196	628	1,089	4,156	2,736	3,873	2,922	15,600	100%	100%	100%	100%	100%	100%	100%	100%
	No financial sponsor / "Pure" MBO															
Acquired by strategic buyer	3	5	12	30	135	111	13	309	43%	29%	50%	10%	11%	7%	1%	8%
Independent private company	0	1	1	13	12	23	6	56	0%	6%	4%	4%	1%	2%	1%	1%
Still in LBO ownership form	3	5	9	221	989	1345	937	3,509	43%	29%	38%	76%	84%	89%	98%	88%
Bankrupt/restruct.	0	2	1	10	28	20	0	61	0%	12%	4%	3%	2%	1%	0%	2%
Went public	1	4	1	15	10	9	0	40	14%	24%	4%	5%	1%	1%	0%	1%
	7	17	24	289	1,174	1,508	956	3,975	100%	100%	100%	100%	100%	100%	100%	100%

Table 7B: By the type of the original LBO transaction (1970–2002 transactions only)

By LBO type												
	Publ. to private	Private to private	Division	Financial vendor	Distress	All LBO types	Public to private	Private to private	Division	Financial vendor	Distress	All LBO types
Acquired by strategic buyer	124	1,619	757	61	42	2,603	22%	29%	31%	26%	30%	29%
Independent private company	30	645	126	14	15	830	5%	12%	5%	6%	11%	9%
Went bankrupt	37	316	93	19	15	480	7%	6%	4%	8%	11%	6%
Went public	72	604	282	21	12	991	13%	11%	12%	9%	8%	11%
Still in LBO ownership form	302	2,307	1,176	116	58	3,959	53%	42%	48%	50%	41%	45%
All exits	565	5,491	2,434	231	142	8,863	100%	100%	100%	100%	100%	100%

Table 7: Ultimate staying power of LBOs: Transition of firms out of LBO ownership

Table 7C: By the location of the LBO firm (1970–2002 transactions only)

By region										
	US & Canada	UK	W. Eur. & Scand.	Rest of world	All regions	US & Canada	UK	W. Eur. & Scand.	Rest of world	All regions
Acquired by strategic buyer	1,388	622	467	126	2,603	29%	34%	26%	25%	29%
Independent private company	458	163	159	50	830	10%	9%	9%	10%	9%
Went bankrupt	324	112	36	8	480	7%	6%	2%	2%	6%
Went public	611	172	147	61	991	13%	9%	8%	12%	11%
Still in LBO ownership form	1,989	756	964	250	3,959	42%	41%	54%	51%	45%
All exits	4,770	1,825	1,773	495	8,863	100%	100%	100%	100%	100%

Table 8: Ultimate holding periods in LBO ownership. Fraction of firms exiting the LBO ownership form

All LBO firms										
Exit within	12 months	24 months	36 months	48 months	60 months	72 months	84 months	96 months	108 months	120 months
1970-1984	2%	13%	21%	34%	43%	48%	54%	55%	59%	64%
1985-1989	2%	10%	18%	24%	32%	39%	48%	54%	59%	65%
1990-1994	3%	12%	26%	36%	44%	52%	56%	60%	64%	67%
1995-1999	2%	10%	18%	24%	29%	35%	39%	43%	49%	56%
2000-2002	2%	5%	10%	16%	21%	27%	32%			
2003-2005	2%	7%	13%	18%						
2006-2007	1%									
Total	2%	8%	15%	22%	28%	36%	42%	48%	54%	61%
N	15,819	13,541	11,781	10,119	8,580	7,253	6,142	5,101	4,070	2,999

Firms with PE-fund sponsor										
Exit within	12 months	24 months	36 months	48 months	60 months	72 months	84 months	96 months	108 months	120 months
1970-1984	2%	14%	21%	35%	44%	50%	55%	56%	60%	65%
1985-1989	2%	10%	18%	25%	33%	39%	49%	55%	60%	67%
1990-1994	3%	13%	27%	37%	45%	53%	57%	61%	64%	68%
1995-1999	2%	11%	19%	25%	31%	36%	41%	45%	50%	56%
2000-2002	2%	6%	12%	19%	25%	31%	34%			
2003-2005	2%	8%	16%	23%						
2006-2007	1%									
Total	2%	9%	17%	25%	31%	38%	44%	49%	55%	62%
N	12,576	10,794	9,429	8,288	7,344	6,540	5,725	4,831	3,917	2,920

Firms without PE-fund sponsor										
Exit within	12 months	24 months	36 months	48 months	60 months	72 months	84 months	96 months	108 months	120 months
1970-1984	0%	0%	29%	29%	29%	29%	29%	43%	43%	43%
1985-1989	0%	0%	0%	0%	0%	13%	13%	20%	20%	27%
1990-1994	0%	0%	5%	5%	5%	5%	15%	25%	25%	35%
1995-1999	1%	4%	7%	9%	12%	13%	15%	18%	24%	30%
2000-2002	2%	3%	6%	9%	12%	14%	21%			
2003-2005	2%	5%	7%	9%						
2006-2007	1%									
Total	2%	4%	7%	9%	12%	13%	17%	20%	25%	32%
N	3,243	2,747	2,352	1,831	1,236	713	417	270	153	79

TABLES

Table 9: Determinants of staying power of LBOs

This table shows the results from logit regressions of the likelihood of a the firm leaving LBO status on deal and sponsor characteristics as well as country and time fixed effects. For the deal type, the omitted variable is "Independent private firm", and for the time fixed effects, the omitted category is "1970–1984." For the dummy variables, the coefficients are the change in probability (in %) of changing the value from 0 to 1, and for the other variables it is the effect of a marginal increase of one unit. P-values are calculated using White robust standard errors (STDE).

	(1)			(2)			(3)		
Dependent variable	Firm exited LBO ownership within 9 years			Firm exited LBO ownership within 9 years			Firm exited LBO ownership within 5 years		
	dY/dX	STDE	P-value	dY/dX	STDE	P-value	dY/dX	STDE	P-value
Public-to-private	1.692	3.821	0.658	-4.831	4.075	0.236	-3.678	2.049	0.073
Divisional	9.226	2.009	0.000	7.204	2.068	0.000	3.482	1.209	0.004
Secondary	-0.250	5.943	0.966	-3.853	5.952	0.517	2.801	3.204	0.382
Distressed	8.847	6.588	0.179	9.122	6.805	0.180	8.026	4.243	0.059
Financial sponsor dummy	25.165	4.189	0.000	21.948	4.477	0.000	13.623	1.529	0.000
Yrs of sponsor experience	1.081	0.156	0.000	0.863	0.161	0.000	0.412	0.090	0.000
Syndicated deal	11.096	2.012	0.000	8.640	2.087	0.000	4.269	1.280	0.001
Public fund sponsor	-10.582	2.952	0.000	-8.309	2.999	0.006	-4.351	1.591	0.006
Log EV, imputed				4.235	0.752	0.000	2.151	0.424	0.000
US	5.949	4.377	0.174	3.662	4.457	0.411	0.186	2.181	0.932
Canada	15.168	7.091	0.032	12.677	7.479	0.090	5.998	4.629	0.195
UK	4.636	4.642	0.318	5.675	4.685	0.226	0.500	2.380	0.834
Continental Europe	-7.117	4.858	0.143	-8.125	4.896	0.097	-7.487	2.108	0.000
Scandinavia	18.241	5.473	0.001	16.198	5.748	0.005	1.837	3.399	0.589
1985-89	-1.681	5.278	0.750	-4.001	5.343	0.454	-9.941	3.072	0.001
1990-95	-1.830	4.986	0.714	-1.030	5.022	0.837	-2.588	3.619	0.475
1996-99	-13.205	4.794	0.006	-11.729	4.857	0.016	-11.717	3.494	0.001
2000-02							-15.386	3.310	0.000
	N = 4,070	Ps.R2	= 0.05	N = 4,068	Ps.R2	= 0.05	N = 8,569	Ps.R2	= 0.05

	(4)			(5)			(6)		
	Firm exited LBO ownership within 3 years			Firm exited to public market (1970-2002 deals only)			Firm exited to public market (1970-2002 deals only)		
	dY/dX	STDE	P-value	dY/dX	STDE	P-value	dY/dX	STDE	P-value
Public-to-private	-2.430	1.285	0.059	2.427	1.374	0.077	-1.944	0.936	0.038
Divisional	2.476	0.774	0.001	2.062	0.705	0.003	0.429	0.635	0.499
Secondary	0.756	1.797	0.674	0.551	2.053	0.788	-1.426	1.520	0.348
Distressed	1.429	2.323	0.538	-0.421	2.356	0.858	-0.310	2.237	0.890
Financial sponsor dummy	7.127	0.928	0.000	3.472	1.113	0.002	1.135	1.377	0.410
Yrs of sponsor experience	0.212	0.057	0.000	0.433	0.049	0.000	0.289	0.050	0.000
Syndicated deal	2.829	0.841	0.001	6.754	0.902	0.000	4.251	0.815	0.000
Public fund sponsor	-3.009	0.999	0.003	-2.254	0.805	0.005	-0.933	0.864	0.281
Log EV, imputed	0.942	0.275	0.001				2.583	0.241	0.000
US	0.733	1.341	0.585	-3.381	1.209	0.005	-4.277	1.196	0.000
Canada	1.836	2.792	0.511	0.590	2.441	0.809	-0.120	2.185	0.956
UK	-0.418	1.452	0.773	-5.993	0.860	0.000	-5.069	0.873	0.000
Continental Europe	-3.007	1.317	0.022	-5.105	0.870	0.000	-5.021	0.819	0.000
Scandinavia	-1.447	1.939	0.456	-3.006	1.323	0.023	-3.370	1.146	0.003
1985-89	-3.160	2.441	0.196	-1.836	1.162	0.114	-2.726	0.994	0.006
1990-95	2.005	2.998	0.504	-4.453	0.935	0.000	-3.861	0.938	0.000
1996-99	-2.347	2.541	0.356	-13.041	1.376	0.000	-11.637	1.351	0.000
2000-02	-7.399	2.299	0.001	-13.712	0.912	0.000	-12.176	0.901	0.000
2003-05	-4.331	2.355	0.066						
	N = 11,761	Ps.R^2	= 0.04	N=8,863	Ps.R^2	= 0.11	N = 8,856	Ps.R^2	= 0.13

APPENDIX 1: IMPUTED ENTERPRISE VALUES

This table displays the results from a Heckman (1979) maximum likelihood estimation of the log Enterprise Value in the LBO transaction on independent variables. The predicted values from this regression are used to calculate imputed valuations for the observation where enterprise value is missing. For the dummy variables measuring LBO type and location, the omitted categories are "Public-to-private" and "Africa/Middle East," respectively.

Dependent variable: Log (Enterprise Value)		(Number of uncensored obs. = 8,959)		
		Coefficient	Stdev	P-value
Private to private		-1.321	0.165	0.000
Divisional		-0.860	0.106	0.000
Financial vendor		-0.244	0.136	0.072
Distressed		-1.590	0.136	0.000
Financial sponsor		0.964	0.066	0.000
Public investment fund		-0.342	0.061	0.000
Indep. private investment fund		0.217	0.049	0.000
Age of financial sponsor		0.040	0.004	0.000
Sponsor with >20 deals		0.318	0.056	0.000
Syndicated transaction		0.560	0.052	0.000
Asia		0.717	0.161	0.000
Australia		0.162	0.182	0.373
Continental Europe		0.341	0.146	0.019
Canada		0.284	0.172	0.098
Eastern Europe		-0.424	0.182	0.020
Latin America		0.624	0.212	0.003
Scandinavia		0.459	0.175	0.009
UK		-0.096	0.134	0.473
US		0.577	0.137	0.000
Year Fixed Effects	Yes			
Industry Fixed Effects	Yes			
Selection model (N = 21,366)				
Private to private		-1.679	0.046	0.000
Divisional		-1.103	0.046	0.000
Financial vendor		-1.357	0.050	0.000
Distressed		-1.013	0.071	0.000
Asia		-0.094	0.097	0.333
Australia		-0.029	0.110	0.792
Continental Europe		-0.532	0.081	0.000
Canada		-0.303	0.099	0.002
Eastern Europe		-0.183	0.102	0.074
Latin America		-0.124	0.121	0.306
Scandinavia		-0.674	0.090	0.000
UK		0.118	0.081	0.148
US		-0.398	0.080	0.000
Syndicated transaction		0.297	0.024	0.000
Public investment fund		0.179	0.035	0.000
Independent private investment fund		0.036	0.027	0.182
Age of financial sponsor		0.023	0.002	0.000
Financial sponsor		0.189	0.033	0.000
LBO post-1990		-0.061	0.054	0.258
LBO post-1997		-0.100	0.036	0.005
LBO post-2000		0.137	0.029	0.000
LBO post-2004		-0.317	0.023	0.000
Constant		1.242	0.101	0.000

REFERENCES

Axelson, U., T. Jenkinson, P. Strömberg, and M. Weisbach (2007), "Leverage and pricing in buyouts: An empirical analysis", Working Paper.

Baker, G., and K. Wruck (1989), "Organizational changes and value creation in leveraged buyouts: The case of O.M. Scott & Sons Company", *Journal of Financial Economics* 25, 163–190.

Ben-Ameur, H., B. Hind, P. Roustan, R. Théoret, and S. Trablesi (2005), "Assessing bankrupt probability on American firms: A logistic approach", Working Paper, University of Montreal.

Cao, J., and J. Lerner (2006), "The performance of reverse leveraged buyouts," Working Paper, Harvard Business School.

Cotter, J.F., and S.W. Peck (2001), "The structure of debt and active equity investors: The case of the buyout specialist", *Journal of Financial Economics* 59, 101–147.

Davis, S., J. Haltiwanger, R. Jarmin, J. Lerner, and J. Miranda (2008), "Private Equity and Employment", in Anuradha Gurung and Josh Lerner (eds.), Globalization of Alternative Investments Working Papers Volume 1: Global Economic Impact of Private Equity 2008, New York, World Economic Forum USA.

Gompers, P., and J. Lerner (2000), "Money Chasing Deals? The Impact of Fund Inflows of Private Equity Valuation", *Journal of Financial Economics* 55, 281–325.

Guo, S., E. Hotchkiss, and W. Song (2007), "Do Buyouts (Still) Create Value?", Working Paper, Boston College.

Hamilton, D., P. Varma, S. Ou, and R. Cantor (2006), "Default and recovery rates of corporate bond issuers, 1920–2005", Special Comment, Moody's Investors Service Global Credit Research.

Heckman, J. (1979), "Sample selection bias as specification error", *Econometrica* 47, 153–162.

Jensen, Michael C. (1989) "The Eclipse of the Public Corporation," Harvard Business Review 67, 61–74.

Kaplan, S.N. (1989a), "Management Buyouts: Evidence of Taxes as a Source of Value", *Journal of Finance* 44, 611–632.

Kaplan, S.N. (1989b), "The Effects of Management Buyouts on Operating Performance and Value", *Journal of Financial Economics* 24, 217–254.

Kaplan, S.N. (1989c), "Campeau's acquisition of Federated: Value destroyed or value added?", *Journal of Financial Economics* 25, 191–212.

Kaplan, S.N. (1991), "The staying power of leveraged buyouts", *Journal of Financial Economics* 29, 287–313.

Kaplan, S.N. (1997), "The evolution of US corporate governance: We are all Henry Kravis now," *Journal of Private Equity*, Fall, 7–14.

Kaplan, S.N., and A. Schoar (2005), "Private equity performance: Returns, persistence and capital flows", *Journal of Finance* 60, 1791–1823.

Kaplan, S.N., and J. Stein (1993), "The Evolution of Buyout Pricing and Financial Structure in the 1980s", *Quarterly Journal of Economics* 108, 313–357.

Kaplan, S.N., and P. Strömberg (2003), "Financial Contracting Theory Meets the Real World: Evidence from Venture Capital Contracts", *Review of Economic Studies* 70, 281–315.

King, R., and R. Levine (1993), "Finance and growth: Schumpeter might be right", *Quarterly Journal of Economics* 108, 717–738.

LaPorta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny (1998), "Law and finance", *Journal of Political Economy* 106, 1113–1155.

Lehn, K., and A. Poulsen (1989), "Free cash flow and stockholder gains in going-private transactions", *Journal of Finance* 44(3), 771–787.

Lerner, J., M. Sørensen, and P. Strömberg (2007), "Private Equity and Long-Run Investment: The Case of Innovation", Working Paper.

Ljungqvist, A., M. Richardson, and D. Wolfenzon (2007), "The Investment Behavior of Buyout Funds: Theory and Evidence", ECGI Working Paper no. 174/2007.

Long, W.F., and D.J. Ravenscraft (1993), "LBOs, debt, and R&D intensity", *Strategic Management Journal* 14, 119–135.

Muscarella, C.J., and M.R. Vetsuypens (1990), "Efficiency and Organizational Structure: A Study of Reverse LBOs", Journal of Financial Economics 45, 1389–1413.

Rappaport, A. (1990), "The staying power of the public corporation", *Harvard Business Review* 1, 96–104.

Renneboog, L., and T. Simons (2005), "Public-to-private transactions: LBOs, MBOs, MBIs, and IBOs", Finance Working Paper no. 94/2005, European Corporate Governance Institute.

Wright, M., L. Renneboog, T. Simons, and L. Scholes (2006), "Leveraged buyouts in the UK and Continental Europe: Retrospect and prospect", Finance Working Paper no. 126/2006, European Corporate Governance Institute.

Private equity and long-run investment: the case of innovation*

JOSH LERNER
Harvard Business School and NBER

PER STRÖMBERG
Stockholm Institute for Financial Research and NBER

MORTEN SØRENSEN
University of Chicago Graduate School of Business, NBER and SIFR

1. INTRODUCTION

In his influential 1989 paper, "The Eclipse of the Public Corporation", Michael Jensen predicted that the leveraged buyout (LBO) would emerge as the dominant corporate organization form. With its emphasis on corporate governance, concentrated ownership by active owners, strong managerial incentives and efficient capital structure, he argued, the buyout was superior to the public corporation with its dispersed shareholders and weak governance. The paper argued that these features enabled managers to proceed without the pressure of catering to the market's demands for steadily growing quarterly profits, which Stein (1988) and others argue can lead to firms myopically sacrificing long-run investments.

These claims excited much debate in the subsequent years. Critics have questioned the extent to which private equity creates value, suggesting that funds' profits are instead driven by favourable tax treatment of corporate debt, inducing senior executives of publicly traded firms into accepting deals that go against the interests of shareholders or abrogating explicit and implicit contracts with workers (e.g. Shleifer and Summers 1988). Moreover, these critics question whether private equity-backed firms take a longer-run perspective than their public peers. They point to practices such as special dividends to equity investors and "quick flips" – that is, initial public offerings (IPOs) of firms soon after a private equity investment – which enable private equity groups to generate fees and raise new funds more quickly. Sceptics argue that given their incentives to undertake and exit deals, private equity investors are also likely to take steps that boost short-run performance at the expense of sustained corporate growth.

In this paper, we examine one form of long-run investment: investments in innovative activities. This arena is an attractive testing ground of the issues delineated above for four reasons:

1. These expenditures have the classic features of a long-run investment: the costs associated with generating innovations must be expensed immediately by firms, yet the benefits are unlikely to be observed for several years thereafter. As a result, a number of studies of managerial "myopia" have examined R&D expenditures (e.g. Meulbroek et al 1990).

2. An extensive body of work in the economics of technological change has documented that the characteristics of patents can be used to assess the nature of firms' technological innovation. While this literature acknowledges that these are not a perfect measurement of innovation – many inventions are instead protected as trade secrets – the value of patents as a measure of innovative activities is widely accepted (e.g. Griliches 1990, Jaffe and Trajtenberg 2002).

3. Unlike many other measures, patents are observable for both public and privately-held firms, which is important when studying private equity transactions.

4. Finally, innovation is important. Economists have understood that technological innovation is critical to economic growth since the pioneering work of Abramowitz (1956) and Solow (1957). At the same time, not all research expenditures are well spent: critics of major corporations (e.g. Jensen 1993) have suggested that many corporate research expenditures have been wasteful and yielded a low return.

We examine the impact of private equity investment on the patenting behaviour of 495 firms with at least one successful patent application filed from three years before to five years after a later-stage private equity investment.[1] We find that:

- Firms pursue more economically important innovations, as measured by patent citations, in the years after private equity investments. This pattern is robust to a variety of specifications and controls

* Harvard Business School and National Bureau of Economic Research; University of Chicago Graduate School of Business, NBER, and SIFR; and Stockholm Institute for Financial Research and NBER. We thank Geraldine Kim, Jodi Krakower, Sanjey Sivanesan, and especially Sarah Woolverton for assistance with this project. The World Economic Forum and Harvard Business School's Division of Research provided financial support for this research. We thank for helpful comments from participants in the World Economic Forum's "Global Economic Impact of Private Equity" project and in a seminar at the London School of Economics, especially Mark Schankerman and John van Reenen. All errors and omissions are our own.

[1] Throughout this paper, when we refer to private equity transactions, we are referring to equity investments by professionally managed partnerships that involve leveraged buyouts or other equity investments with a substantial amount of associated indebtedness.

- These firms display no deterioration in the extent to which their research is basic or fundamental after the private equity investments, as measured by patent originality and generality
- The quantity of patenting does not appear to systematically change after private equity transactions
- The patent portfolios of firms become more focused in the years after private equity investments
- The increase in patent importance is the greatest in the patent classes where the firm has had its historic focus and in those classes where the firm increases patenting after the private equity investment

Collectively, these findings appear inconsistent with claims that private equity firms generate profits by sacrificing necessary long-run investments: rather, the private equity investments appear to lead to a beneficial refocusing of the firms' innovative portfolios.

There are two sets of related literatures. First, a number of works have looked at the impact of leverage, which is a prominent feature of private equity investments, on innovation. These studies, which have typically examined publicly traded firms with differing debt levels, have reached ambiguous conclusions. On the one hand, there is a clear association between more leverage and lower levels of R&D spending, as documented by Hall's (1992) examination of over 1200 manufacturing firms and Himmelberg and Petersen's (1994) more targeted study of 170 small, high-technology firms. On the other hand, the direction of causality is unclear: it is difficult to determine if debt leads to R&D cutbacks or if struggling firms simply have more debt and less spending on innovation. Hao and Jaffe (1993), who carefully grapple with this question, conclude that more debt can be shown to reduce R&D spending only for the very smallest firms. For larger firms, the causal relationship is ambiguous.

A second set of related papers examines innovative activity specifically after leveraged buyouts. Hall (1990) looks at 76 public-to-private buyouts (i.e. transactions where a publicly traded firm was purchased and taken private) of manufacturing firms that took place in the 1980s. She points out that the impact of these transactions on cumulative innovation is likely to be slight: while these firms represent 4% of manufacturing employment in 1982, they only account for 1% of the R&D spending. Lichtenberg and Siegel (1990) examine 43 whole-firm LBOs during the 1980s where the firm files the Bureau of the Census's survey on research activities (Form RD-1) prior to and after the transaction. They find that these firms increase research spending after the LBO, both on an absolute basis and relative to their peers.

There are several reasons to revisit the question of the impact of private equity investments on innovation. First, the private equity industry is much more substantial than it was in the 1980s. This growth not only means that we have a larger sample to work with, but the changes in the industry (e.g. the increased competition among and greater operational orientation of private equity groups) suggest that the earlier relationships may not hold today. In particular, transactions involving technology-intensive industries have become more common in recent decades. It is also desirable to look beyond the public-to-private transactions that dominate earlier samples. Finally, the computerization of patent records in the past two decades has enhanced our ability to study the impact on innovation.

The plan of this paper is as follows. In Section 2, we describe the construction of the dataset. Section 3 reviews the methodology employed in the study. We present the empirical analyses in Section 4. The final section concludes the paper and discusses future work.

2. THE SAMPLE

To construct the dataset, we identify a comprehensive list of private equity investments and match these firms to the US patent records. This section describes the process.

A. Identifying private equity transactions

To identify private equity investments, we begin with the Capital IQ database. Capital IQ has specialized in tracking private equity deals on a worldwide basis since 1999. Through extensive research, Capital IQ attempts to "back fill" information about investments prior to this period.[2]

Our starting point is the list of transactions identified by Capital IQ that closed between January 1980 and December 2005. We eliminate two types of transactions. First, Capital IQ includes some transactions by private equity groups that did not entail the use of leverage. Many buyout groups made at least some venture capital investments during the late 1990s and Capital IQ also captures a considerable number of venture capital investments by traditional venture funds. Hence, we eliminate transactions that were not classified in the relevant categories by Capital IQ (which involve the phrases "going private", "leveraged buyout", "management buyout", "platform", or slight variants). Second, the database includes a number of transactions that do not have the involvement of a financial sponsor (i.e. a private equity firm). We eliminate these deals as well: while transactions in which a management team takes a firm private using their own resources and/or bank debt are interesting, they are not the focus of this study. After these eliminations, the database consists of approximately 11,000 transactions.

We supplement the Capital IQ data with data from another vendor, Dealogic. In many cases, Dealogic has more comprehensive information about the features of the transactions, such as the multiple of earnings paid and the capital structure. It also frequently records information on

[2] Most data services tracking private equity investments were not established until the late 1990s. The most geographically comprehensive exception, SDC VentureXpert, was primarily focused on capturing venture capital investments until the mid-1990s.

alternative names associated with the firms, add-on acquisitions and exits, which are useful for searching patent records. We also use a wide variety of databases, including those from Capital IQ and SDC and compilations of news stories, to identify the characteristics of the transactions and the nature of the exits from the investment.

B. Capturing patent data

We then match the names of the private equity portfolio firms to those of the US Patent and Trademark Office (USPTO). To do this, we employ the Harvard Business School (HBS) patent database, which includes all electronic records of the USPTO up to May 2007. Since the names of assignees in the original USPTO database are riddled with misspellings and inconsistencies, the names in the HBS patent database have been researched and consolidated.

We then search the database for each of the bought-out firms, using both the original name and any alternative names from Dealogic. We examine firms based both in the US and abroad: patent protection is nation-specific, so non-US firms with important discoveries will apply for patent protection in the US.

We only identify cases where we were confident that the name and geographic location of the firms matched. (The patent data have information on the location of both the inventors and the entity to which the firm was assigned at the time the patent issues, which is typically the inventor's employer.) In many cases, we encounter ambiguous situations where the firm names are similar, but not exact, or where the location of the patentee differs from the records of Capital IQ. In these cases, we research the potential matches, using historical editions of the *Directory of Corporate Affiliations*, *Hoover's Directory*, the Factiva database of news stories and web searches. Only when we are confident of the match is it included in the sample. In all, we identify 496 entities with at least one ultimately successful patent application from the calendar year starting three years before to the calendar year starting five years after the year of the private equity investment.[3]

We believe the seemingly small number of patentees reflects two considerations. First, in many instances, the private equity-backed firms are "old economy" ones that rely on trade secrets or branding to protect intellectual property. Second, the acceleration of private equity activity means that many of the transactions were undertaken in 2004 and 2005. In cases of divisional buyouts where new firms were created, we have only a short period to observe patenting activity. Even if these new entities have filed patents, they are unlikely to have issued by May 2007. (We are only examining patent applications that are successful, that is, have been granted by the USPTO.)

One challenge is that, of the 8,938 patents we identify, more than one-quarter (2,440) are assigned to a single firm, Seagate Technologies. The next largest patentee accounts for under 5% of the sample. Because Seagate would dominate the sample, we do not include it in the analyses. Thus, our sample consists of 6,398 patents from 495 firms.

Table 1 and Figure 1 summarize the data. In Panel A, we summarize the years of the private equity investments and of the exits from these investments. (Many investments remain in progress, and we are not able to determine the year of all exits, especially those involving private sales.) The transactions are concentrated in the second half of the 1990s and the first half of the 2000s. This pattern reflects both the increased volume of private equity investments during these years and the growing representation of technology firms (which are more likely to have patents) among more recent investments (Strömberg 2008). The absence of transactions from 2006 and 2007 reflects the construction of the sample, as described above. Exits, not surprisingly, lag the transactions by several years.

Panel B shows the transactions are a mixture of types. Most common are buyouts of corporate divisions, followed by private-to-private (investments in unquoted entities), secondary (that is, groups already with a private equity investor) and public-to-private deals. These patterns mirror private equity investments more generally, as does the preponderance of exits by trade sale revealed in Panel C (Strömberg 2008).

Panel D reveals the industry composition of the firms and patents in the sample. (All patents in this tabulation are assigned to the primary industry of the parent: in later analyses, we use the patent-specific information revealed in its classification by the USPTO.) No single industry dominates the population, which consists of a mixture of "old" (e.g. auto parts and building products) and "new" (for instance, application software and healthcare equipment) economy sectors.

Panel E displays the timing of the patent applications and awards in the sample. The application dates of the awards in the sample extend from 1983 (three years before the first private equity investment) to 2006. (No applications from 2007 appear because we are only examining successful applications that have already been granted by the USPTO.) The number of grants mirrors the pattern of applications with a two-to-three year lag. The number of awards falls sharply in 2007, because we only identify grants up to May 2007. The growth in private equity investments and patent grants is also captured in Figure 1.

Panel F, which shows the distribution of patenting relative to the private equity investments, illustrates one of the

[3] We follow the literature in focusing only on standard, or utility, patents, rather than other awards, such as design or reissue awards. Utility patents represent about 99% of all awards (Jaffe and Trajtenberg 2002).

challenges posed by our methodology. The patents are concentrated in the years before and immediately after the buyout. Again, this reflects the "back-end loaded" nature of the sample and the lags associated with the patent grant process. We obviously cannot see successful patents filed five years after a buyout undertaken in 2005, and may not see many of those filed five years after a buyout in 2000: patents take on average over 30 months to issue, with a substantial minority taking considerably longer.[4]

We capture a variety of information about the patent awards. Over the past two decades, several quantitative measures of patent quality have become widely adopted (Jaffe and Trajtenberg 2002; Lanjouw, Pakes and Putnam 1998). These measures rely on the citations either to or by the patent award to characterize the grants (called forward and backward citations respectively). Citations are extremely important in patent filings, since they serve as "property markers" delineating the scope of the granted claims. Patents with more forward citations are typically interpreted in the literature as having more impact or being more important than other awards.

Economists have also looked at the distribution of these citations. Patents that cite patents in a broader array of technology classes are regarded as having more "originality"; those that are cited by a more technologically dispersed array of patents, more "generality". Both measures have been interpreted as indicative of the fundamental importance of the research being patented.[5]

In addition to the truncation problem delineated above, we also face challenges around divisional buyouts and cases where the target firm was ultimately acquired by another corporation. In these instances, the firm's patents may not be assigned to the target but rather to the corporate parent. Consider, for instance, a divisional buyout. Many of the patents applied for three years before the buyout are likely to be issued before the private equity investment: in most instances, these will be assigned to the corporate parent. Even some patents applied for by employees of the bought-out division that are issued after the buyout may nonetheless be assigned to the corporate parent rather than to the target.

While we are unable to comprehensively solve this problem, we can partially address the issue. In unreported regressions, we repeat the analyses, capturing some, though not all, of the additional patents associated with bought-out firms that are units of larger concerns during part of the period from three years before to five years after the investment. In particular, we first collect the names of all the individual inventors in the patents applied for by each private equity-backed firm during the study period. We then identify all patents either assigned to its corporate parent prior to the private equity investment or assigned to the target's acquirer after the private equity investment that had an inventor who was on the list. We feel confident that this criterion is a conservative one: it will help us identify some, though not all, of the missing patents associated with the target. It will, however, identify few "false positives", or patents assigned to the parent that are not associated with the target. If we delete these supplemental patents from the analyses below, the statistical and economic significance of the results does not change materially.

Finally, we gathered information on patents similar to the ones awarded to the private equity-backed firms. In particular, we identified all other patents assigned to the same primary US patent class and with the same grant year as the sample firms' awards. We computed the mean number of citations per year to these patents, as well as the mean generality and originality of these matches. These comparison sets allow us to control for any industry-wide changes that may have happened around the time of the private equity transactions.

3. METHODOLOGY

This section describes the methodological choices we make in the empirical analysis that follows.

In our analysis, we will focus on the *quality, size and structure* of the target's patent portfolios in four ways:

1. We examine the patents applied for before and after the private equity investment, using citations as the proxy for the quality, or economic importance.[6] In particular, we examine whether their citations in subsequent documents change before and after the transaction.

2. We examine whether the patents are substantially more or less fundamental, or basic, after the transactions. In particular, we use the measures of patent originality and generality, which are computed using the dispersion of patent classes in the patents that cite or are cited by the awards.

3. We examine variations in the propensity of firms to file for patent protection before and after private equity investments.

[4] Statistics available at http://www.uspto.gov/web/offices/com/annual/2006/50304_table4.html (accessed 21 October 2007). It is natural to ask why we only examine successful patent applications, rather than all patent filings. Unfortunately, the USPTO did not publish information on applications for patents filed prior to November 2000, and even these data are imperfect: not all applications in the US are published and information on successful applications is often removed from the database of applications.

[5] Each patent is assigned to a primary (three-digit) patent class as well as a subclass using the USPTO's classification scheme. These classifications are important to the USPTO as they are used to search subsequent awards. We follow the literature in computing these measures as one minus the Herfindahl index of the primary patent class of the cited or citing patents. Thus, a higher measure of originality or generality means that the patent is drawing on or being drawn upon by a more diverse array of awards.

[6] The widespread acceptance of patent citations as an indicator of economic importance is discussed in Griliches (1990) and Jaffe and Trajtenberg (2002).

4. Finally, we explore whether firms alter their patent filing practices after the private equity transactions. In particular, we examine whether the changes in patent quality can be explained by firms increasingly patenting in certain areas.

These analyses listed above provide some indications as to the impact of private equity on long-run investments. If indeed we observe higher quality patent filings, and a more targeted allocation of innovative activity, the patterns may be interpreted as consistent with the arguments postulated by Jensen (1989, 1993) about the salutatory effects of private equity investments. If there is a decrease in these measures of innovative activities, we interpret the results as consistent with the more sceptical views of private equity investment.

We also look across the different types of transactions listed in Table 1, Panel B. For instance, public-to-private transactions are most common at the top of the private equity market cycles. Do these transactions have more of a deleterious impact on innovation?

4. ANALYSIS

We proceed in five steps. First, we report on the analysis of patent importance. Second, we examine the fundamental nature of the patents being awarded. Third, we describe the various robustness checks of the results regarding patent quality we undertake in supplemental analyses. Fourth, we look at the quantity of patenting by these firms. Finally, we present some findings about the firms' patent portfolios before and after the private equity investments.

A. Measuring patent importance

We begin by examining the quality of the patents in the sample. The most widely used measure in the literature, as noted above, is patent citations.

One essential challenge is determining the number of years over which we should compute patent citations. There is a considerable degree of serial correlation in patent citations: patents that are highly cited in their first few years tend to be cited heavily throughout their lifetimes (Jaffe and Trajtenberg 2002). Our sample is back-end loaded, and we focus on citations in the year that the patent is issued and the three following calendar years.[7] We examine the sensitivity of the results to this choice in Section 4C below.

Table 2 takes a first look at the citations to the patents filed prior to and after the private equity transactions. The two panels treat patents filed in the calendar year of the private equity investment in two different ways: Panel A (on which we will focus) compares patents filed in the three calendar years before and the year of the private equity investment with those filed in later years, while Panel B compares those filed in the three calendar years before the investment with those in later years.

Focusing on Panel A, we see that, on average, patents issued before the transactions are cited 1.99 times in the first three years after they are granted. In contrast, patents issued after the transactions are cited 2.49 times over the three years after the grant date, corresponding to a 25% increase in the number of citations. The patterns are similar, but less sharp, in Panel B.

These comparisons are instructive but coarse, since they are based on the raw citation counts. Figure 2 plots the number of citations in the three years after the patent grants for each of the patents in the sample. Figure 3 depicts the average number of citations for the matching patents, where the matching patents are all US patents granted in the same year and assigned to the same USPTO technology class.[8] We observe a clear increase in the average number of citations for the private equity-backed firms. In part, this may reflect the increased importance of patents in later years, but it also may reflect two other changes. As the pace of patenting worldwide has accelerated, the frequency with which patents get cited may have changed. Furthermore, as private equity investments in high-technology industries have become more common (Strömberg 2008), the representation of patents in technologically dynamic industries may have increased. Figure 3 illustrates these two changes. In this figure, we observe an increase in the average number of citations for the matching patents. Thus, it is important to control for the timing of the patent grant and its technology class.

To address these concerns, Table 2 also reports relative citation counts. These are defined as the number of citations in the calendar year of the grant and the three calendar years thereafter less the number of citations in the same years to the average patent with the same grant year and primary USPTO class. When comparing the relative citation counts, both the absolute and percentage increase in the citation counts are as great or greater.

To provide a more nuanced view of the changes in the patent citations, we turn to a multivariate analysis. A natural starting point is the Poisson count model. The defining property of our model is that, for each patent i, the individual citation events are independently distributed over the three years following the grant. The intensity of citations is denoted as λ_i, and with this intensity, the patent receives λ_i citations, on average, over the three years following the grant date. To compare these intensities before and after the buyout transaction, we estimate a basic Poisson specification

$$ln(\lambda_i) = X_i'\beta \qquad (1)$$

[7] In the USPTO data, patents are typically not cited prior to issuance. This reflects the fact that many awards are not published prior to issuance and that the USPTO does not update its records of citations to published patent applications to include the number of the ultimately granted patents. Thus, the grant date is the beginning of the period when a patent can garner citations.

[8] Patents are assigned during the application process to one of approximately 1,000 technology classes, as well as a more detailed subclass. These classifications are important, since they are the primary way in which the USPTO identifies other relevant patents during the examination process.

Estimates are reported in Table 3. One limitation of this model is that the intensity is a deterministic function of the observed characteristics, $\mathbf{X\iota}$, and the parameters, β. In reality, unobserved factors often affect the citation intensity, and the Negative Binomial model is an extension of the Poisson model that includes an error term in the above equation to capture these factors. Hence, for the Negative Binomial model, the intensity is given as

$$ln(\lambda_i) = X_i'\beta + \varepsilon_i \quad (2)$$

where ε_i is an independently and identically distributed (i.i.d.) random variable with mean zero (and a Gamma distribution).

We use these models to estimate both absolute and relative citation intensities, where the relative citation intensities are defined as follows. For each patent, we find the matching patents in the USPTO database within the same technology class that are granted in the same year, and we calculate the average citation intensity of these matching patents as

$$\gamma_i = \frac{Total\ citations}{Number\ of\ matching\ patents} \quad (3)$$

where *Total citations* is the number of citations received by all matching patents during the three years following the grant year.

By including this baseline intensity in the estimation, we estimate the relative (or abnormal) citation intensities, controlling for technology specific trends in the citations, Using either the Poisson or Negative Binomial models, we estimate the specifications

$$ln(\lambda_i) = X_i'\beta + ln(\gamma_i) \quad (4)$$

$$ln(\lambda_i) = X_i'\beta + ln(\gamma_i) + \varepsilon_i \quad (5)$$

When $X_i'\beta = 0$, the patent's citation intensity equals the intensity for the matching patents. When $X_i'\beta$ is greater (or less) than zero, the citation intensity is proportionally greater (or less) than the intensity for the matched patents.

In Table 3, each patent is a separate observation.[9] In the first four regressions, the independent variables are dummy variables denoting the year of the patent application relative to that of the private equity investment. In each case, applications in the second to fifth year after the buyout are cited significantly more frequently. (In all tables in the paper, we report incidence rate ratios, where a coefficient greater than one means that the dependent variable is more likely, and a coefficient less than one means that it is less likely.) For instance, in the first regression, the coefficient of 1.824 for a patent applied for three years after the private equity transaction implies that these patents garner 82% more citations than those applied for in the year of the transaction. In the first four specifications, the coefficients in the first three rows are not significantly different from zero. Hence, patents filed before the LBO investment are cited as frequently as the matching patents. However, the coefficients in the rows that follow are greater than one and consistently significant (with the exception of the fourth row), showing that patents filed after the investment are cited significantly more frequently than the matched patents. Both the absolute and relative citation intensities show strong evidence for this pattern, although it is slightly more pronounced for the relative ones.

One advantage of the Negative Binomial model is that it allows for unobserved factors to affect citation intensity. Empirically, the presence of such factors leads to over-dispersion of the citation counts relative to the dispersion specified by the Poisson model. In our sample, when testing the dispersion, the Poisson model is decisively rejected, and we turn to the Negative Binomial specification. In specification 3, we see that this does not affect the estimated coefficients, but the standard errors increase substantially due to the extra source of variance in the model. Except for the first year after the buyout, the coefficients remain significant at the same levels. Figure 4 plots the implied absolute citation intensities in specification 4 and their standard errors.

In the fifth and sixth columns of Table 3, we employ a more parsimonious specification, in which a dummy variable equals one if the patent was applied for in the first to fifth year after the private equity investment. Again, this coefficient is greater than one and statistically highly significant.

A concern about the specifications in Table 3 is that there may be composition effects that lead to misleading conclusions. We address this concern in Table 4, where we re-estimate the equations, using fixed and random effects to control for the characteristics of the firms. In this way, we are asking whether there are any changes after the private equity investments, even after controlling for the unobserved characteristics of each firm.

One subtle issue with the implementation of this analysis is that the Negative Binomial model where the error terms ε_i are highly correlated within each firm is implemented as a Poisson model with an additional firm effect. We implement both a fixed-effect specification and a random-effect specification, which imposes the additional assumption that the error terms are uncorrelated with the observed firm characteristics. Finally, we estimate a Negative Binomial specification with fixed and random effects. This specification allows for an extra source of uncertainty and the citation intensity is given as

$$ln(\lambda_i) = X_i'\beta + ln(\gamma_i) + \varepsilon_j + \eta_i \quad (6)$$

where ε_j is a firm-specific and η_i is an additional i.i.d. error term. The cases where ε_j are fixed and random effects are both reported in Table 4.

[9] Because the patents must have three years after being issued to garner citations, the sample size is less than 6,398.

When we estimate these regressions, we find that the key results are robust to the use of fixed and random effects specifications. In particular, we find that in the four Poisson specifications (with random and fixed effects, and with controls for individual years and a more parsimonious specification with the post-investment dummy), the years after the private equity investment are associated with consistently more significant patents. The magnitudes of the coefficients do not change appreciably from those in Table 3. The results are less signficant when we employ the Negative Binomial specification with fixed and random effects in columns (5) and (6), due to the additional flexibility of this model, but qualitatively similar.

In the final column of Table 3, we employ an approach half-way between the parsimonious specification of initial regressions and the fixed effects used in Table 4. Here, we control for one important aspect of these transactions. We focus on the type of the transaction, motivated by the concern that the effects may differ across deals. For instance, public-to-private transactions are concentrated at the peaks of private equity cycles, which are often times characterized by tremendous deal volumes and low subsequent returns (Kaplan and Stein 1993; Guo et al 2007). It is possible that the ability of private equity organizations to add value to portfolio companies' long-run investment strategies is reduced during these peak periods.

To explore these possibilities, we re-run the regression, including interactions between the type of transaction and the period after the private equity investment. (This regression is estimated without a constant term.) The reported specifications include individual interaction effects for public-to-private, private-to-private, divisional buyouts and secondaries (or financial sellers), using a Negative Binomial specification and examining abnormal citation intensity. In this, and similar, specifications, we find coefficients less than one for private-to-private transactions interacted with the post-LBO dummy. However, in this case, the post-LBO dummy is greater than one, and largely offsets the below-one coefficients on the interaction terms. This effect can thus be interpreted as a return to the mean after the transaction. For secondaries or financial sellers, the interaction variable is greater than one. This suggests that the longer the company is held by private equity groups, the greater the improvement in innovative investments. We also note that the secondary transactions also start from a higher level of citation intensity.

B. The fundamental nature of the patents

One possibility is that the patents awarded to the firms are more economically important, but the firms are sacrificing more basic or fundamental research that will not yield commercial benefits for some time going forward.

We thus turn to examining the fundamental nature of the patents awarded to these firms, using the measures of patent originality and generality described above. In Table 2, we see that when we examine these measures, patents applied for after the private equity investments are somewhat more general but less original than those applied for beforehand. Once we adjust for the average generality and originality of awards in the same patent class and with the same grant year, these differences essentially disappear.

A similar conclusion emerges from the regression analyses in Table 5. When we run regressions akin to those in earlier tables (now employing an ordinary least-squares specification), we find initially that the awards applied for after the private equity investments are somewhat more general and less original.[10] Once we add the originality and generality of the average patent in the same class and grant year as independent variables, the significance of these differences essentially disappears. Thus, private equity investments do not seem to be associated with a change in the extent to which the (patented) research being pursued is fundamental.

C. Robustness checks of the patent quality analyses

In undertaking the analyses of patent quality, we needed to make a number of assumptions. In this section, we summarize the results of unreported supplemental analyses, where we relaxed these assumptions.

One issue was posed by private equity investments where there was already an existing investor. These investments are typically secondary buyouts, where one sponsor buys out the stake of another. As a result, some patents may be double-counted: they may be simultaneously prior to one transaction and after another. We repeat the analysis, employing these patents only the first time they appear and then dropping them entirely. The results are little changed.

A second concern was posed by our measure of patent citations. As discussed above, the number of citations to a given patent in each year is strongly serially correlated, so we should identify the same set of patents as heavily cited ones whether we tabulate citations after two, three or five years. Using a long window to identify citations, though, will enhance the accuracy of our identification of important patents but reduce our sample size. We repeat the analysis, using citations through the end of the second calendar year after the patent grant, as well as after the fourth year. The results are qualitatively similar to those reported in Tables 3 and 4.

A third concern has to do with what we term "cherry picking" in divisional buyouts. In particular, we worried that corporate parents, when they determine which pending patent applications will be assigned to the firm at the time of the buyout, will select only low-quality patents: the best patents, even if very relevant to the target firm, will be retained by the corporate parent. This tendency might lead to an apparent increase in quality in the patents applied for after the award, while all we are really seeing is an unbiased sample of the unit's patents.

[10] The sample size is smaller in regressions examining generality because this measure requires that patents be subsequently cited to compute.

We are able to partially address this concern by using the "missing" patents assigned to the corporate parents, as described above. We also address this issue by re-running the cross-tabulations and regressions above, dropping the divisional buyouts from our sample. Since the other cases are not "carve out" parts of firms, but rather involve the purchase of the entirety of a corporation, this problem should not be present. The key results are little changed as a result of this shift.

D. Analysis of level of patenting

In the last two analyses, we move from examining the quality of individual patents and instead look at the mixture of the overall patenting activity generated in the years before and after the private equity investments.

A natural first question is how the level of patenting activity changes around the time of a private equity investment. If the average number of successful patent filings falls dramatically, our interpretation of the earlier finding that the importance of the issued patents rises considerably might be quite different. It would suggest cut-backs of unproductive innovative activities rather than repositioning of research from lower to higher impact topics.

An analysis of patenting prior to and after the private equity investment is problematic, however, for several reasons. While we can adjust for the truncation associated with the timing of the patent applications (the fact that, in many cases, not all patents in the five years after the private equity investments in our sample have been applied for, much less awarded), it is very difficult to control for the assignment of patents to corporate parents. As noted above, we will be able to see some but not all of the patents assigned to targets that were units of larger firms prior to divisional buyouts or else were ultimately acquired by other concerns. The reliability of the algorithm that identifies these hidden patents is almost impossible to assess. Consequently, we exclude divisional buyouts for the analysis below.

Despite this limitation, in Table 6 we undertake an analysis of the level of patenting. An observation is a target firm in a given year: that is, for each transaction in 2000 and before, we use nine observations for each transaction, from three years prior to five years after the transaction. For transactions in subsequent years, we use smaller number of observations, reflecting our inability to see patent filings made after 2005. The dependent variable is the number of ultimately successful patent filings made in the given calendar year.

The initial analysis is in the first two columns of Table 6, which use in turn fixed effects for each year and firm to control for the differing propensity to patent. In this analysis, the results suggest that there is a marked decline in patenting.

We might worry, however, that this result is an artifact of our sample construction: in particular, while we observe some successful patent filings in the final years of the sample, there are likely to be many applications that were filed in these years that had not issued as at May 2007. (Recall the average patent pendency today is about 30 months.) Because observations of patent filings in 2004 and 2005, where this selection bias will be the worst, are disproportionately likely to be in the years after private equity transactions, this effect may bias our counts of patent filings.

We thus repeat the analyses restricting the sample in two ways. First, in columns 3 and 4, we limit the analysis to using only private equity investments prior to 1999. In these regressions, effects due to not-yet-issued patent applications should be much less severe. We find that when we use firm fixed effects, the trend of patenting over time is negative; when we use year fixed effects, the trend is insignificant.

A remaining worry is that these results may be affected by some firms not being stand-alone firms in the years before or after this transaction, even if the transaction itself is not a divisional buyout. To ensure we have patenting information about the individual firms in the years surrounding the transaction, specifications (5) and (6) are conditional on the firm having filed an ultimately successful patent application both three years before and five years after the transaction (Event years -3 and +5). This reduced the concern that we do not observe patents for the firm in the entire nine-year window. It also introduces a concern that companies that are stand-alone entities before and remain stand-alone entities after the transaction are special in other ways, which may affect our results as well. However, as expected, the main effect of conditioning on this sub-sample is to reduce the below-one coefficients in the years before the transaction, consistent with the concern that specifications (3) and (4) may underestimate these coefficients.

In the final set of analyses, we use a dummy variable for patents filed after the private equity investment, rather than separate ones for each year. When we do so, we can now estimate regressions with both year and firm fixed effects (in earlier estimations, when we tried such specifications, the regressions failed to converge). Here, we find that as before, with firm effects, the time trend in patenting is negative; with year effects, it is greater than one; and with both sets of dummy variables, it is not significantly different from zero.

Taken together, the results suggest that there is no clear change in patenting. While our conclusions must be somewhat tentative due to the discussed difficulties in measurement and the remaining uncertainties, the lack of a consistent pattern once we control for the biases is evident.

E. Analysis of patent portfolios

In the final section, we turn to considering the structure of the patent portfolios constructed by these firms in the years before and after the private equity investments. Since the previous section shows that the increase in patent importance is not driven by private equity-backed firms

cutting back on the number of filings, it is natural to wonder about the dynamics behind the change in quality.

The initial analysis is presented in the final line in Panel A of Table 2. We compare the Herfindahl index, or concentration measure, of the patent classes in which firms' awards are assigned. In this comparison, we restrict the sample to the 59 firms with at least four patent applications filed prior to the private equity investment and at least four patents applied for afterwards, in order to ensure the computed measures of concentration are meaningful. When we undertake this comparison, we find that after the private equity investments, firms are likely to have more concentrated patent portfolios than beforehand, but the p-value is just above the 10% threshold.

We can gain some additional insights as to how these more concentrated portfolios emerge from the cross-tabulations in Table 7. We use as observations each patent, and examine citations in the years prior to and after the private equity investment, just as we did in Table 2. We now divide the patents, though, in two ways. In Panel A, we divide the observations into those whose primary patent class assignment was more or less well-populated prior to the investments: more precisely, whether the firm, in applications filed in the three years prior to the private equity transaction, had above or below the median share of patenting in that primary patent class. In Panel B, we divide the patents by whether the share of patenting in the primary class increased or decreased after the private equity transaction.

The cross-tabulations provide additional insights into the sources of the increase in patent importance. First, we see from Panel A that awards in the firms' focal technologies – the areas where they had done a disproportionate amount of patenting prior to the transaction – are more likely to increase in quality, regardless of whether raw or adjusted patent counts are used. Panel B reveals that patent classes that experience an increase in patenting share are also disproportionately where the increase in patent quality occurred. These patterns are consistent with the private equity-backed firms focusing their innovative investments in their core areas of strength and generating higher-impact patent portfolios as a result.

Consistent results emerge from Table 8, which presents Negative Binomial regression analyses akin to that in the sixth column of Table 3. We now add controls for the share of patenting in the primary patent class prior to the private equity investment (in the first and second regressions) and for the change in the share of patenting in that class from before to after the investment (in the third and fourth regressions), as well as interactions between the patent measure and the dummy denoting an award filed in the first to fifth years after the private equity investment. Because the measures of patent shares may be misleading if there are just a handful of patents assigned to a given firm, we undertake the analysis both using the entire sample (the first and third columns) and only patents of firms which had at least four patents prior to the private equity investments and four after (the second and fourth columns).

The significantly greater than one coefficient for the variable "Share of firm's pre-investment patents in class" suggest that patents in the firms' "core" areas – the areas where there was more patenting prior to the private equity investment – are disproportionately likely to be important ones. Moreover, the interaction term is greater than one. Not only are these patents likely to be important, but their impact is likely to increase after the private equity investment.

The variable "Change in firm's patent in class pre- and post-investment" initially presents a more confusing picture. The coefficient is again greater than one – areas where there is growth are more important ones – but the significance is only marginal. In column 3, this interaction term is less than one, but when we restrict the sample to those firms with at least four patents before and after the transaction (or similar cut-offs), the interaction turns greater than one and significant. Once we exclude firms with only modest patenting activity, an increase in patenting is associated with a sharp (and highly significant) boost in patent quality.

Thus, these analyses suggest that private equity-backed firms tend to focus their patent filings. This focusing process is not indiscriminate, however, but tends to concentrate on core technologies. Moreover, the very process of focusing seems to lead to the patents in these selected classes having greater impact after the private equity investment.

5. CONCLUSIONS

This paper examines the nature of long-run investments in firms backed by private equity groups, focusing on innovative activities. It examines patents filed by 495 firms that received private equity backing between 1983 and 2005.

We find that:

- Patents of private equity-backed firms applied for in the years after the investment are more frequently cited
- Private equity-backed firms have no deterioration after the investments in patent originality and generality, which are proxies for the fundamental nature of the research
- The quantity of patenting appears not to consistently change in the years after the private equity investment
- The patent portfolios of firms become more focused in the years after private equity investments. Breakdowns of the patenting patterns suggest that the areas where the firms concentrate their patenting after the private equity investment, and the historical core strengths of the firm, tend to be the areas where the increase in patent impact is particularly great

We see three avenues for future research into the relationship of private equity and innovation. While each will require

additional data collection, they should deepen our understanding of this important phenomenon:

- *Is sensitivity of innovative activity to market changes less for private equity-backed firms?* Financial economists have argued (e.g., Baker, Stein and Wurgler 2003) that the public market can give misleading signals to firms regarding appropriate investments, but that managers nonetheless feel pressured to follow the market's lead. If this argument is correct, and the private equity-backed firms provide insulation against these pressures, we might anticipate that investments in innovation by private equity firms would be less sensitive to the shifts in market sentiment. To examine this, we will need to link the patent activity to changes in financial and accounting performance.

- *Do private equity-backed firms differ in their management of patent portfolios?* In the past decade, US patentees have needed to pay renewal fees in order to keep their patents active. Some large firms appear to have an automatic policy of renewing patents, even if the bulk of patents have very little value. It would be interesting to observe if private equity-backed firms are less likely to renew patents, particularly lightly cited ones, than the norm.

- *How do sales of divisions affect innovation by the parent firms?* Recent research has suggested that firms that are more reliant on internal capital markets to reallocate resources across divisions produce both a lesser number of innovations and also less novel innovations (Seru 2007). We can examine patenting not just by target firms, but also by the corporate parents of these targets. Do the changes associated with the sale of the target lead the (presumably more focused) parent firm to pursue a more effective innovation strategy?

TABLES

Table 1: Summary statistics

Panel A: year of private equity investments and exits with patenting in [-3,+5] window

	In that year, number of private equity…	
	Investments	Exits
1986	1	0
1987	0	0
1988	0	0
1989	2	0
1990	0	0
1991	0	0
1992	0	0
1993	3	0
1994	1	0
1995	11	0
1996	17	1
1997	24	4
1998	32	3
1999	53	2
2000	44	5
2001	37	3
2002	49	6
2003	70	22
2004	87	29
2005	64	41
2006	0	47
2007	0	25

Panel B: Type of private equity investments with patenting in [-3,+5] window

	Number of Investments
Public-to-Private	64
Private-to-Private	127
Divisional	219
Secondary	81
Other	4

Panel C: Type of private equity exits with patenting in [-3,+5] window

	Number of Investments
No Exit	191
Secondary	59
Initial Public Offering	38
Trade Sale	150
Bankruptcy	3
Other/Unknown	54

Table 1: Summary statistics

Panel D: Industry distribution of private equity investments with patenting in [-3,+5] window and associated patents

	Share of industry	
	Investments	Patents
Industrial Machinery	9.9%	8.3%
Auto Parts and Equipment	5.2%	11.4%
Commodity Chemicals	4.8%	4.8%
Electrical Equipment Manufacturers	4.8%	5.8%
Building Products	4.2%	1.9%
Application Software	3.4%	3.2%
Leisure Products	3.0%	4.5%
Healthcare Equipment	2.6%	3.0%
Speciality Chemicals	2.4%	4.8%
Electrical Components and Equipment	2.0%	1.6%

Panel E: Year of sample patent applications and grants

	In each year, number of	
	Applications	Grants
1983	52	0
1984	52	17
1985	56	55
1986	60	58
1987	42	54
1988	37	56
1989	25	48
1990	19	23
1991	17	21
1992	16	14
1993	30	19
1994	64	20
1995	99	30
1996	153	57
1997	313	79
1998	456	166
1999	593	309
2000	805	412
2001	968	587
2002	1,035	683
2003	869	680
2004	462	819
2005	155	801
2006	20	996
2007	0	394

Table 1: Summary statistics

Panel F: Lag between private equity investment and patent application

	Number of Investments
Three Years Prior	1,131
Two Years Prior	1,163
One Year Prior	1,121
Year of Investment	925
One Year After	721
Two Years After	531
Three Years After	360
Four Years After	264
Five Years After	182

NOTE: The sample consists of 6,398 patents awarded up to May 2007 to 495 firms that received private equity backing between 1980 and 2005. Firms and patents are only included in the sample if patents were applied for between three years before and five years after the private equity investment.

Table 2: Univariate tests of differences of patents in sample

Panel A: Comparing patents filed in [-3,0] and in [+1,+5]

	Mean for [-3,0]	Mean for [+1,+5]	p-Value, t-Test
Citations in First Three Years	1.99	2.49	0.000
Relative Citations in First 3 Years	0.24	0.74	0.000
Generality	0.71	0.69	0.332
Relative Generality	0.00	-0.02	0.047
Originality	0.51	0.49	0.006
Relative Originality	-0.05	-0.05	0.594
Herfindahl Index of Patent Classes	0.29	0.33	0.113

Panel B: Comparing patents filed in [-3,-1] and in [0,+5]

	Mean for [-3,-1]	Mean for [0,+5]	p-Value, t-Test
Citations in First Three Years	2.01	2.27	0.028
Relative Citations in First 3 Years	0.27	0.53	0.020
Generality	0.69	0.71	0.100
Relative Generality	0.00	-0.01	0.390
Originality	0.51	0.50	0.110
Relative Originality	-0.05	-0.05	0.853

NOTE: The sample consists of 6,398 patents awarded up to May 2007 to 495 firms that received private equity backing between 1980 and 2005. Firms and patents are only included in the sample if patents were applied for between three years before and five years after the private equity investment. The comparisons in the table above are made at the individual patent level, except for the calculation of the Herfindahl index of firms' patent classes, which is done on the firm level. The latter calculations are only undertaken if the firm had at least four patents applied for before and four patents applied for after the private equity investment.

TABLES

Table 3: Count models of citation intensity

	(1) Absolute Intensity	(2) Relative Intensity	(3) Absolute Intensity	(4) Relative Intensity	(5) Absolute Intensity	(6) Relative Intensity	(7) Relative Intensity
	Poisson Model	Poisson Model	Negative Binomial Model	Negative Binomial Model	Negative Binomial Model	Negative Binomial Model	Negative Binomial Model
Event Year -3	1.089**	1.012	1.089	1.035			
	(0.041)	(0.038)	(0.085)	(0.077)			
Event Year -2	1.107***	1.037	1.107	1.060			
	(0.043)	(0.040)	(0.090)	(0.082)			
Event Year -1	1.029	1.021	1.029	1.024			
	(0.041)	(0.041)	(0.085)	(0.081)			
Event Year 1	1.042	1.064	1.042	1.092			
	(0.048)	(0.049)	(0.099)	(0.099)			
Event Year 2	1.300***	1.401***	1.300**	1.375***			
	(0.062)	(0.067)	(0.135)	(0.135)			
Event Year 3	1.786***	1.942***	1.786***	1.919***			
	(0.088)	(0.095)	(0.210)	(0.213)			
Event Year 4	1.574***	1.750***	1.574***	1.714***			
	(0.093)	(0.104)	(0.219)	(0.225)			
Event Year 5	1.473***	1.805***	1.473**	1.787***			
	(0.120)	(0.147)	(0.281)	(0.323)			
Post LBO Dummy					1.251***	1.381***	
					(0.064)	(0.067)	
Public-to-Private							1.067
							(0.058)
Private-to-Private							1.182***
							(0.076)
Divisional							0.965
							(0.031)
Secondary							1.232**
							(0.106)
Post x Pub-to-Pri							0.986
							(0.095)
Post x Pri-to-Pri							0.863
							(0.086)
Post x Divisional							0.925
							(0.073)
Post x Secondary							4.463***
							(0.635)
Observations	4,207	4,205	4,207	4,205	4,207	4,205	4,175

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

NOTE: The sample consists of 6,398 patents awarded up to May 2007 to 495 firms that received private equity backing between 1980 and 2005. Firms and patents are only included in the sample if patents were applied for between three years before and five years after the private equity investment. The unit of observation is each patent in the sample with at least three years to be cited. The dependent variable is the number of citations received in the three years after the award. The table reports incidence rate ratios.

Table 4: Relative citation intensity with patentee fixed and random effects

	(1) Poisson Model Fixed Effects	(2) Poisson Model Random Effects	(3) Poisson Model Fixed Effects	(4) Poisson Model Random Effects	(5) Negative Binomial Model Fixed Effects	(6) Negative Binomial Model Random Effects
Event Year -3	1.145***	1.131***			1.107	1.080
	(0.048)	(0.046)			(0.072)	(0.068)
Event Year -2	1.192***	1.185***			1.119*	1.105
	(0.050)	(0.049)			(0.073)	(0.070)
Event Year -1	1.080*	1.069			1.027	1.015
	(0.045)	(0.045)			(0.068)	(0.066)
Event Year 1	1.045	1.044			0.912	0.924
	(0.050)	(0.050)			(0.072)	(0.071)
Event Year 2	1.446***	1.426***			1.037	1.041
	(0.073)	(0.072)			(0.093)	(0.090)
Event Year 3	1.779***	1.761***			1.210**	1.207**
	(0.093)	(0.092)			(0.118)	(0.115)
Event Year 4	1.720***	1.703***			1.235*	1.242*
	(0.110)	(0.108)			(0.144)	(0.140)
Event Year 5	1.689***	1.704***			1.218	1.246
	(0.147)	(0.146)			(0.196)	(0.196)
Post LBO Dummy			1.244***	1.243***		
			(0.035)	(0.034)		
Observations	4,005	4,205	4,005	4,205	4,005	4,205

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

NOTE: The sample consists of 6,398 patents awarded up to May 2007 to 495 firms that received private equity backing between 1980 and 2005. Firms and patents are only included in the sample if patents were applied for between three years before and five years after the private equity investment. The unit of observation is each patent in the sample with at least three years to be cited. The dependent variable is the number of citations received in the three years after the award. The table reports incidence rate ratios.

Table 5: OLS estimates of originality and generality

	(1) Originality	(2) Originality	(3) Originality	(4) Originality	(5) Generality	(6) Generality	(7) Generality	(8) Generality
Event Year -3	0.029**	0.006			-0.115***		-0.037**	
	(0.012)	(0.012)			(0.017)		(0.017)	
Event Year -2	0.002	-0.010			-0.078***		-0.031*	
	(0.012)	(0.012)			(0.016)		(0.016)	
Event Year -1	-0.004	-0.009			-0.045***		-0.024	
	(0.012)	(0.011)			(0.017)		(0.016)	
Event Year 1	-0.020	-0.014			0.036*		0.006	
	(0.013)	(0.013)			(0.019)		(0.019)	
Event Year 2	-0.021	-0.007			0.029		-0.017	
	(0.015)	(0.014)			(0.022)		(0.022)	
Event Year 3	-0.020	-0.001			0.108***		0.017	
	(0.017)	(0.017)			(0.024)		(0.024)	
Event Year 4	-0.041**	-0.004			0.120***		0.006	
	(0.019)	(0.019)			(0.029)		(0.029)	
Event Year 5	-0.095***	-0.059**			0.056		-0.090**	
	(0.022)	(0.023)			(0.036)		(0.036)	
Post LBO Dummy			-0.033***	-0.008		0.114***		0.017
			(0.008)	(0.008)		(0.012)		(0.013)
Peer Average Originality		0.794***		0.802***				
		(0.041)		(0.041)				
Peer Average Generality							0.890***	0.908***
							(0.057)	(0.053)
Constant	0.513***	0.072***	0.519***	0.065***	0.731***	0.667***	0.096**	0.059
	(0.009)	(0.025)	(0.004)	(0.024)	(0.012)	(0.005)	(0.043)	(0.036)
R-squared	0.223	0.269	0.220	0.268	0.314	0.298	0.364	0.360
Observations	6,346	6,089	6,346	6,089	3,416	3,416	3,413	3,413

NOTE: The sample consists of 6,398 patents awarded up to May 2007 to 495 firms that received private equity backing between 1980 and 2005. Firms and patents are only included in the sample if patents were applied for between three years before and five years after the private equity investment. The unit of observation is each patent in the sample for which originality and generality can be computed. The dependent variables are the originality and generality of the patents.

TABLES

Table 6: Poisson model of patent counts with fixed effects (excluding divisional buyouts)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Full Sample	Full Sample	Before 1999	Before 1999	Early and late patenting	Early and late patenting	Early and late patenting	Early and late patenting	Early and late patenting
	Year Fixed Effect	Firm Fixed Effect	Year Fixed Effect	Firm Fixed Effect	Year Fixed Effect	Firm Fixed Effect	Year Fixed Effect	Firm Fixed Firm	Year and Firm Fixed Effects
Event Year -3	1.128**	1.177***	0.298***	0.601***	0.865**	1.614***			
	(0.059)	(0.058)	(0.049)	(0.072)	(0.054)	(0.093)			
Event Year -2	1.115**	1.226***	0.512***	0.734***	0.852**	1.403***			
	(0.057)	(0.060)	(0.077)	(0.082)	(0.054)	(0.083)			
Event Year -1	1.078	1.198***	0.632***	0.878	0.930	1.273***			
	(0.055)	(0.059)	(0.084)	(0.094)	(0.059)	(0.077)			
Event Year 1	0.939	0.863***	1.203	0.957	1.016	0.767***			
	(0.051)	(0.047)	(0.141)	(0.100)	(0.074)	(0.054)			
Event Year 2	0.902*	0.857***	1.335**	0.899	1.244***	0.784***			
	(0.052)	(0.050)	(0.167)	(0.095)	(0.098)	(0.060)			
Event Year 3	0.721***	0.649***	1.389**	0.782**	1.462***	0.667***			
	(0.048)	(0.043)	(0.191)	(0.086)	(0.127)	(0.057)			
Event Year 4	0.664***	0.570***	1.438**	0.723***	1.368***	0.515***			
	(0.049)	(0.043)	(0.226)	(0.081)	(0.145)	(0.053)			
Event Year 5	0.613***	0.514***	1.060	0.713***	1.924***	0.726***			
	(0.053)	(0.045)	(0.195)	(0.081)	(0.213)	(0.079)			
Post LBO Dummy							1.373***	0.537***	0.999
							(0.056)	(0.020)	(0.068)
Observations	2,953	2,956	744	747	972	975	972	975	975

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

NOTE: The sample consists of 6,398 patents awarded up to May 2007 to 495 firms that received private equity backing between 1980 and 2005. Firms and patents are only included in the sample if patents were applied for between three years before and five years after the private equity investment. The unit of observation is each patent in the sample for which originality and generality can be computed. The dependent variables are the originality and generality of the patents. The table reports incidence rate ratios.

Table 7: Univariate tests of differences in patent citations

Panel A: Comparing patents in well- and poorly populated patent classes prior to the PE investment

	Mean for [-3,0]	Mean for [+1,+5]	p-Value, t-Test
Citations in First Three Years			
In Well-Populated Classes	2.17	3.60	0.000
In Poorly Populated Classes	1.68	1.69	0.956
Relative Citations in First 3 Years			
In Well-Populated Classes	0.42	1.86	0.000
In Poorly Populated Classes	-0.06	-0.06	0.956

Panel B: Comparing patents in growing and shrinking patent classes around time of the PE investment

	Mean for [-3,0]	Mean for [+1,+5]	p-Value, t-Test
Citations in First Three Years			
In Growing Classes	2.30	2.68	0.068
In Shrinking Classes	1.81	1.86	0.824
Relative Citations in First 3 Years			
In Growing Classes	0.55	0.93	0.069
In Shrinking Classes	0.07	0.11	0.824

NOTE: The sample consists of 6,398 patents awarded up to May 2007 to 495 firms that received private equity backing between 1980 and 2005. Firms and patents are only included in the sample if patents were applied for between three years before and five years after the private equity investment. The comparisons in the table above are made at the individual patent level. We divide the patents by whether the share of the firm's patents prior to the private equity investment in the given patent class was above or below the median, and by whether the share of the firm's patents in the class after the buyout was greater or less or equal to that prior to the transaction.

Table 8: Negative binomial regressions with controls for patent class share

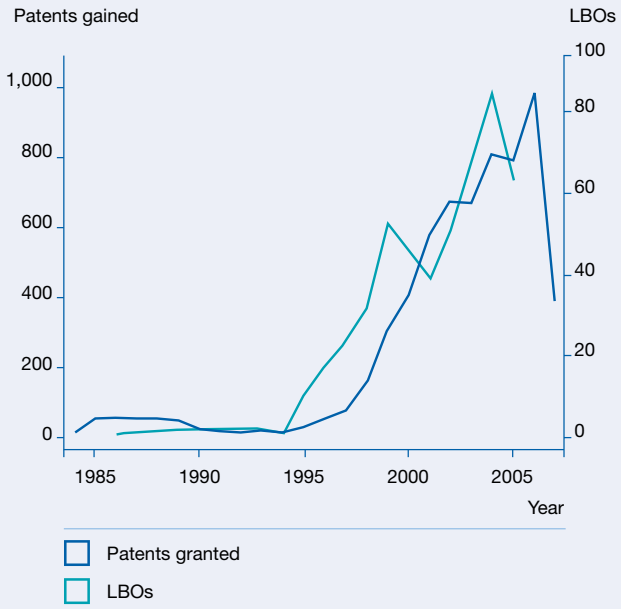
	(1)	(2)	(3)	(4)
Post LBO Dummy	0.989	0.952	1.414***	1.327***
	(0.066)	(0.073)	(0.077)	(0.081)
Share of Firm's Pre-Investment Patents in Class	1.283***	1.732***		
	(0.118)	(0.229)		
Post LBO* Share…	3.669***	4.389***		
	(0.657)	(0.987)		
Change in Firm's Patent in Class Pre- and Post-Investment			1.207**	1.323
			(0.109)	(0.288)
Post LBO* Change…			0.570***	2.666**
			(0.106)	(1.214)
Observations	4,063	2,883	4,063	2,883

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

NOTE: The sample consists of 6,398 patents awarded up to May 2007 to 495 firms that received private equity backing between 1980 and 2005. Firms and patents are only included in the sample if patents were applied for between three years before and five years after the private equity investment. The unit of observation is each patent class in which a firm received a patent in the three calendar years prior to that of the investment. The dependent variable is the share of patents in that class after the investment. The table reports incidence rate ratios.

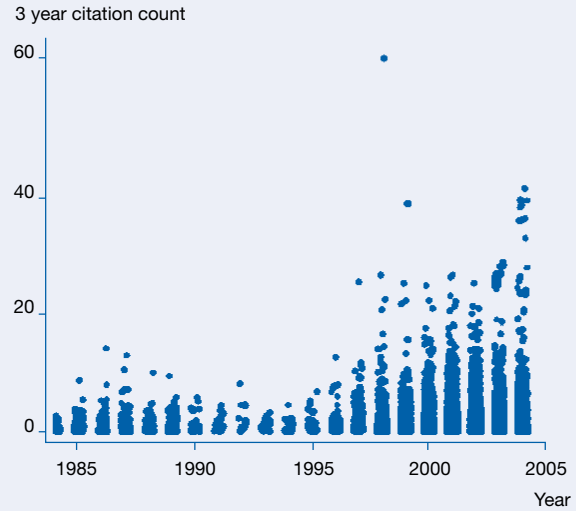
FIGURES

Figure 1: Number of private equity investments and patents granted in sample



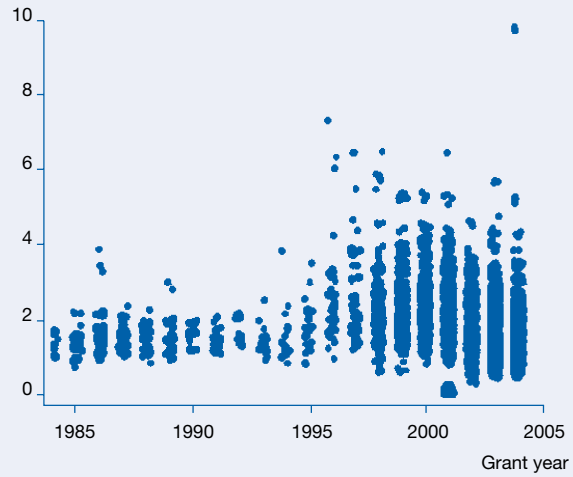
NOTE: The sample consists of 6,398 patents awarded up to May 2007 to 495 firms that received private equity backing between 1980 and 2005. Firms and patents are only included in the sample if patents were applied for between three years before and five years after the private equity investment.

Figure 2: Citations in first three years, by grant year of patent



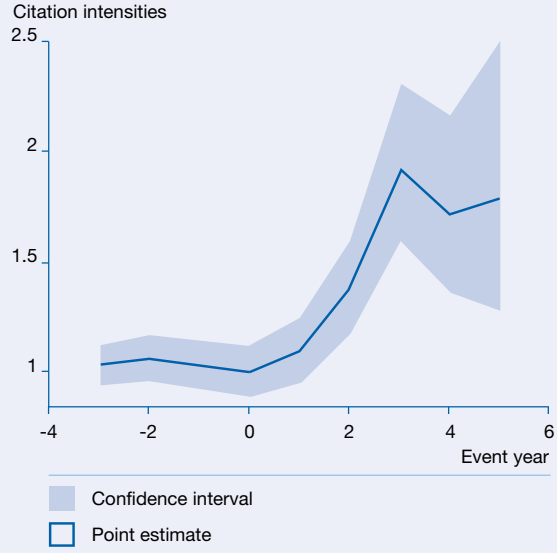
NOTE: The sample consists of 6,398 patents awarded up to May 2007 to 495 firms that received private equity backing between 1980 and 2005. Firms and patents are only included in the sample if patents were applied for between three years before and five years after the private equity investment.

Figure 3: Mean citations in first three years for patents in same class and grant year



NOTE: The sample consists of 6,398 patents awarded up to May 2007 to 495 firms that received private equity backing between 1980 and 2005. Firms and patents are only included in the sample if patents were applied for between three years before and five years after the private equity investment.

Figure 4: Citation intensities from negative binomial regression



NOTE: The sample consists of 6,398 patents awarded up to May 2007 to 495 firms that received private equity backing between 1980 and 2005. Firms and patents are only included in the sample if patents were applied for between three years before and five years after the private equity investment. The chart presents the incidence rate ratios and two standard deviation confidence intervals from the patent timing variables in the fourth regression in Table 3.

REFERENCES

Abramowitz, M. (1956), "Resource and Output Trends in the United States since 1870", *American Economic Review* 46, 5–23.

Baker, M., J. Stein and J. Wurgler (2003), "When Does the Market Matter? Stock Prices and the Investment of Equity-Dependent Firms", *Quarterly Journal of Economics* 118, 969–1006.

Griliches, Z. (1990), "Patent Statistics as Economic Indicators: A Survey", *Journal of Economic Literature* 28, 1661–1707.

Guo, S., E. Hotchkiss and W. Song (2007), "Do Buyouts (Still) Create Value?", unpublished Working Paper, Boston College and University of Cincinnati.

Hall, B. (1990), "The Impact of Corporate Restructuring on Industrial Research and Development", *Brookings Papers on Economic Activity* 1, 85–136.

Hall, B. (1992), "Investment and Research and Development at the Firm Level: Does the Source of Financing Matter?", National Bureau of Economic Research, Working Paper no. 4096.

Hao, K.Y. and A.B. Jaffe (1993), "Effect of Liquidity on Firms' R&D Spending", *Economics of Innovation and New Technology* 2, 275–282.

Himmelberg, C.P. and B.C. Petersen (1994), "R&D and Internal Finance: A Panel Study of Small Firms in High-Tech Industries", *Review of Economics and Statistics* 76, 38–51.

Jaffe, A.B. and M. Trajtenberg (2002), *Patents, Citations and Innovations: A Window on the Knowledge Economy*, Cambridge, MA, MIT Press.

Jensen, M.C. (1989), "The Eclipse of the Public Corporation", *Harvard Business Review* 67 (September–October), 61–74.

Jensen, M.C. (1993), "The Modern Industrial Revolution, Exit and the Failure of Internal Control Systems", *Journal of Finance* 48, 831–880.

Kaplan, S.N. and J.C. Stein (1993), "The Evolution of Buyout Pricing and Financial Structure in the 1980s", *Quarterly Journal of Economics* 108, 313–357.

Lanjouw, J.O., A. Pakes and J. Putnam (1998), "How to Count Patents and Value Intellectual Property: The Uses of Patent Renewal and Application Data", *Journal of Industrial Economics* 46, 405–432.

Lichtenberg, F.R. and D. Siegel (1990), "The Effects of Leveraged Buyouts on Productivity and Related Aspects of Firm Behavior", *Journal of Financial Economics* 27, 165–194.

Muelbroek, L.K., M.L. Mitchell, J.H. Mulherin et al (1990), "Shark Repellents and Managerial Myopia: An Empirical Test", *Journal of Political Economy* 98, 1108–1117

Seru, A. (2007), "Do Conglomerates Stifle Innovation?", unpublished Working Paper, University of Chicago.

Shleifer, A. and L. Summers (1988), "Breach of Trust in Hostile Takeovers", in Auerbach, A.J. (ed.), *Corporate Takeovers: Causes and Consequences*, Chicago, University of Chicago Press.

Solow, R.M. (1957), "Technical Change and the Aggregate Production Function", *Review of Economics and Statistics* 39, 312–320.

Stein, J.C. (1988), "Takeover Threats and Managerial Myopia", *Journal of Political Economy* 96, 61–80.

Strömberg, P. (2008), "The New Demography of Private Equity", in Anuradha Gurung and Josh Lerner (eds.), Globalization of Alternative Investments Working Papers Volume 1: Global Economic Impact of Private Equity 2008, New York, World Economic Forum USA.

Private equity and employment*

STEVEN J DAVIS
University of Chicago Graduate School of Business

JOHN HALTIWANGER
University of Maryland

RON JARMIN
US Bureau of the Census

JOSH LERNER
Harvard Business School

JAVIER MIRANDA
US Bureau of the Census

1. INTRODUCTION

The impact of private equity on employment arouses considerable controversy. Speaking about hedge funds and private equity groups in April 2005, Franz Müntefering, then chairman of the German Social Democratic Party (and soon to be German vice-chancellor), contended that: "Some financial investors don't waste any thoughts on the people whose jobs they destroy".[1]

Contentions like these have not gone unchallenged. Private equity associations and other groups have released several recent studies that claim positive effects of private equity on employment. Examples include the European Venture Capital Association (2005), the British Venture Capital Association (2006), A.T. Kearney (2007), and Taylor and Bryant (2007). While efforts to bring data to the issue are highly welcome, these studies have significant limitations:[2]

- Reliance on surveys with incomplete response, giving rise to concerns that the data do not accurately reflect the overall experience of employers acquired by private equity groups.

- Inability to control for employment changes in comparable firms. When a firm backed by private equity sheds 5% of employment, the interpretation depends on whether comparable firms grow by 3% or shrink by 10%.

- Failure to distinguish cleanly between employment changes at firms backed by venture capital and firms backed by other forms of private equity. Both are interesting, but the recent debate focuses on buyouts and other later-stage private equity transactions, not venture capital.

- Difficulties in disentangling organic job growth from acquisitions, divestitures and reorganizations at firms acquired by private equity groups. The prevalence of complex ownership changes and reorganizations at these firms makes it hard to track employment using only firm-level data. Limiting the analysis to firms that do not experience these complex changes is one option, but the results may then reflect a highly selective, unrepresentative sample.

- Inability to determine where jobs are being created and destroyed. Policy makers are not indifferent to whether jobs are created domestically or abroad. Some view foreign job creation in China, India and other emerging economies with alarm, especially if accompanied by job cuts in the domestic economy.

In this study, we construct and analyse a dataset that overcomes these limitations and, at the same time, encompasses a much larger set of employers and private equity transactions. We rely on the Longitudinal Business Database (LBD) at the US Bureau of the Census to follow employment at virtually all private equity-backed companies in the US, before and after private equity transactions. Using the LBD, we follow employment at the level of firms and establishments – i.e. specific factories, offices, retail outlets and other distinct physical locations where business takes place. The LBD covers the entire non-farm private sector and includes annual data on employment and payroll for about 5 million firms and 6 million establishments.

We combine the LBD with data from Capital IQ and other sources to identify and characterize private equity transactions. The resulting analysis sample contains about 5,000 US firms

* University of Chicago Graduate School of Business; University of Maryland; US Bureau of the Census; Harvard Business School; and US Bureau of the Census. Davis, Haltiwanger, and Lerner are research associates with the National Bureau of Economic Research, and Davis is a Visiting Scholar at the American Enterprise Institute. We thank Ronald Davis and Kyle Handley for research assistance with this project and Per Strömberg for data on private equity transaction classifications. Francesca Cornelli, Per Strömberg, a number of practitioners, and participants at the NBER "New World of Private Equity" pre-conference and the AEI Conference on "The History, Impact and Future of Private Equity" provided many helpful comments. The World Economic Forum, the Kauffman Foundation, Harvard Business School's Division of Research, the Global Markets Initiative at the University of Chicago's Graduate School of Business and the US Bureau of the Census provided generous financial support for this research. The analysis and results presented herein are attributable to the authors and do not necessarily reflect concurrence by the US Bureau of the Census. All errors and omissions are our own.

[1] http://www.telegraph.co.uk/money/main.jhtml?xml=/money/2005/10/14/cnmunt14.xml (accessed 3 November 2007). John Adler of the Service Employees International Union uses less inflammatory language but offers a similar assessment: "Typically it's easier to decrease costs quickly by cutting heads, which is why buyouts have typically been accompanied by layoffs". (Wong, G., "Private Equity and the Jobs Cut Myth", *CNNMoney.com*, 2 May 2007 at http://money.cnn.com/2007/05/02/markets/pe_jobs/index.htm (accessed 10 December 2007). For remarks with a similar flavour by Phillip Jennings, general secretary of the UNI global union, see Elliot, L., "Davos 2007: Private Equity Under Fire", *Guardian Unlimited*, 25 January 2007 at http://www.guardian.co.uk/business/2007/jan/25/privateequity.globalization (accessed 10 December 2007).

[2] See Service Employees International Union (2007) and Hall (2007) for detailed critiques. We discuss academic studies of private equity and employment in Section 2 below.

acquired in private equity transactions from 1980 to 2005 ("target firms") and about 300,000 US establishments operated by these firms at the time of the private equity transaction ("target establishments"). To construct control groups, we match each target establishment to other establishments in the transaction year that are comparable in terms of industry, age, size, and an indicator for whether the parent firm operates multiple establishments. We take a similar approach in constructing controls for target firms.

To clarify the scope of our study, we consider later-stage changes in ownership and control executed and partly financed by private equity firms. In these transactions, the (lead) private equity firm acquires a controlling stake in the target firm and retains a significant oversight role until it "exits" by selling its stake. The initial transaction usually involves a shift toward greater leverage in the capital structure of the target firm and, sometimes, a change in its management. We exclude management-led buyouts that do not involve a private equity firm. We also exclude startup firms backed by venture capitalists.

Our analysis of employment outcomes associated with private equity transactions has two main components. First, we track employment at target establishments for five years before and after the private equity transaction, irrespective of whether these establishments are owned and operated by the target firm throughout the entire time period around the private equity transaction. We compare the employment path for target establishments with the path for the control establishments. This component of our analysis circumvents the difficulties of firm-level analyses described above. Second, we consider outcomes for target firms – including the jobs they create at new "greenfield" establishments in the wake of private equity transactions. We quantify greenfield job creation by target firms backed by private equity and compare with greenfield job creation by control firms. Taken together, these two components yield a fuller picture of the relationship between private equity transactions and employment outcomes.

To summarize the main findings of our establishment-level analysis:

1. Employment shrinks more rapidly in target establishments than in control establishments in the wake of private equity transactions. The average cumulative two-year employment difference is about 7% in favour of controls.

2. However, employment also grows more slowly at target establishments in the year of the private equity transaction and in the two preceding years. The average cumulative employment difference in the two years before the transaction is about 4% in favour of controls. In short, employment growth at controls outstrips employment growth at targets before *and* after the private equity transaction.

3. Gross job creation (i.e. new employment positions) in the wake of private equity transactions is similar in target establishments and controls, but gross job destruction is substantially greater at targets. In other words, the post-transaction differences in employment growth mainly reflect greater job destruction at targets.

4. In the manufacturing sector, which accounts for about a quarter of all private equity transactions since 1980, there are virtually no employment growth differences between target and control establishments after private equity transactions. In contrast, employment falls rapidly in target establishments compared with controls in Retail Trade, Services and Finance, Insurance and Real Estate (FIRE).

The foregoing results describe outcomes relative to controls for establishments operated by target firms as at the private equity transaction year. They do not capture greenfield job creation at new establishments opened by target firms. To address this issue, we examine employment changes at the target firms that we can track for at least two years following the private equity transaction. This restriction reduces the set of targets we can analyse relative to the establishment-level analysis. Using this limited set of targets, we find the following:

5. Greenfield job creation in the first two years post-transaction is 15% of employment for target firms and 9% for control firms. That is, firms backed by private equity engage in 6% more greenfield job creation than the controls.

This result says that bigger job losses at target establishments in the wake of private equity transactions (Result 1 above) are at least partly offset by bigger job gains in the form of greenfield job creation by target firms. However, we have not yet performed an apples-to-apples comparison of these job losses and gains. As mentioned above, our firm-level analysis – including the part focused on greenfield job creation – relies on a restricted sample.

Our firm-level analysis also uncovers another interesting result:

6. Private equity targets engage in more acquisitions and more divestitures than controls. In the two-year period after the private equity transaction, the employment-weighted acquisition rate is 7.3% for target firms and 4.7% for controls. The employment-weighted divestiture rate is 5.7% for target firms and 2.9% for controls.

This final result, like the result for greenfield job creation, reflects outcomes in the restricted sample of target firms that we can match to the LBD and follow for at least two years post-transaction. The selection characteristics of the restricted sample may lead us to understate the employment performance of target firms, an issue that we are currently exploring.

Especially when taken together, our results suggest that private equity groups act as catalysts for creative destruction. Result 1 says that employment falls more rapidly at targets post-transaction, in line with the view that private equity groups shrink inefficient, lower value segments of underperforming target firms. We also find higher employment-weighted establishment exit rates at targets than at controls in both the full and restricted samples. At the same time, however, Result 5 says that private equity targets engage in more greenfield job creation than controls. This result suggests that private equity groups accelerate the expansion of target firm activity in new, higher value directions. Result 6 says that private equity also accelerates the pace of acquisitions and divestitures. These results fit the view that private equity groups act as catalysts for creative destruction activity in the economy, but more research is needed to fully address this issue.

Our study offers a rich set of new results on employment outcomes in the wake of private equity transactions. However, our analysis also has significant limitations, two of which we mention now. First, employment outcomes capture only one aspect of private equity transactions and their effects on firm-level and economy-wide performance. A full evaluation would consider a broader range of outcomes and issues, including the effects of private equity on compensation, profits, productivity, the health of target firms and the efficiency of resource allocation. This paper seeks to provide useful evidence on just one element of a fuller evaluation. We intend to address many of the other elements of a fuller evaluation in follow-on work using the LBD database and other sources.

Second, the experience of the private equity industry in the US, while particularly interesting given its size and relative maturity, may not reflect the experience in other countries. Thus, there is a real need to study the role of private equity in other countries with environments that differ in terms of corporate governance, financial depth, legal institutions and economic development. We think it would be extremely fruitful to study the role of private equity in other countries using the same type of rich firm-level and establishment-level data that we exploit in this study.[3]

The paper proceeds as follows: in Section 2 we review previous literature that considers the impact of private equity transactions on employment patterns in target firms. We then describe the construction of the data in Section 3. Section 4 describes our empirical methodology. We present the analyses in Section 5. The final section offers concluding remarks and discusses directions for future work.

2. PREVIOUS LITERATURE

Economists have a longstanding interest in how ownership changes affect productivity and employment (e.g. Lichtenberg and Siegel 1987, Long and Ravenscraft 1993, McGuckin and Nguyen 2001). However, only a modest number of empirical works explicitly focus on the impact of private equity on employment.[4] Most previous studies of the issue consider small samples of transactions dictated by data availability.

Kaplan (1989) focuses on 76 public-to-private leveraged buyouts (LBOs) during the 1980s. He finds that the median firm lost 12% of its employment on an industry-adjusted basis from the end of the fiscal year prior to the private equity transaction to the end of the fiscal year after the transaction. Once he eliminates target firms with asset sales or purchases that exceed 10% of total value, the adjusted employment decline (for the 24 remaining firms) is -6.2%. Muscarella and Vetsuypens (1990) focus on 72 firms that complete an initial public offering (IPO) after an LBO between 1983 and 1987. In the 26 firms they can track, employment declines by an average of 0.6% between the LBO and the IPO. This outcome represents less job creation than 92% of the publicly traded firms in Compustat.

Lichtenberg and Siegel (1990), in the analysis closest in spirit to this one, use Census Bureau data to examine changes in employment at manufacturing plants of 131 firms undergoing buyouts between 1981 and 1986. They show that, on an industry-adjusted basis, employment declines after the buyouts. The rate of decline, however, is less dramatic than that beforehand (an annual rate of -1.2% versus -1.9% beforehand). The decline is more dramatic among non-production workers than blue-collar workers. Wright, Thompson and Robbie (1992) and Amess and Wright (2007) similarly find that buyouts in the UK lead to modest employment declines. These studies follow overall employment at a set of firms, and contrast it with aggregate employment at matching firms.[5]

These studies share certain features. First, they focus on the aggregate employment of private equity-backed firms. Thus, the sale of a division or other business unit is typically counted as an employment loss even if that business unit continues to have the same number of employees under the new owner. Likewise, the acquisition of a division or other business unit is counted as an employment gain even if there is no employment change at the business unit itself. While a number of the works discussed above attempt to address this issue by eliminating buyouts involving substantial asset sales, it is unclear how this type of sample restriction affects the results given the extent of "asset shuffling" by both private equity-backed and other firms.

Second, previous US studies consider a relatively modest number of deals in the 1980s. The private equity industry is much larger today than in the 1980s. Using inflation-adjusted

[3] But see the works in the UK discussed in the next section, such as Amess and Wright (2007) and Harris, Siegel and Wright (2005).
[4] Economists have also written some more general discussions of these issues, largely based on case examples, such as Jensen (1989) and Shleifer and Summers (1988).
[5] These studies of British transactions also include management-led deals (which they term management buyouts). Some of these transactions may not have a financial sponsor playing a key role governing the firm, and thus may be quite different from traditional private equity transactions. The results described above apply primarily to the standard private equity transactions in the UK (which they term management buy-ins).

dollars, fundraising by US private equity groups is 36 times greater in 1998 than in 1985. It is more than 100 times greater in 2006 than in 1985.[6] The tremendous growth in private equity activity allows us to examine a much larger sample, and it suggests that earlier relationships may not hold because of changes in the private equity industry (e.g. the increased competition for transactions and the greater operational orientation of many groups).

Third, virtually all previous studies are subject to some form of selection or survival bias – especially those studies that focus on the firm rather than the establishment as the unit of observation. Even those previous studies that focus on establishments have typically been restricted to the manufacturing sector and even then with limitations on the ability to track establishment or firm closings.

Fourth, it is also desirable to look beyond the public-to-private transactions that dominated the earlier samples. Divisional buyouts, secondary buyouts and investments in private firms may be fundamentally different in nature. Finally, it would be helpful to examine job creation and destruction separately. The recent literature on the dynamics of firms has highlighted the high pace of creative destruction in the US economy. Gross job creation and destruction dwarf net changes. Moreover, the associated reallocations of workers across firms and sectors have been shown to enhance productivity (see, for example, Davis and Haltiwanger 1999). An open and important question is what role private equity plays in the process of creative destruction. The LBD data we use are well suited to investigate creative destruction in private equity targets relative to otherwise similar establishments and firms.

3. THE SAMPLE

The construction of the dataset required the identification of as comprehensive a database of private equity transactions as possible, and the matching of these firms to the records of the LBD. This section describes the process.

A. Identifying private equity transactions

To identify private equity transactions, we began with the Capital IQ database. Capital IQ has specialized in tracking private equity deals on a worldwide basis since 1999. Through extensive research, they have attempted to "back fill" earlier transactions prior to 1999.[7]

We download all recorded transactions that closed between January 1980 and December 2005. We then impose two sample restrictions. First, we restrict attention to transactions that entail some use of leverage. Many of the Capital IQ transactions that do not entail the use of leverage are venture capital transactions rather than private equity investments involving mature or later-stage firms. To keep the focus on private equity, we delete transactions that are not classified by Capital IQ as "going private", "leveraged buyout", "management buyout", "platform" or a similar term. A drawback of this approach is that it excludes some private equity-backed "growth buyouts" and "expansion capital" transactions that involve the purchase of a minority stake in a firm with little or no leverage. While these transactions do not fit the classic profile of leveraged buyouts, they share other key characteristics of private equity transactions.

Second, the Capital IQ database includes a number of transactions that did not involve a financial sponsor (i.e. a private equity firm). We eliminate these deals as well. While transactions in which a management team takes a firm private using its own resources are interesting, they are not the focus of this study. After restricting the sample in these two ways, the resulting database contains about 11,000 transactions worldwide.

We supplement the Capital IQ data with data from Dealogic. In many cases, Dealogic has much more comprehensive data on the features of the transactions, such as the multiple of earnings paid and the capital structure. It also frequently records information on alternative names associated with the firms, add-on acquisitions, and exits. We also use a wide variety of databases, including those from Capital IQ and SDC and compilation of news stories, to identify the characteristics of the transaction and the nature of the exit from the investment.

B. Matching to LBD data

The LBD is constructed from the Census Bureau's Business Register of US businesses with paid employees and enhanced with survey data collections. The LBD covers all sectors of the economy and all geographic areas and currently runs from 1976 to 2005. In recent years, it contains over 6 million establishment records and almost 5 million firm records per year. Basic data items include employment, payroll, four-digit Standard Industrial Classification (SIC) (and more recently six-digit North American Industrial Classification (NAICS)), employer identification numbers, business name and information about location.[8] Identifiers in the LBD files enable us to compute growth rate measures for establishments and firms, to track entry and exit of establishments and firms, and to identify changes in firm ownership. Firms in the LBD are defined based on operational control, and all establishments that are majority owned by the parent firm are included as part of the parent's activity measures.

To merge data on private equity transactions with the LBD, we match the names and addresses of the private equity portfolio firms (i.e. the targets) to name and address records in the LBD.[9] We use a three-year window of LBD data

[6] http://www.venturexpert.com (accessed 3 November 2007).

[7] Most data services tracking private equity transactions were not established until the late 1990s. The most geographically comprehensive exception, SDC VentureXpert, was primarily focused on capturing venture capital transactions until the mid-1990s.

[8] Sales data are available in the LBD from 1994. Sales data from the Economic Censuses are available every five years for earlier years. More recent years in the LBD record industry uses the newer NAICS scheme.

[9] For some of the non-matched cases, we have been successful in matching the name of the seller in the Capital IQ to the corresponding LBD firm. We plan to use such seller matches to fill out our matches of target firms, but the use of these matches requires us to determine which components of the seller firm are involved in the private equity transaction.

centred on the transaction year identified in the private equity transactions data to match to the Capital IQ/Dealogic private equity sample. A three-year window is used to cope with issues arising from differences in the timing of transactions in the two datasets.

Once we identify target firms in the LBD, we use the firm-establishment links in the LBD to identify all of the establishments owned by target firms at the time of the private equity transaction. We then follow these establishments before and after the transaction. Given the interest in examining dynamics pre- and post-private equity transaction, we need to define the private equity transaction year carefully relative to the measurement of employment in the LBD. In the LBD, employment is measured as the total employment at the establishment for the payroll period that includes the week of 12 March. Accordingly, for dating the private equity transaction year, we use the month and year information from the private equity transaction data and relate this to whether the private equity transaction occurred before or after March. For all private equity deals with a closing date after 1 March in any given calendar year, we date year zero of the transaction so that it matches up to the LBD in the subsequent calendar year.

Of the approximately 11,000 firms in our private equity sample, a little more than half are companies not headquartered in the US.[10] After dropping foreign firms, we are left with a little more than 5,000 US target firms acquired in private equity transactions between 1980 and 2005. We currently match about 86% of these targets to the LBD, which yields an analysis sample of about 4,500 firms. The matched target firms operated about 300,000 US establishments as at the private equity transaction year. On a value-weighted basis, we currently match about 93% of target firms to the LBD.

Figure 1 shows the number of US private equity targets by year and the number that we currently match to the LBD. It is apparent from Figure 1 that the number of transactions grew rapidly in the late 1990s. Figure 2 shows the dollar value of private equity targets and matched targets by year. The total market value of target firms is very large in the later years: for example, in 2005 the total market value is about $140 billion. Figure 3 shows that in 2005, for example, target firms account for about 1.9% of total non-farm business employment.

4. METHODOLOGY

This section describes three key methodological choices in the empirical analysis that follows. The first relates to the unit of analysis. In Sections 5.A and 5.B, we focus on establishments owned by the target firm immediately after the private equity transaction. This approach restricts attention to the employment outcomes of workers at target establishments at the time of the private equity transaction. By following these units over time, we are not necessarily examining entities that remain under the control of private equity investors. For example, the target firm may be taken public at a later date or some of its establishments may be sold. We take a different approach in Section 5.C and look at firm-level changes. The firm-level approach allows us to capture greenfield job creation as well as asset sales and acquisitions after the private equity transaction.

The second key choice relates to the use of controls. The use of suitable controls is important for at least two reasons:

- The distribution of private equity transactions across industries and by firm and establishment characteristics is not random. For example, practitioner accounts often suggest that transactions are concentrated in industries undergoing significant restructuring, whether due to regulatory action, foreign competition or technological change. Figures 4A and 4B show the distribution of private equity transactions by broad industry sector for the 1980–2001 and 2002–2005 periods. Even at this high level of industry aggregation, it is apparent that target firms are disproportionately concentrated in manufacturing and financial services.

- By construction, target establishments have positive employment in the year of the private equity transaction. To the extent that newer establishments continually replace older ones, any randomly selected set of establishments is expected to decline in size going forward. Hence, the interesting issue is not whether target establishments lose employment after transaction, but what happens to their employment compared with other establishments that also have positive employment in the year of the private equity transaction.[11] Our use of controls deals with this issue in a natural way.

The choice of the specific benchmark in constructing control groups also presents some issues. While the huge number of firms and establishments in the LBD might seem to allow infinite specificity of controls, as one chooses more dimensions along which to control simultaneously, the degrees of freedom diminish rapidly. Our basic approach is to define a set of control establishments for each target establishment based on observable establishment characteristics in the private equity transaction year. Once we identify the control establishments, we then follow them before and after the transaction year in the same way that we follow target establishments. This approach enables us to compare

[10] Some foreign firms that are targets in private equity transactions are likely to have US establishments. We will explore this issue and seek to capture US establishments of foreign-owned private equity targets in a future draft.
[11] The same issue arises in the firm-level analysis, but it is much more pronounced in the establishment-level analysis.

employment paths for targets with the employment paths for controls with the same observable characteristics in the transaction year. There are close to 300,000 target establishments in our analysis sample and more than 1.4 million control establishments.

In constructing control groups we use 72 industry categories, three establishment age classes, three establishment size classes based on relative size within the industry and age class, and an indicator for whether the establishment is part of a multi-establishment firm or a single-establishment firm.[12] Fully interacting these factors yields about 1,300 control cells per year. After pooling across years, there are about 30,000 potential control classes in our analysis. In practice, target establishments populate about 7,500 of these classes. We now provide some additional remarks about the controls and their motivation:

- Industry: By matching targets to controls in the same industry, we alleviate concerns that the non-random industry distribution of targets (Figures 4A and 4B) drives our results. We match targets to controls at the two-digit SIC level for the 1980–2001 period and at the four-digit NAICS level (roughly equivalent to two-digit SIC) for the 2002–2005 period.

- Establishment age: Figure 5 shows that target establishments are older than other establishments on an employment-weighted basis. Previous research on business dynamics emphasizes that the mean and variability of employment growth rates vary systematically with establishment and firm age (e.g. Davis et al 2006, 2007). Recent findings highlight especially large differences between very young establishments (firms) and more mature establishments (firms). To alleviate concerns that the non-random age distribution of targets drives our results, we use three age classes for establishments: 0–4, 5–9 and 10 or more years since first year of positive payroll for the establishment. Given the large differences in the mean and variability of employment growth by establishment age, net employment and volatility of growth rates across establishments, controlling for such age differences is likely to be very important.

- Relative size: The recent literature also finds that average net growth as well as the volatility of net growth varies systematically by business size. However, the size distribution of establishments also varies dramatically by industry, with manufacturing establishments typically much larger than, say, retail establishments. As such, we control for the relative size of establishments in each industry. We classify each establishment into a small, medium or large size class based on its relative size in the establishment's industry-age-year cell. We choose the size thresholds so that each relative size class contains one third of employment in the industry-age-year cell. The right panel of Figure 5 shows that the targeted establishments are disproportionately in the middle and larger relative size classes, compared with the LBD universe of establishments on an employment-weighted basis.

- Single-unit versus multi-unit: Another factor that has been shown to be important for firm and establishment dynamics is whether the establishment is part of a single-unit firm or part of a firm with multiple establishments. Examples of multi-unit firms include Wal-Mart with many retail and wholesale establishments and Chrysler with many automobile assembly plants and other facilities.

A third choice relates to the time frame of the analysis. The establishment-level analyses focus on the change in employment in the five years before and after the transaction. This corresponds to typical holding periods by private equity groups (Strömberg 2008), and should give a reasonably comprehensive sense of the impacts of the transactions.

For the firm-level analysis, we must confront the fact that firms are constantly being reorganized through mergers, acquisitions and divestitures, as well as whole-firm changes in ownership. The exit of a firm often then does not imply that all the establishments in the firm have ceased operations and likewise the entry of a firm often does not imply greenfield entry. We deal with this limitation of the firm-level analysis in a number of ways. While our firm-level analysis is based on firms that we can accurately track over time, we focus on a relatively short horizon after buyout transactions (two years) so that the tracking of firms is more reliable. In addition, we use our establishment-level data integrated with the firm to quantify the impact of selection bias in our firm-level analysis.

Finally, in Sections 5.A and 5.B, we compare employment dynamics at the establishments of target firms with the employment dynamics of the control establishments. It is useful to define the measure of employment and growth that we use in this analysis. Let E_{it} be employment in year t for establishment i. Recall this is a point-in-time measure reflecting the number of workers on the payroll for the payroll period that includes 12 March. We measure establishment-level employment growth as follows:

$$g_{it} = (E_{it} - E_{it\text{-}1}) / X_{it},$$

where

$$X_{it} = .5^{*} (E_{it} + E_{it\text{-}1}) .$$

This growth rate measure has become standard in analysis of establishment and firm dynamics, because it shares some useful properties of log differences but also accommodates entry and exit. (See Davis et al 2006, and Tornqvist, Vartia

[12] To construct our relative size measure, we first group establishments by the 72 industries and three age classes in each calendar year. Next, we rank establishments by number of employees within each industry-age-year cell. Finally, we define cutoffs for small, medium and large establishments so that each size class category accounts for about one third of employment in the industry-age-year cell.

and Vartia 1985.) Aggregate employment growth at any level of aggregation is given by the appropriate employment weighted average of establishment-level growth:

$$g_t = \sum_i (X_{it} / X_t) / g_{it},$$

where

$$X_t = \sum_i X_{it}$$

It is instructive to decompose net growth into those establishments that are increasing employment (including the contribution of entry) and those establishments decreasing employment (including the contribution of exit). Denoting the former as (gross) job creation and the latter as job destruction, these two gross flow measures are calculated as:

$$JC_t = \sum_i (X_{it} / X_t) \max \{g_{it}, 0\}$$

$$JD_t = \sum_i (X_{it} / X_t) \max \{-g_{it}, 0\}$$

In addition, computing the respective contribution of entry to job creation and exit to job destruction is useful. These measures are given by:

$$JC\_Entry_t = \sum_i (X_{it} / X_t) I \{g_{it} = 2\},$$

where I is an indicator variable equal to one if expression in brackets hold, zero otherwise, and $g_{it} = 2$ denotes an entrant.

$$JD\_Exit_t = \sum_i (X_{it} / X_t) I \{g_{it} = -2\},$$

where $g_{it} = -2$ denotes an exit.

Given these definitions, the following simple relationships hold:

$$g_t = JC_t - JD_t, JC_t = JC\_Cont_t + JC\_Entry_t$$
$$\text{and } JD_t = JD\_Cont_t + JD\_Exit_t$$

where *JC_Cont* and *JD_Cont* are job creation and job destruction for continuing establishments respectively.

The firm-level analysis uses the same basic measures but with the caveat that firm-level entry and exit must not be interpreted in the same manner as establishment-level entry and exit. As discussed above, establishment-level entry is the opening up of a new (greenfield) establishment at a specific location and establishment-level exit indicates that the activity at the physical location has ceased operations. In contrast, firm-level entry may reflect a new organization or ownership of previously operating entities and firm-level exit may likewise reflect some change in organization or ownership.

5. ANALYSIS

A. Basic establishment-level analyses

We conduct an "event study", exploring the impact of the private equity transaction during as well as before and after the transaction. As noted above, we focus on the window of time from five years before to five years after the transaction. We compare and contrast the employment dynamics for the target (private equity-backed) establishments with the control establishments. For any given target establishment, the control establishments are all the establishments that have positive activity in the transaction year of the target that are in the same industry, age, relative size and multi-unit status cell. Since we look at the impact five years prior to and five years subsequent to the transaction for this initial analysis, we focus on transactions that occurred in the 1980–2000 period.[13]

The first exercise we explore is the differences in net growth rates of employment for the establishments of the targets vs the controls. Figure 6A shows the net growth rate differences in the transaction year and for the five years prior and subsequent to the transaction. To construct Figure 6A, we pool all of the private equity transactions in our matched sample from 1980 to 2000 and calculate differences in growth rates relative to controls on an employment-weighted basis. Prior to and in the year of the private equity transaction, there is a systematic pattern in terms of less job growth (or more job losses) for the targets than the controls: the differences in net growth are between 1% and 3% per year. This is consistent with depictions of private equity groups investing in troubled companies. After a similarly lower rate for net job growth for targets in the first year after the transaction, the difference in the job growth rates widens in the second and third year after the transaction: the rate is about 4% below that of the controls in each year. In the fourth and fifth years after the transaction, the pattern reverses, with the targets having slightly greater employment growth.[14]

To help understand these patterns, we explore different dimensions of the differences between establishments of targets and controls. In Figure 6B, we show the net growth rate patterns separately for targets and controls. The basic patterns of net growth for targets and controls are quite similar. Prior to the transaction, both targets and controls exhibit large positive growth rates. Subsequent to the transaction, both targets and controls exhibit large negative growth rates. These patterns highlight the critical need to include controls in evaluating the employment dynamics of establishments of targets. If one looked at employment dynamics of establishments of targets in isolation (focusing only on the targets in Figure 6B), one might draw the very misleading conclusion that targets shrink consistently and substantially after the private equity transaction.[15]

[13] Our firm-level analysis in later sections focuses on a two-year horizon after the transaction and thus considers all transactions up through those in 2003. For the firm-level analysis, we have found that the results are quite similar whether we consider transactions only up through 2000 or 2003, suggesting that the establishment-level analysis is likely not very sensitive to this restriction. We plan to explore this issue further in future work.

[14] We do not report standard errors in this draft but will report standard errors for key exercises in subsequent drafts. For example, the reported net differences in Figure 6A can be interpreted as being consistent with pooling the target and control data over all years and estimating an employment-weighted regression of net employment growth on fully saturated controls and private equity transaction dummies for targeted establishments.

[15] It is important to note that the pattern of positive net employment growth prior to the transaction year and negative net growth after seen in Figure 6B and the inverted v-shape in Figure 6C reflect a generic feature of the data. Namely, if one randomly observes establishments at some fixed point in their lifecycle, they will, on average, exhibit growth up to the point and will, on average, exhibit decline from that point on.

Figure 6C compares the actual employment level of private equity transactions pre- and post-transaction with the implied employment of these targets had they grown at the same rate as the controls.[16] This exercise permits evaluating the cumulative impact of the differences in net growth rates between targets and controls. To conduct this counterfactual exercise, the employment level of the controls is normalized to be exactly equal to that of the targets in the transaction year. The pattern for the controls shows the counterfactual level of employment that would have emerged for targets if the targets had exhibited the same pre- and post-transaction employment growth rates as the controls. Figure 6C shows that, five years after the transaction, the targets have a level of employment that is 10.3% lower than it would be if targets had exhibited the same growth rates as controls.[17]

In interpreting the results from Figures 6A to 6C, it is important to emphasize that the observed net changes may stem from several margins of adjustment. The recent literature on firm and establishment dynamics has emphasized the large gross flows relative to net changes that underlie employment dynamics (see, for example, Davis, Haltiwanger and Schuh 1996). Figures 7A and 7B show the underlying gross job creation and destruction rates for targets and controls. It is apparent from Figures 7A and 7B that the rates of gross changes for both targets and controls are large relative to the net changes observed in Figure 6. Both targets and controls have higher job creation rates prior to the transaction than after and have higher destruction rates subsequently than beforehand. As discussed above, this pattern reflects the nature of the sample construction process.

While the overall patterns are similar, there are some interesting differences in the patterns of the gross flows between targets and controls. Figures 8A and 8B show the differences between creation and destruction rates, respectively, between targets and controls. Prior to the transaction, there is no systematic pattern of differences between the private equity-backed targets and the controls in terms of creation and destruction rates, except for the decline in job creation by the targets in the year before the private equity transaction. Subsequent to the transaction, the targets tend to have substantially higher destruction rates in the first three years after the transaction – though this rapidly drops off thereafter – and about the same creation rates as the controls.

One implication is that the net differences exhibited in Figure 6A after the transaction year are associated with the job destruction margin. An interesting suggested implication is that private equity transactions trigger a period of accelerated creative destruction relative to controls that is most evident in the first three years after the transaction.

Given its relevance to the net employment pattern, the job destruction margin can be explored further in terms of the patterns of establishment exit. Figure 9A shows the employment-weighted exit rate (or put another way, the job destruction from exit) for the targets and the controls. Both sets of establishments exhibit substantial exit rates after the transaction, reflecting that establishment exit is a common feature of the dynamics of US businesses. The targets exhibit higher exit rates in the first three years after the transaction relative to controls. The difference in the exit rates is reported in Figure 9B. For example, in the second year after the transaction, private equity transactions have a two percentage point higher exit rate than controls. In the fourth and fifth years, the exit rate of the targets is actually lower than that of the controls.

B. Changes in sub-samples of transactions

The results presented in Section 5.A reflect the results from pooling across all private equity transactions over the 1980–2000 period. The controls account for differences in the net growth patterns along many dimensions, but we have not examined whether the patterns differ by observable characteristics of the private equity transactions. In this section we consider a number of simple classifications.

To begin, we consider differences in the net growth patterns between private equity transactions and controls by time periods, industry, establishment age and establishment size. Figure 10 shows the equivalent of Figure 6A for different sub-periods of transactions. The pattern in the overall data on employment is more pronounced for the transactions that occurred from 1995 onwards. Since the number of transactions accelerated rapidly over the post-1995 period, it is not surprising that much of the overall employment effects depicted in Figure 6C are during this time period.

Figure 11 shows how the patterns vary by broad sector. We focus on three of the broad sectors where most of the private equity transactions are concentrated. Within manufacturing, we find relatively little systematic difference in net growth patterns between private equity transactions and controls. We find that the level of employment for private equity transactions five years afterwards is about the same as if the targets had grown at the same rate as the controls. (More specifically, the targets are 2.4% lower at the end of five years.) Manufacturing is a sector where a large fraction of private equity transactions are concentrated and in this sector at least, there are few differences between targets and controls.

We know, however, from Figure 6A that there are non-trivial differences between private equity transactions and controls in the pooled data. Figure 11 shows that for establishments in Retail Trade and Services, we see more pronounced but volatile differences between targets and controls. While the patterns are volatile and differ across these sectors, the cumulative reduction in employment for the private equity transactions compared with the controls is large in both

[16] The sum of employment for targets across all years reported in Figure 6C is about 3.3 million workers. This represents the sum of employment in the transaction years for targeted establishments over the 1980–2000 period.

[17] The 10.3 percentage point calculation derives from the difference in the level between private equity transactions and controls in year five (about 34,000 employees) divided by the initial base in year zero.

sectors. In Retail Trade, the cumulative impact of the private equity transaction after five years yields a 9.6% lower employment level than would have occurred if the targets had the same growth rates as the controls. The cumulative five-year impact is 9.7% lower employment in Services for the targets compared with the controls.[18]

Figure 12 shows the variation in the differences between different types of private equity transactions. There are few concerted differences across the categories: each displays a similar pattern. One exception is the fact that the period of reduced employment growth is considerably larger and concentrated immediately after the transaction for the secondary buyouts,[19] which presumably have already undergone a restructuring under their previous owner.[20] By contrast, public-to-private buyouts experience reduced employment growth in the first two years after the transaction relative to divisional and independent buyouts.

C. Firm-level changes including greenfield entry, acquisitions and divestitures

In our establishment-based analysis in the last two sections, we focused our attention on the ultimate outcomes for establishments and workers in target firms at the time of the deal. Alternatively, one could focus on similar outcomes for the entire target firm. While the analysis contained in the prior two sections is an appropriate way to trace the employment impacts of private equity transactions for establishments and workers at target firms at the time of the buyout, it ignores the opening of new establishments and other actions that private equity firms or other subsequent owners may take that impact employment at target firms post-buyout.

In this final section, we address this shortcoming of the establishment-based analysis. However, to do this we, by necessity, restrict our attention to the subset of target firms that we can observe for some period post-buyout. With the LBD, we are able to readily follow establishments over time, even if they undergo ownership or other changes. Tracking firms over time is more problematic due to mergers and other events that lead to changes in the firm-level identifiers in the LBD. This was not an issue in our establishment analysis above, since we only needed to find the target firm in the year of the private equity transaction and then follow its establishments over time, regardless of any changes in their associated firm identifiers.

The disappearance of a firm ID in the LBD can be associated with a firm's death, where all the firm's establishments are shut down, or some form of organizational change such as a merger. It is possible to utilize the LBD's robust longitudinal establishment linkages to provide a rich description of these organizational changes. Such analyses are, at this point, very time-consuming and resource-intensive. Thus, we restrict our firm-level analysis to a subset of target firms and similar control firms that we can observe two years after the buyout.

In order to be able to identify target firms that we can observe two years after the buyout, we must restrict the set of transactions in this firm-level analysis relative to the establishment-level analysis given the differences in the matching of the private equity transaction data at the establishment and firm level. For the establishment-level analysis, as discussed in Section 3.B, the matching of the private equity transactions to the LBD is based on a 3-year window centred on the transaction year. This is feasible and reasonable because with the establishment-level analysis we use the information from the Capital IQ data to date the transaction and, given high-quality establishment longitudinal identifiers, only use the set of establishments that exist in that deal year. In contrast, for the firm-level analysis we are forced to restrict attention to matched cases where the match to the LBD occurs in the transaction year. This matching restriction implies that even before restricting on two-year survivors, our firm-level analysis starts with about 65% of the matched transactions used in the establishment-level analysis. Using this subset, we impose the further restriction that we observe the target firm in the transaction year and two years later. This latter restriction implies that in the firm-level analysis we have about 55% of the matched transactions in the establishment-level analysis (approximately 1,300 transactions). Note, however, that conditional on matching in the transaction year, this survivor restriction yields 97% of the employment from all the firms that match in the transaction year. Thus, it is the matching restriction and not the survivor restriction that matters most for our firm-level subset.

Given that we track the target firms for two years and find a comparable group of controls, we can compare growth in employment and the number of establishments at target firms with similar control firms. In addition, the LBD permits us to overcome many of the challenges that plagued earlier work in that we can identify the components of the firm changes due to greenfield entry, the closing of the establishments owned by the firm, acquisitions of new establishments and divestitures of establishments owned by the firm. However, it is important to note that, since we restrict attention to firms that can be followed for at least two years post-private equity transaction, the firm-level analysis focuses on a subset of

[18] While not reported in Figure 11, we have also examined the patterns for the FIRE (Fire, Insurance, Real Estate) broad sector. We find even more volatile patterns for FIRE than for Retail Trade and Services and a very large net difference between targets and controls.

[19] It is important to note the differences in scale for the figure depicting secondary buyouts – we chose to use a different scale given the very large net negative difference between targets and controls for the first year after the transaction.

[20] In unreported analyses, we examine relative establishment growth rates across age and size classes. There are some differences, but the post-transaction patterns are quite similar across age and size classes. One notable difference between private equity transactions and controls is the pre-transaction net growth differences for very young (between 0 and 4 years old) establishments: very young control establishments have substantially higher net growth compared with targets prior to the private equity transaction. This pattern likely reflects differences between targets and controls in the age distribution of the parent firms of very young establishments. That is, among very young establishments, targets are likely part of older firms that are ripe for restructuring.

targets and controls that are at least somewhat likely to be older, larger and more likely to be successful than the target and control establishments examined in the above two sections. Given the fact that the considerable majority of the target and control firms are older, larger ones, it is likely that the firms that are disappearing are doing so due to an acquisition or other restructuring, not because of the outright liquidation of the firm. Because we are only looking two years forward, we now include transactions through 2003.[21]

In this section, we employ a slightly different approach from that above. Rather than simply looking at the differences across firms, we undertake regression analyses. We use as observations all firms in the LBD that are present in the transaction year and two years thereafter. The dependent variables – the key measures we are seeking to explain – are the employment growth rates from the transaction year to two years after, as well as the associated growth in the number of establishments.

We use as independent, or control variables, measures that are similar to those we used to match the establishments and firms in the above analyses:

- SU/MU is an indicator as to whether the firm in the transaction year has more than one establishment
- Firm age classes are again defined based on the age of the oldest establishment in the transaction year
- Firm size classes are defined based upon total employment in the transaction year
- Finally, we use in Table 1 a dummy variable denoting whether the observation was a private equity target (as opposed to a control firm), and, in Table 2, a set of controls for the various private equity transaction types

All regressions are weighted by employment, so larger transactions are given more influence.

Again, it is important to note that these firm-level analyses include the effects of employment changes at existing establishments, the opening of new greenfield facilities, the closing of establishments (conditional on the survival of the firm) as well as acquisitions and divestitures of already-existing establishments. The analyses in Sections 5.A and 5.B only capture the changes at existing establishments and the closing of establishments. While the firm analysis includes establishment exits, it does not include cases where the entire firm disappears. These differences apply to both targets and controls.

Our firm-level results are given in Tables 1 to 3. Table 1 presents the results of regressions measuring the difference in employment and establishment growth rates (computed in the same manner as in the establishment-level analysis above) between targets and controls where we control for the effects listed above in a fully interacted model. The non-target controls consist of all LBD firms in the same year, firm age category, size category and status as a single or multi-unit firm as the targets. This allows for a more parsimonious and manageable analytic dataset.

The estimated coefficients in Table 1 imply that the target firms grow at a lower rate relative to controls over a two-year horizon: the targets have a 3.6% lower net employment growth rate than controls over this period. When we examine the number of establishments, targets have a slightly higher growth rate, with the difference a little under 1%.

In Table 2 we report the results of regression where we exploit rich detail in the type of buyout transactions. The results indicate significant variation in outcomes across transaction types. Note that all coefficients are relative to the omitted control group. The difference in net employment growth relative to controls is especially large in magnitude for public-to-private and secondary transactions, as Table 2 reveals. Interestingly, divisional transactions have a higher net growth rate than controls. The results are quite similar when we restrict to deals through 2000, although now buyouts gain another 0.5% relative to controls in terms of net employment growth at the firm level.

While the results in Tables 1 and 2 are similar to the establishment-level results in that targets contract relative to controls, the establishment-level results imply a larger net difference relative to the firm-level results. Using Figure 6C, we see that, over a two-year horizon, existing establishments of targets contract at about a 6.7% larger rate than controls, while for the firm-level results the net difference is 3.6%. These results are not directly comparable given that the firm-level analysis is on a restricted sample of firms that continue for two years. Nevertheless, we know that the contribution of greenfield entry, acquisitions and divestitures that are missed in the establishment-level analysis potentially account for some of this difference. To explore the contribution of the latter effects, Table 3 shows two-year employment-weighted greenfield entry rates, establishment exit rates, establishment acquisition rates and establishment divestiture rates for the sample of targets and controls.

The results in Table 3 are striking on a number of dimensions. We find that target firms exhibit a very high greenfield entry rate relative to controls. Target firms have a greenfield entry rate of 14.9% relative to 8.9% for controls. However, target firms also have a very high establishment exit rate relative to controls. Target firms have an establishment exit rate of 16.7% relative to 8.1% for controls. Thus, the net entry effect from establishments contributes to targets shrinking relative to controls.

We also find that targets have a higher pace of both acquisitions and divestitures. Target firms have an

[21] The patterns are similar, but the differences somewhat wider, when we only look through 2000.

employment-weighted acquisition rate of 7.4% compared with 4.7% for controls and an employment-weighted divestiture rate of 5.7% compared with 2.9% for controls. The greater change in establishment ownership via acquisitions and divestitures for targets does not yield much of a net effect, but when combined with the entry and exit rate results, implies a much greater overall rate of change at the target firms.

Some caution needs to be used in comparing the weighted mean rates in Table 3 with the results in Table 1. For Table 3, we compute the weighted mean rates among the targets and the controls for the indicated categories (e.g. greenfield entry). If one adds up the components of Table 3 (i.e. entry - exit + acquisition - divestiture + continuing), one obtains the weighted mean growth rates for targets and controls reported in the last row of the table. This implies a net difference between targets and controls based upon weighted net growth rates of -4.5%. The regression in Table 1 yields a net difference of -3.6%. While Tables 1 and 3 use exactly the same sample of targets and controls (so that the controls are the LBD firms in the industry, firm age, firm size, single unit/multi-unit and year cells as the target firms), Table 1 is based upon a employment-weighted firm-level regression with a rich set of fully interacted effects. There is a regression equivalent of Table 3 that would require computing and using as dependent variables firm-level greenfield entry rates, exit rates, acquisition and divestiture rates and include the full set of interacted control effects in the regression. We will explore such regression specifications in future drafts of the paper.

Overall, the results in Table 3 strongly show that target firms are undergoing much more restructuring than we observe at similar non-target control firms. These results suggest that the employment impact of private equity buyouts is much more complex than may be widely understood. While, on net, we find slower employment growth associated with private equity transactions, we also find substantial greenfield entry and acquisition of establishments by target firms post-buyout. This is indicative of substantial investments in and commitments to the continued operation and success of the target firms by private equity firms. It is also consistent with the view that private equity transactions are catalysts for a wave of creative destruction in target firms, accelerating both job destruction and divestitures, on the one hand, and job creation and acquisitions, on the other.

Before concluding this section, it is instructive to discuss the possible implications of the differences in the sample of private equity transactions comparing the firm-level and the establishment-level results. The challenge that we face in our firm-level analysis and shared by virtually all the existing firm-level studies of the impact of private equity on employment is that the analysis is based upon firms that can be accurately tracked longitudinally over time. As we have discussed, tracking establishments longitudinally, while a challenge as well, is a much less complex exercise. In contrast, firm reorganizations and ownership changes make measures of firm entry and exit difficult to interpret. This implies the firm-level analysis is based on a subset of the transactions relative to the firm-level analysis for both matching and survival reasons.

In terms of comparing the establishment-level to the firm-level results, the establishment-level results have the virtue that they are based on a larger sample of transactions and also are not subject to survivor bias. However, as noted, the firm-level results have the advantage relative to the establishment-level results that we can quantify the contribution of greenfield entry as well as acquisitions and divestitures for surviving firms.

While it is difficult without further analysis to quantify the implications of the sample restrictions for the firm-level analysis, comparisons of some aspects of the establishment-level and firm-level results are insightful for possible directions of the bias and areas for further inquiry. In particular, the tabulations in Table 3 can be used to generate results for "existing" establishments in a manner analogous to the establishment-level results for the survivor firms. By combining the continuing establishment and exiting establishment effects, Table 3 implies that for targets, existing establishments of surviving firms had a two-year net growth rate of -18.4%. For controls, Table 3 implies that existing establishments of surviving firms had a two-year net growth rate of -8.2%. In comparing these results with the establishment-level results using all targets (and associated controls), Figure 6C yields that "existing" establishments from targets exhibited a two-year net growth rate of -17.7% while controls exhibited a two-year net growth rate of -10.9%.

On the basis of these comparisons, it is tempting to conclude that the sample selection bias is more of an issue for controls than targets since the difference between -18.4% and -17.7% is smaller than the difference between -8.2% and -10.9%. If true, this would suggest the adjustment for sample selection bias in our firm-level results would push towards a smaller gap between targets and controls. Moreover, it is possible to construct a rationale for such a difference in sample selection bias. For the targets, the firms that cannot be matched in the transaction year or cannot be tracked subsequently are plausibly being reorganized as a consequence of the private equity transaction. Indeed, our findings of higher acquisition and divestiture rates for targets suggest more reorganization of targets relative to controls. For controls, the firms that cannot be tracked are also likely to be driven primarily by reorganizations, but also by whole firm exits (i.e. cases where the firms' operations cease entirely). Drawing inferences about the implications for the survivor bias adjustments needed for targets and controls is too speculative, however, since sample selection bias probably impacts not only continuing and exiting establishment rates but also greenfield entry. It is also clear that computing greenfield entry rates for firms undergoing ownership changes and reorganizations is a very difficult task – but

one that we plan to pursue in future research. In addition, the speculation above about reorganizations vs firm exits for targets and controls requires further research.

These difficult conceptual and measurement issues associated with sample selection bias make it difficult to derive a "bottom line" number about the impact on employment from private equity transactions. We can say with confidence that the net impact on existing establishments is negative and substantial. We can also say with confidence that for a sample of surviving firms, we observe more greenfield entry, more acquisitions, divestitures and establishment shut-downs, and a negative net impact on employment that is substantial but smaller than that from the establishment-level results that ignore greenfield entry. The computation of a "bottom line" overall net number, however, requires further research exploring the dynamics of the firms and establishments that are in the establishment-level sample but not in the firm-level sample.

6. CONCLUSIONS AND FUTURE AREAS OF INVESTIGATION

This paper examines the question of employment outcomes at the targets of private equity transactions at a far more granular level than earlier studies. We focus on 300,000 US private equity-backed establishments in the period from 1980 to 2005. Among the most interesting results that emerge are:

1. The establishments of target firms that exist at the time of the transaction exhibit lower rates of net employment growth in the years before, of, and immediately after a private equity transaction, when compared with a group of similar control establishments.

2. In the second and third years after such transactions, these targets have considerably lower net job growth than control establishments.

3. By the fourth and fifth years, job growth of the target firms is slightly above that of the controls.

4. Target establishments seem to create roughly as many jobs as similar control establishments. The lower net job growth of about 10% over the five years after the transaction appears to be generated via higher gross job destruction as the new private equity-backed owners shed presumably unprofitable segments of the target firms.

5. These patterns are exclusively confined to Retail Trade, Services and Financial Services: there is little difference in the post-transaction growth of the target firms in Manufacturing.

6. When we examine greenfield entry, the target firms have a substantially higher job creation rate (as a share of employment) through the opening of new greenfield facilities in the two years after the transaction than the controls. However, target firms also exhibit a much higher cumulative job destruction rate from establishment exits relative to controls.

7. In like fashion, we find that target firms have both higher acquisition and divestiture rates (on an employment-weighted basis) relative to controls. Combined with the results on entry and exit, target firms have a much higher overall rate of change in establishments owned than controls.

The LBD and related micro datasets contain a rich array of information beyond simply information on employment levels. These include information on the composition and compensation of employees, labour and total factor productivity. We intend to explore these consequences of private equity transaction in subsequent papers using these data. These efforts are particularly relevant, given that the formulation of policy recommendations regarding private equity must consider not just changes in employment levels, but a wide variety of other considerations.

Also in future work, we plan to examine the employment and productivity outcomes for corporations that sell to private equity groups. Many divisional buyouts consist of divestitures of underperforming units that may be consuming management attention. Schoar (2002) documented that acquisitions may lead managers to neglect core business, a pattern she called the "new toy" effect. It will be interesting to observe whether the same pattern exists in reverse for the sellers in divisional buyouts.

Finally, we highlight the need to focus on the experience outside the US. While the US has the oldest and largest private equity industry, the industry elsewhere is experiencing rapid growth (Strömberg 2008) and in many cases, evolving in different ways. Understanding whether the dynamics of private equity and employment are similar or different in these markets is an important challenge.

FIGURES

Figure 1: Matches of private equity targets to LBD (US Census Bureau Longitudinal Business Database)

Number of US target events: targets matched and total

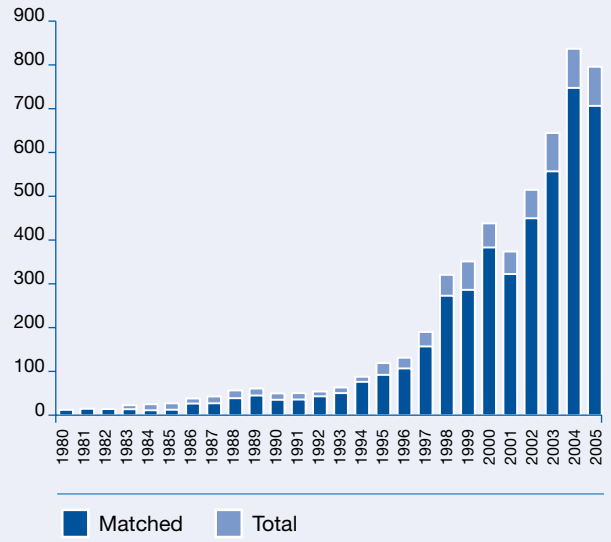


Figure 2: Value of private equity targets (total and matches)

Value of targets, matched and total by year ($ million)

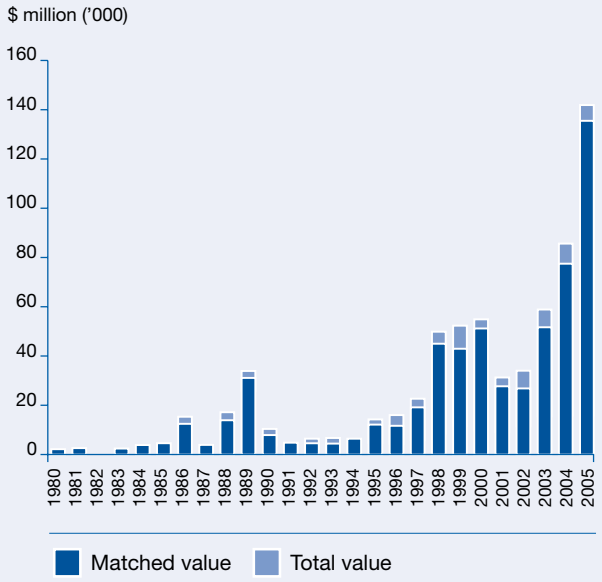


Figure 3: Employment of matched targets (level and % of LBD total)

Employment under private equity targets: by year and as a % of economy

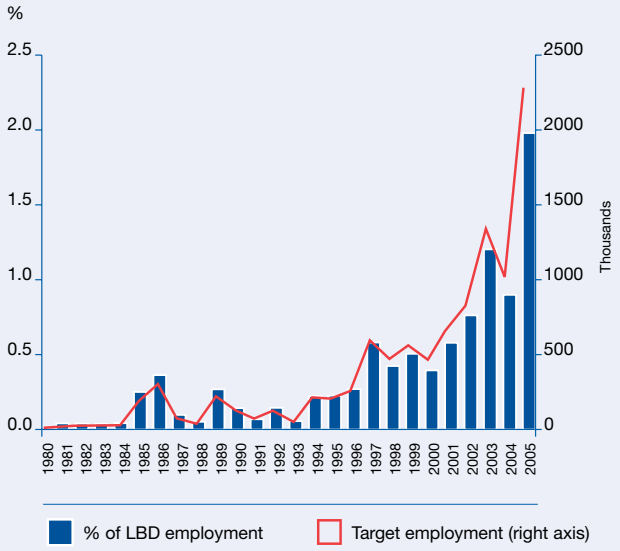
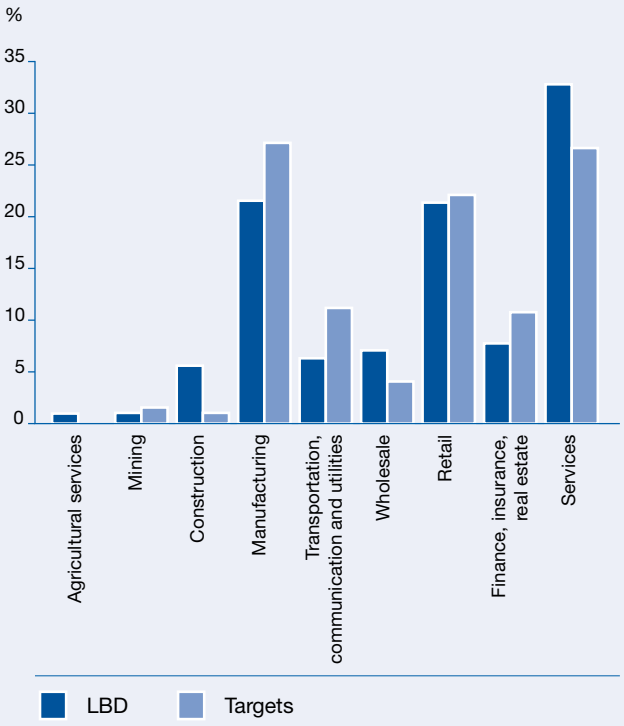


Figure 4:

Figure 4A: Industry distribution: targets vs LBD [1980–2001] (employment weighted)



FIGURES

Figure 4:

Figure 4B: Industry distribution: targets vs LBD, 2002–2005 (employment weighted)

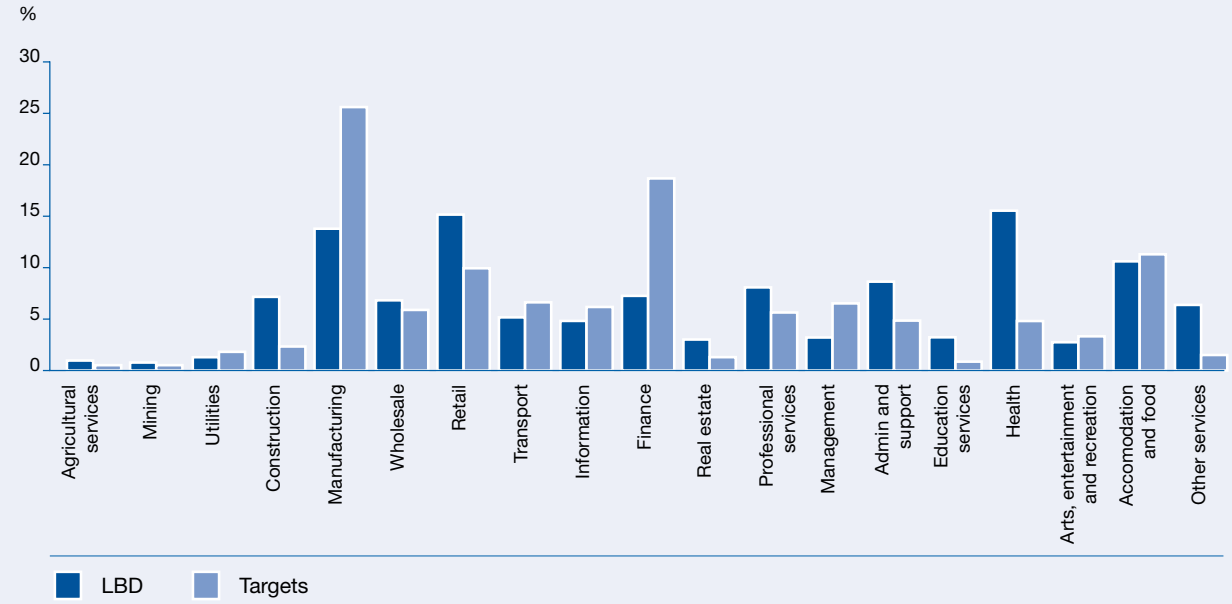


Figure 5:

Figure 5A: Establishment age distribution: matched targets and LBD (employment weighted)

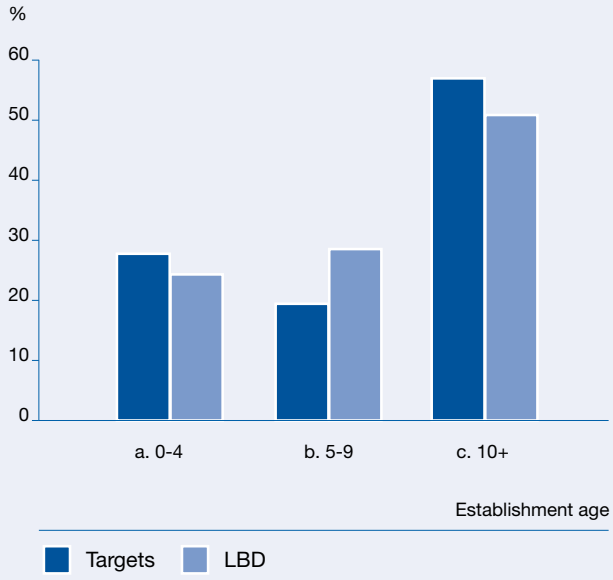


Figure 5B: Establishment size distribution: matched targets and LBD (employment weighted)

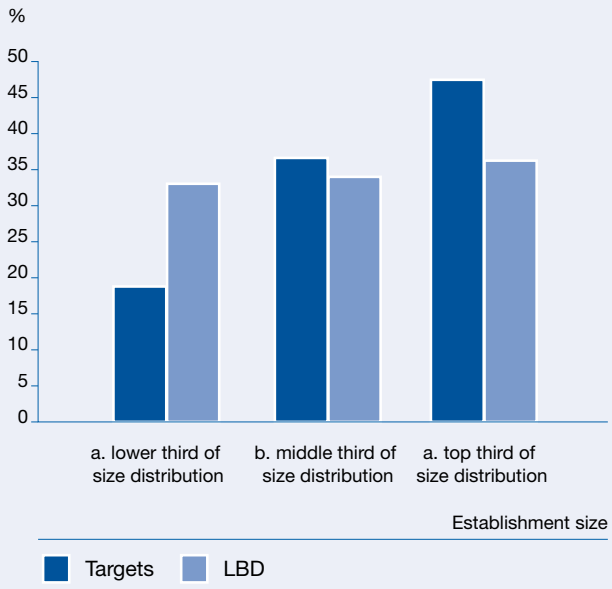


Figure 6:

Figure 6A: Comparison of net growth rates – targets less controls before and after event

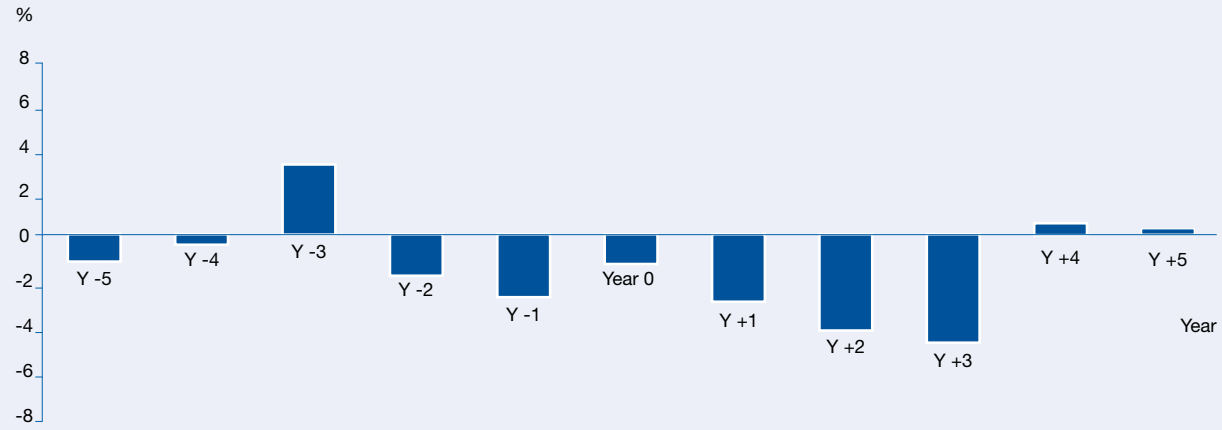


Figure 6B: Net job creation rates: targets vs controls before and after event

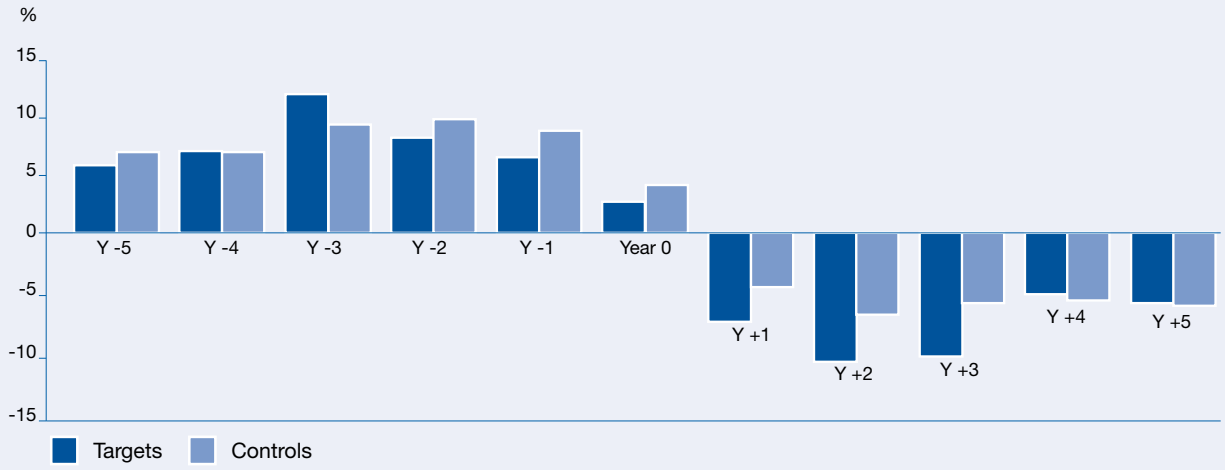
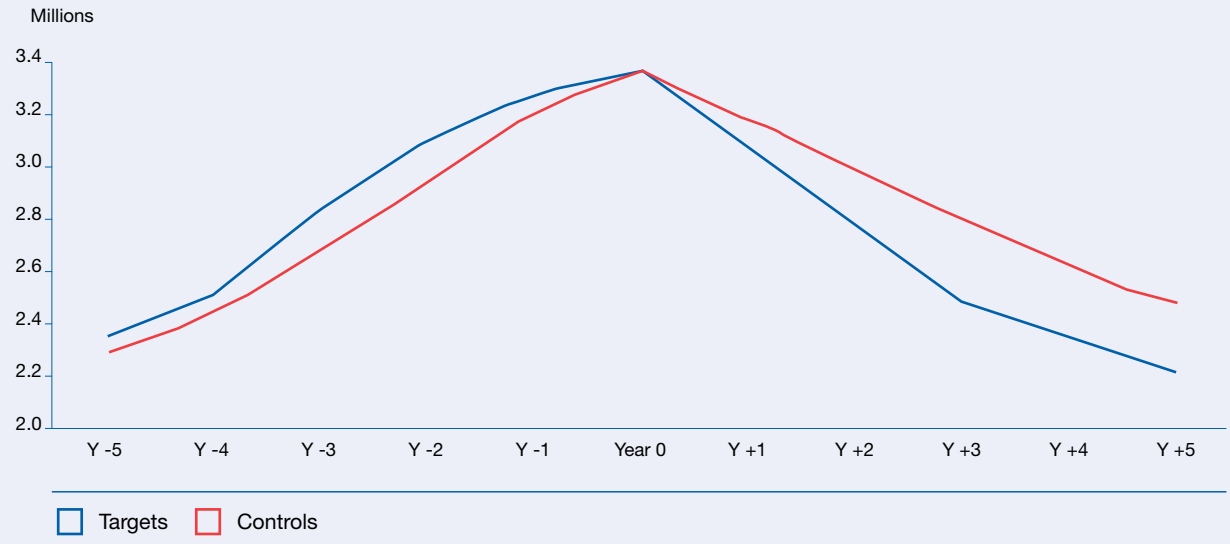


Figure 6C: Employment: targets vs normalized controls before and after event



FIGURES

Figure 7:

Figure 7A: Job creation rates: targets vs controls before and after event

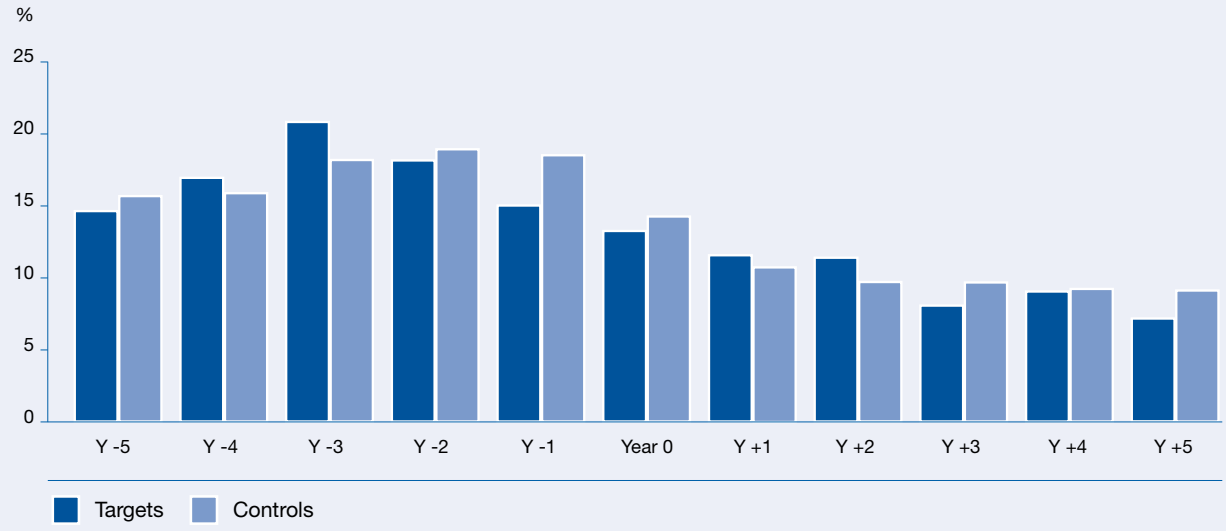


Figure 7B: Job destruction rates: targets vs controls before and after event

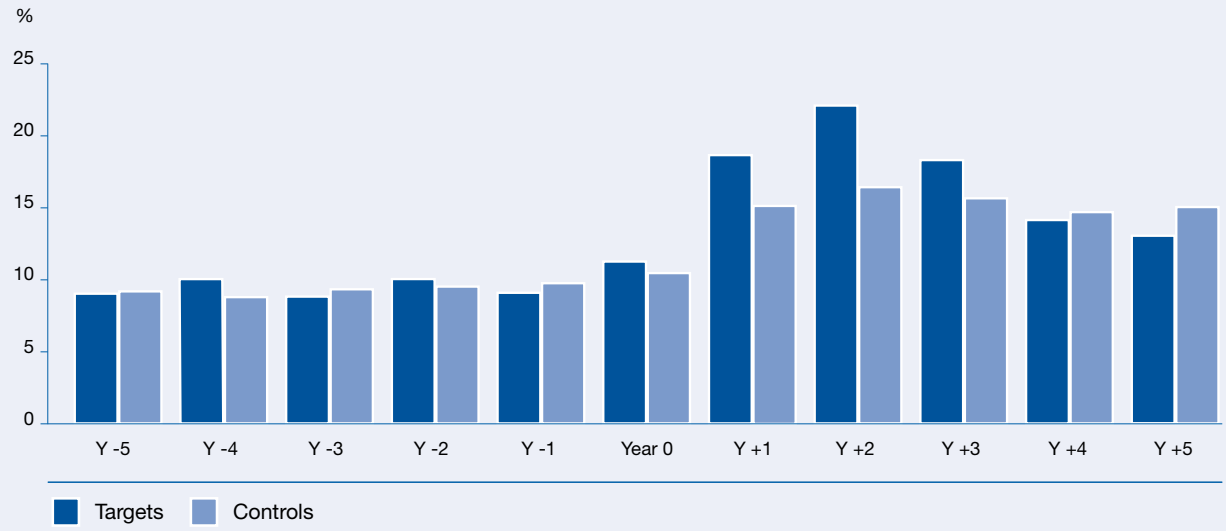


Figure 8:

Figure 8A: Comparison of job creation rates: targets less controls before and after event

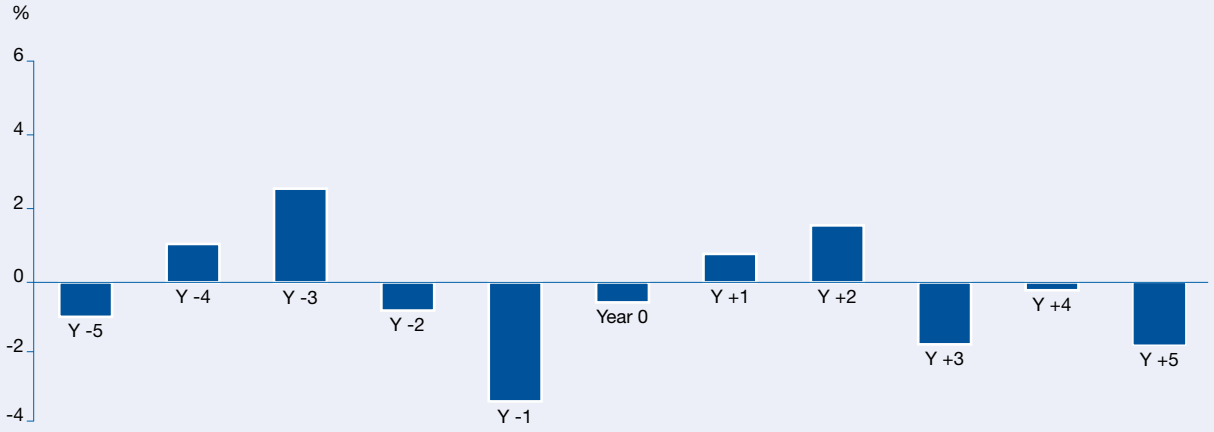


Figure 8B: Comparison of job destruction rates: targets less controls before and after event

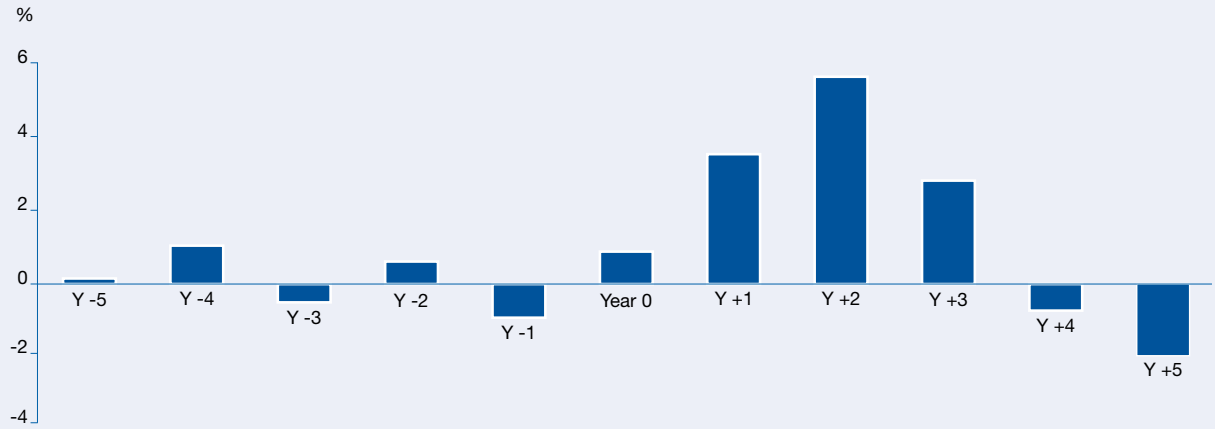
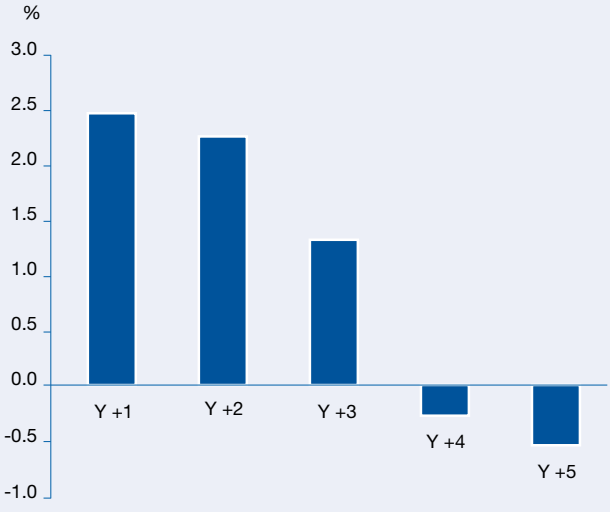


Figure 9:

Figure 9A: Employment-weighted establishment exit rates: targets vs controls after event

Figure 9B: Comparison of establishment exit rates: targets less controls after event



FIGURES

Figure 10: Differences in impact by targets and controls across different time periods

Figure 10A: Comparison of net growth rates – targets less controls before and after event, 1980s

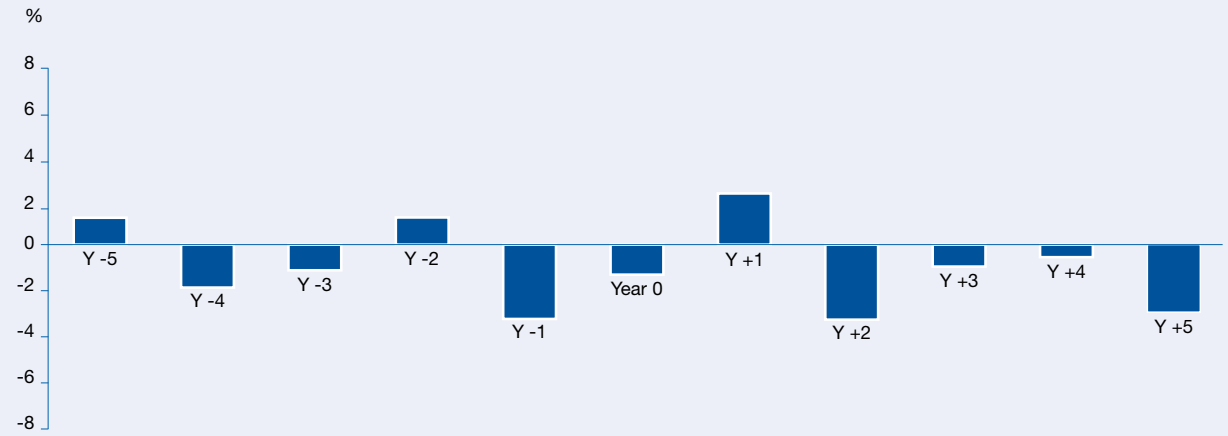


Figure 10B: Comparison of net growth rates – targets less controls before and after event, 1990–1994

Figure 10C: Comparison of net growth rates – targets less controls before and after event, 1995+

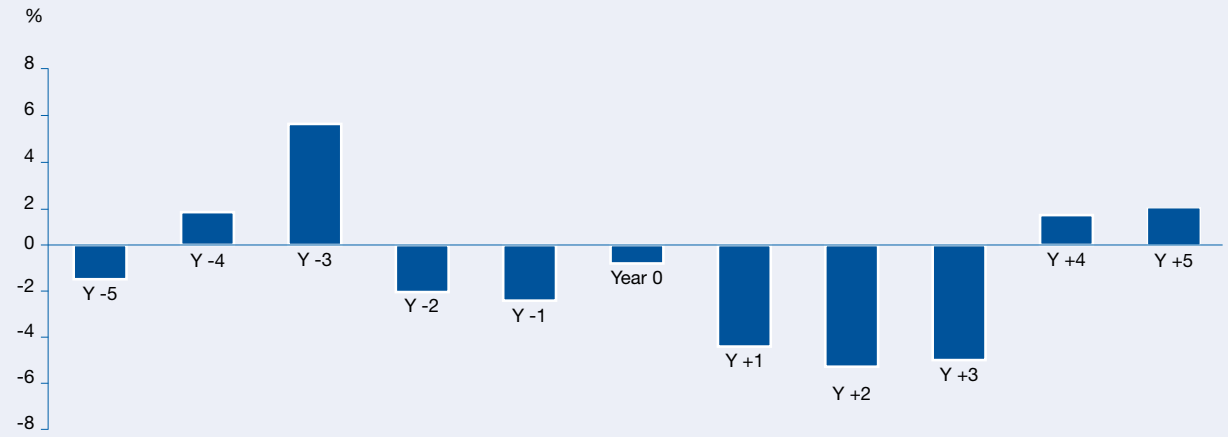


Figure 11: Variation in impact in employment across broad sectors

Figure 11A: Comparison of net growth rates – targets less controls before and after event, manufacturing

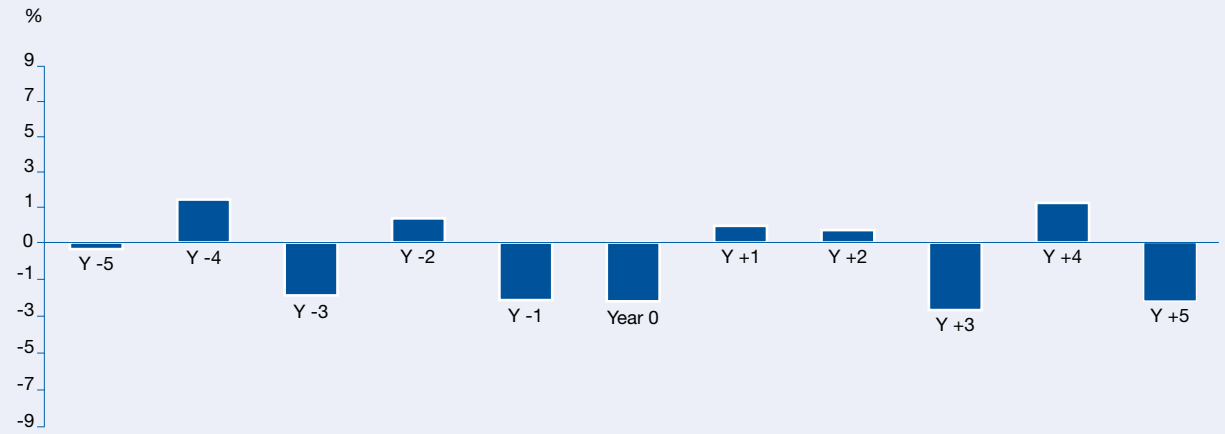


Figure 11B: Comparison of net growth rates – targets less controls before and after event, retail

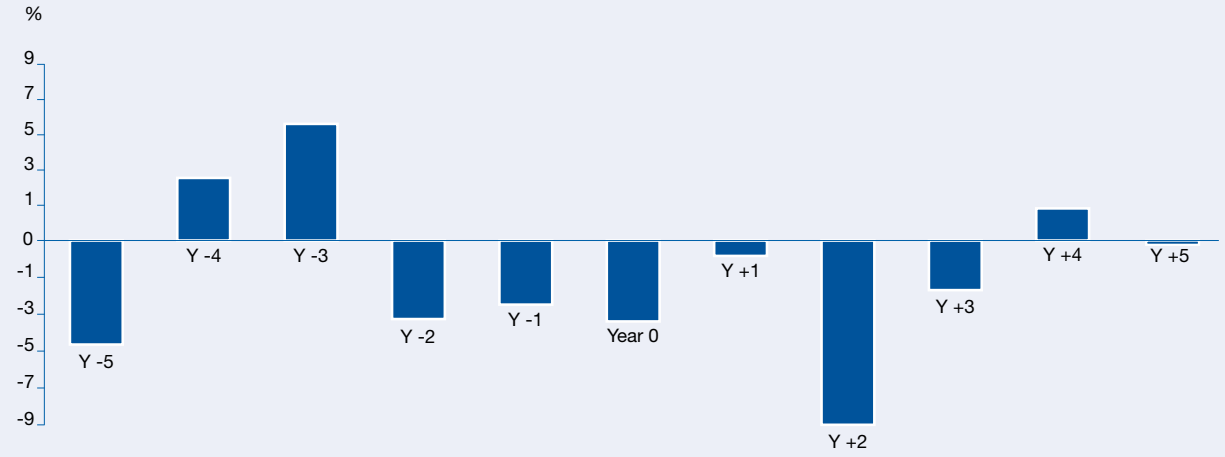
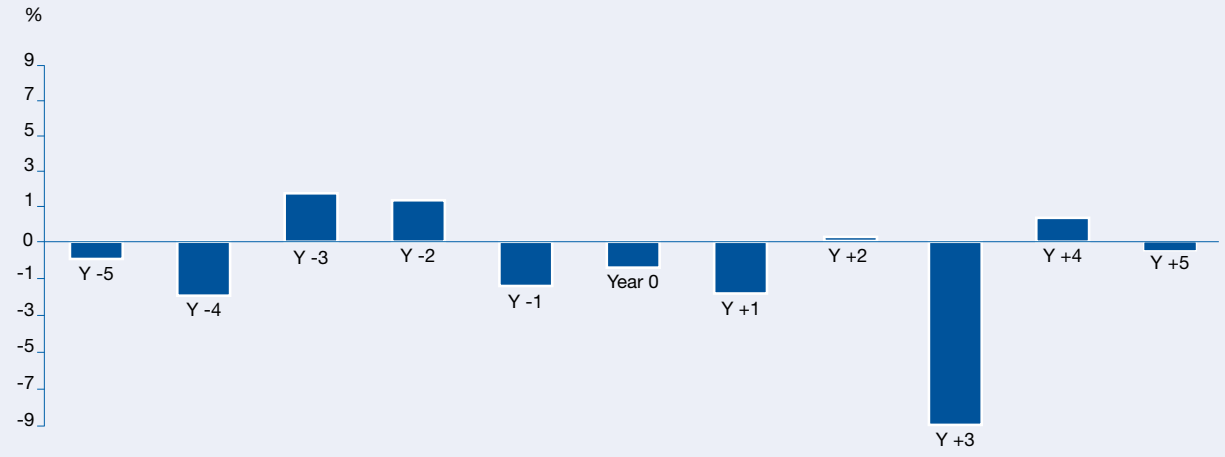


Figure 11C: Comparison of net growth rates – targets less controls before and after event, services



FIGURES

Figure 12: Differences in impact on targets vs controls by LBO type

Figure 12A: Comparison of net growth rates – targets less controls before and after event, public to private

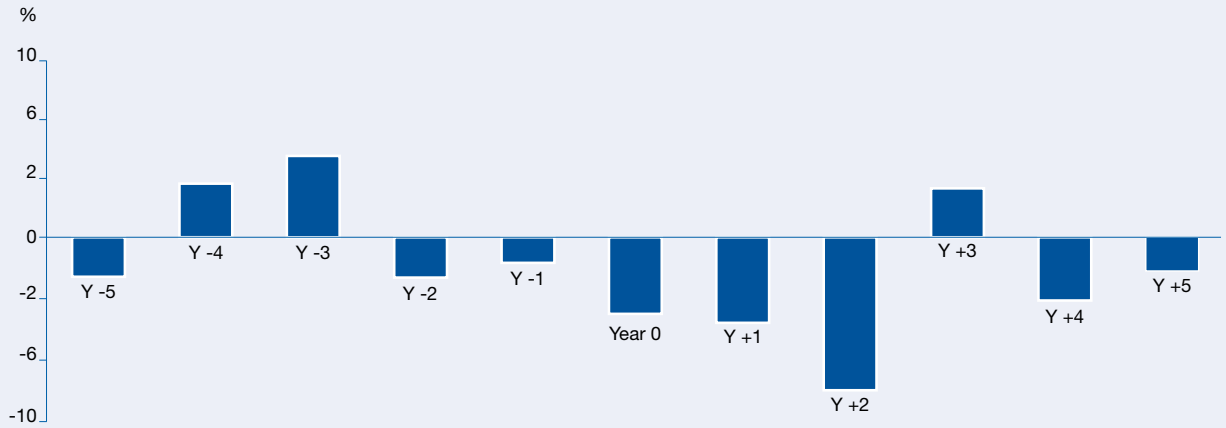


Figure 12B: Comparison of net growth rates – targets less controls before and after event, independent private/no seller

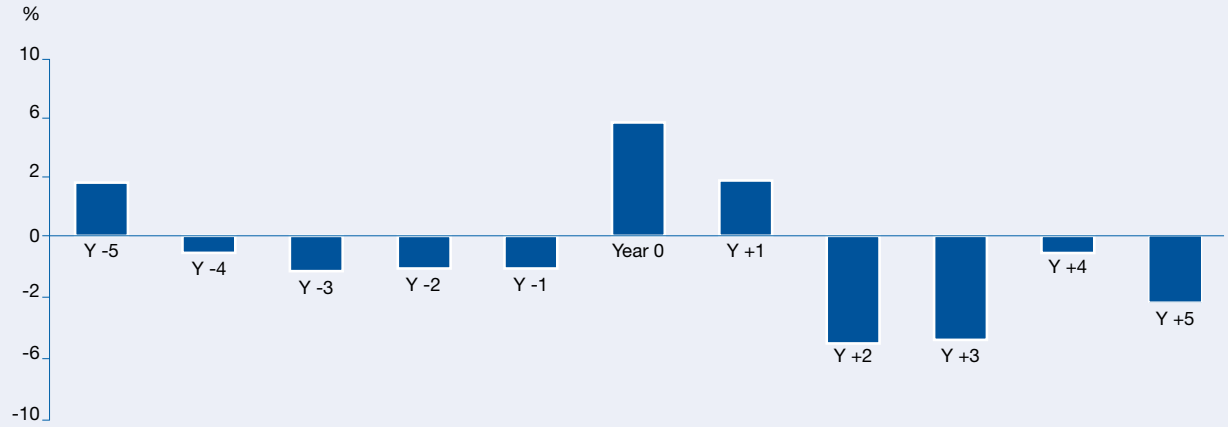


Figure 12C: Comparison of net growth rates – targets less controls before and after event, divisional/non-financial corporate seller

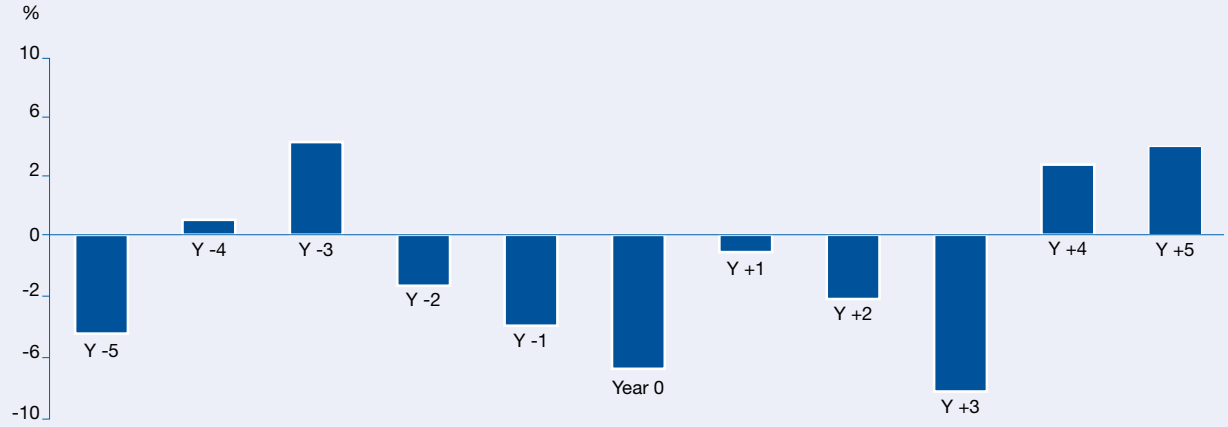
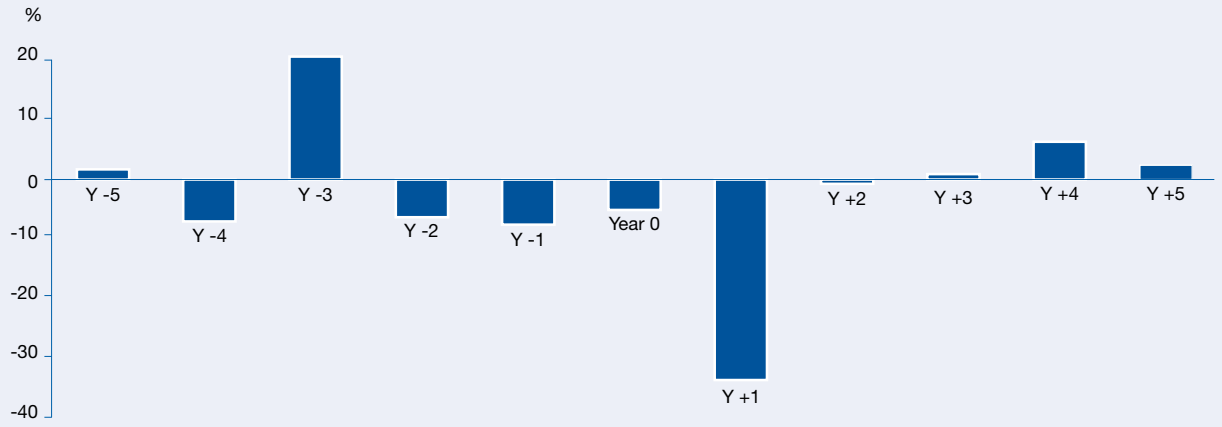


Figure 12: Differences in impact on targets vs controls by LBO type

Figure 12D: Comparison of net growth rates – targets less controls before and after event, secondary/financial firm seller



TABLES

Table 1: Employment and establishment growth rates: target firms relative to controls

(Deals to 2003)

	Dependent variable	
	Employment growth rate	Establishment growth rate
Target dummy	-0.036	0.009
	(0.002)	(0.002)
R-squared	0.134	0.09
Number of observations	675,640	675,640

Notes: Regressions based on sample of target and control firms with growth rates calculated over two-year horizon from event year t to t+2. All specifications include fully interacted industry, year, firm age, firm size, and single unit/multi-unit effects. All specifications are employment-weighted. Omitted group are non-target firms.

Table 2: Employment and establishment growth rates: target firms relative to controls

By deal type (deals to 2003)

	Dependent variable	
LBO type:	Employment growth rate	Establishment growth rate
Public to private	-0.161	-0.065
	(0.005)	(0.005)
Independent private/no seller	-0.028	0.082
	(0.004)	(0.004)
Divisional/non-financial corporate seller	0.048	-0.002
	(0.003)	(0.003)
Secondary/financial firm seller	-0.235	-0.053
	(0.007)	(0.007)
All other LBO types	0.015	0.003
	(0.025)	(0.023)
R-squared	0.137	0.091
Number of observations	675,640	675,640

Notes: Regressions based on sample of target and control firms with growth rates calculated over two-year horizon from event year t to t+2. All specifications include fully interacted industry, year, firm age, firm size, and single unit/multi-unit effects. All specifications are employment-weighted. Omitted group are non-target firms.

Table 3: Greenfield entry, establishment exit, acquisitions and divestitures (two-year employment weighted rates)

	Targets	Controls
Greenfield entry rate	14.9	9.0
Establishment exit rate	-16.7	-8.1
Establishment acquisition rate	7.4	4.7
Establishment divestiture rate	-5.8	-2.9
Continuing establishment net growth rate	-1.7	-0.1
Weighted two-year growth rate	-1.9	2.6

Reported are employment-weighted means of rates as percent of average of firm employment in event year and event year + 2.

REFERENCES

Amess, K. and M. Wright (2007), "The Wage and Employment Effects of Leveraged Buyouts in the UK", *International Journal of the Economics of Business* 14, 179–195.

British Venture Capital Association (BVCA) (2006), *The Economic Impact of Private Equity in the UK*, London, BVCA.

Davis, S.J. and J.C. Haltiwanger (1999), "Gross Job Flows", in David Card and Orley Ashenfelter (eds.), *Handbook of Labor Economics*, New York, North-Holland.

Davis, S.J., J.C. Haltiwanger, R. Jarmin et al (2006), "Measuring the Dynamics of Young and Small Businesses: Integrating the Employer and Non-employer Business Universes", Working paper no. 13266, National Bureau of Economic Research. Forthcoming in Dunne, T., J. Bradford Jensen and M.J. Roberts (eds.), *Producer Dynamics: New Evidence from Micro Data*, University of Chicago Press.

Davis, S.J., J.C. Haltiwanger, R. Jarmin et al (2007), "Volatility Dispersion in Business Growth Rates: Publicly Traded versus Privately Held Firms", in Acemoglu, D., K. Rogoff and M. Woodford (eds.), *NBER Macroeconomics Annual 21*, 107–180.

Davis, S.J., J.C. Haltiwanger and S. Schuh (1996), *Job Creation and Destruction*, Cambridge, MA, MIT Press.

European Private Equity and Venture Capital Association (EVCA) (2005), *Employment Contribution of Private Equity and Venture Capital in Europe*, Zaventum, Belgium, EVCA.

Hall, D. (2007), "Methodological Issues in Estimating the Impact of Private Equity Buyouts on Employment", unpublished Working Paper, Public Services International Research Unit, Business School, University of Greenwich.

Harris, R., D.S. Siegel and M. Wright (2005), "Assessing the Impact of Management Buyouts on Economic Efficiency: Plant-Level Evidence from the United Kingdom", *Review of Economics and Statistics* 87, 148–153.

Jensen, M.C. (1989), "The Eclipse of the Public Corporation", *Harvard Business Review* 67 (September–October), 61–74.

Kaplan, S.N. (1989), "The Effects of Management Buyouts on Operating Performance and Value", *Journal of Financial Economics* 24, 217–254.

Kearney, A.T. (2007), *Creating New Jobs and Value with Private Equity*, Chicago, A.T. Kearney.

Lichtenberg, F.R. and D. Siegel (1987), "Productivity and Changes in Ownership of Manufacturing Plants", *Brookings Papers on Economic Activity: Microeconomics*, 643–683.

Lichtenberg, F.R. and D. Siegel (1990), "The Effects of Leveraged Buyouts on Productivity and Related Aspects of Firm Behavior", *Journal of Financial Economics* 27, 165–194.

Long, W. and D. Ravenscraft (1993), "The Financial Performance of Whole Company LBOs", CES working paper no. CES-WP-93-16, November 1993.

McGuckin, R.H. and S.V. Nguyen (2001), "The Impact of Ownership Changes: A View from Labor Markets", *International Journal of Industrial Organization* 19, 739-762.

Muscarella, C.J. and M.R. Vetsuypens (1990), "Efficiency and Organizational Structure: A Study of Reverse LBOs", *Journal of Finance* 45, 1389–1413.

Schoar, A. (2002), "Effects of Corporate Diversification on Productivity", Journal of Finance 57, 2379-2403.

Service Employees International Union (SEIU) (2007), Behind the Buyouts: Inside the World of Private Equity, Washington, SEIU.

Shleifer, A. and L. Summers (1988), "Breach of Trust in Hostile Takeovers", in Auerbach, A.J. (ed.) (1988) *Corporate Takeovers: Causes and Consequences*, Chicago, University of Chicago Press.

Strömberg, P. (2008), "The New Demography of Private Equity", in Anuradha G. and J. Lerner (eds,), Globalization of Alternative Investments Working Papers Volume 1: Global Economic Impact of Private Equity 2008, New York, World Economic Forum USA.

Taylor, A. and C. Bryant (2007), "Private Equity Deals that Cement Business Growth", *Financial Times*, 2 April.

Tornqvist, L., P. Vartia and Y. Vartia (1985), "How Should Relative Change Be Measured?", *American Statistician* 39 (February), 43–46.

Wright, M., S. Thompson and K. Robbie (1992), "Management-Led Leveraged Buy-Outs: A European Perspective", *Journal of Business Venturing* 7, 45–71.

Private equity and corporate governance: do LBOs have more effective boards?*

FRANCESCA CORNELLI

London Business School and CEPR

ÕGUZHAN KARAKAS

London Business School

1. INTRODUCTION

The literature on corporate governance has long focused on the boards of public companies. Boards monitor and provide advice to management. When ownership of the company is dispersed, boards, and in particular outside directors sitting on boards, monitor management on behalf of the owners.

If the role of boards in public companies is to provide management supervision, one may ask whether boards play the same role in companies that have been acquired by one or more private equity groups. The rationale often given for the success of private equity is that it concentrates the ownership in the hands of a few shareholders. Since these shareholders are also involved in running the company operations, they have strong incentives to maximize the value of the firm. In addition, private equity partners often have extensive experience in restructuring companies, and thus their advice can be very useful. As Sir David Walker states in his July 2007 consultation document: "... alignment [of interests] is achieved in private equity through control exercised by the general partner over the appointment of the executive and in setting and overseeing implementation of the strategy of a portfolio company. Lines of communications are short and direct, with effectively no layers to insulate or dilute conductivity between the general partner and the portfolio company executive team."

One may therefore argue that a company which has been bought by a private equity fund may not need a board at all, as private equity partners can monitor and provide advice directly. However, usually such monitoring and advisory functions are provided through the board. For example, Lerner (1995) shows that venture capitalists sit on the board of the companies they have invested in, and their presence on the board increases when their support is particularly valuable (e.g. during a change in CEO). We may therefore expect to find that this is also the case for leveraged buyouts (LBOs), and the private equity sponsors may be actively involved in the company by participating in the board. In this paper we study the boards of public companies that have been taken private with private equity backing.[1] The purpose of this is twofold. First, we want to learn more about how boards of companies with private equity investors function. Are these boards dramatically different from the boards of public companies? Are they just nominal boards, with no relevance for the restructuring of the company? Or do they serve an important supervisory and advisory role in the restructuring process? Second, if boards are an important part of the restructuring process of a company, given the successful performance of many private equity investments, one may wonder whether private equity boards are better structured to assist a company in the restructuring process. Therefore, by looking at the characteristics of these boards we can have further evidence about what makes a board more effective.

In this paper, we have constructed a new dataset, which follows the board composition of all public-to-private transactions that took place in the UK between 1998 and 2003.[2] Out of 142 such transactions, 88 were sponsored by at least one private equity fund. We can thus look at the change in the composition of the board at and during the time of private equity involvement. We examine whether private equity boards are substantially different from the boards of public companies and whether there is support for the view that boards backed by private equity funds are more involved in an advisory and supervisory capacity than public boards. When making this comparison, one has to keep in mind, as already mentioned, that the role of a board cannot be exactly the same in these two situations. As stressed by Sir David Walker (July 2007): "... the main driver of reforms of corporate governance of listed companies has been to re-emphasize the role of the board as a guardian of shareholder interests. But the private equity model has no material deficiency in this respect." Keeping this in mind, we use as a control group a set of public-to-private transactions with no private equity backing. Therefore the control group consists of either pure management buyouts (MBOs) or buyouts backed by non-financial sponsors. Management buyouts are an interesting comparison group as in these

* We thank Per Strömberg for providing part of the data. We thank Paul Coombes, Denis Gromband and Josh Lerner for comments. Daniel Metzger and Kai Truempler provided excellent research assistance.

[1] By private equity backing (or sponsorship) we mean that at least one private equity firm has invested in the equity of the company.

[2] The focus on UK companies is due to the availability of data: only for the UK was it possible to find non-sporadic information about boards of private companies in the last 10 years.

cases equity ownership is in the hands of a few shareholders who were and continue to be directly involved in the company operations and have aligned interests.

We find that when a company goes private fundamental shifts in board size and composition take place:

- The board size and the presence of outside directors are drastically reduced. We do not find a significant difference in the change in the board size of MBOs and LBOs, once we take into account differences in the size of the firms. We find that when the private equity sponsor has large experience the board size decreases more. The composition is instead very different. In the case of private equity deals, outside directors are replaced by individuals employed by the private equity sponsors. In the case of pure management buyouts, the outside directors disappear and only management is left. The private equity sponsors replacing the outside directors are substantially younger.

- Private equity board members are most active in complex and challenging transactions. Private equity groups appear to adjust their board representation based on the anticipated challenges in the investments.[3] We find that if there is a CEO change the board size decreases less when the company is taken private, the private equity sponsor representation on the board is larger and the fraction of management on the board is smaller. This suggests that in these, presumably more difficult, cases the private equity sponsor is more actively involved and its presence on the board is larger.

- We also look at deals which have not yet been exited (or that went bankrupt after the LBO). Obviously, ex post these turned out to be the most difficult companies to restructure. If the expectation of the private equity sponsor is correct, one would assume that, on average, the private equity firm had anticipated these deals to be difficult. We find that the private equity presence on the board (as a proportion of total directors), immediately after the company went private, is larger for deals that take longer to exit.

- We also look at companies that had a larger proportion of outsiders sitting on the board while still public, as a signal that these companies may need more supervision (or advice) than other companies. We find that these companies also have a larger presence of private equity sponsors sitting on the board after the LBO.

- The presence of LBO sponsors on the board may also depend on the style or preferences of the private equity firm: certain firms rely less on their own partners or employees and more on outsiders. We also find that if more than one private equity firm is sponsoring the deal, then the proportion of LBO sponsors on the board is larger, presumably because each sponsor wants to have a representative on board.

- Private equity investors remain actively engaged with their portfolio businesses in the years after the transaction. The percentage of LBO sponsors sitting on the board only slightly decreases over time post-transaction.

- Post-private equity transaction and during the restructuring process, CEO turnover is high for firms backed by private equity funds. Board turnover is high in private equity firms, whether we compare it with the turnover of the same companies before the LBO or to the turnover of companies that went private through an MBO.

Therefore, the evidence shows that in more difficult cases, when extra management support or monitoring is needed, boards are larger and the LBO sponsors are more likely to sit on it. This suggests that the board is central to the restructuring process and for the relation between management and shareholders (i.e. the private equity firms). Individuals on the board can help the restructuring process, but since those with management experience and ability to help in this process are a scarce resource, they are added to the board only if the additional benefit of their presence is significant (which is likely to be only in the most difficult deals).

On the other hand, the evidence regarding CEO and board turnover does not support the opinion that private equity companies have a long-term view which allows them to be less sensitive to short-term events and to provide management with incentives to invest in long-term growth.[4] The very high CEO turnover, for example, may be consistent with a period of major restructuring and refocusing, but it is hard to reconcile with the view that private equity firms have a long-term approach.

In the discussion of our results, we refer to the existing literature on public company boards. This literature so far has focused on whether certain board characteristics make a board more effective in its supervisory role, and whether these translate to improved company performance. For example, Weisbach (1988) shows that CEOs are more likely to be fired when prior performance is not satisfactory, if there is a greater proportion of outside directors on the board. The presence of outsiders is thus crucial in ensuring that the board does not collude with the management and thus become ineffective as a monitor. Similarly, it has been suggested (see, for example, Jensen 1993) that larger boards may be less effective than smaller ones. Yermack (1996) finds that larger boards are associated with a lower Tobin's Q (i.e. worse performance).

Other studies have looked at what factors determine the characteristics of the board. Boone, Casares Field, Karpoff

[3] Looking at the statements around the time of transition this seems to be what happened in most cases. However, even if the departure of the CEO was completely voluntary, one could also argue that losing a CEO who is most familiar with the business could constitute a significant challenge.
[4] See, for example, Rogers, Holland and Haas (2002).

et al (2007) track the evolution of the board of public companies from their IPO until 10 years later, and find that board independence (measured by the proportion of outside directors) decreases when the manager has more influence. Coles, Daniel and Naveen (2007) show that complex firms, which have a greater need for advisors, have larger boards with more outside directors. Linck, Netter and Yang (2007) look at public companies and find that firms structure their boards in ways consistent with the costs and benefits of the monitoring and advisory roles of the board. We will also show that this trade-off of costs and benefits of monitoring is present in the context of private equity firms, and argue that it is easier for private equity firms to identify the cost of allocating one more experienced individual to one board. Some papers (see, for example, Adams 1998) also stress the fact that the board does not only have a monitoring role, but also has an advisory role. Adams and Ferreira (2007) argue that management-friendly boards can be optimal when the advisory role is particularly important. This view may also help to shed some light on private equity boards.

The rest of the paper is structured as follows. Section 2 explains how we constructed the dataset and gives a general description of the data. Section 3 studies how the board changes when the company becomes private, and Section 4 looks at the evolution of the board after the company has become private. Section 5 provides the conclusion.

2. DESCRIPTION OF THE DATA

Using Capital IQ, we identified all public-to-private transactions that took place in the UK from January 1998 until October 2003. We identified 148 transactions, but had to drop six cases because of the lack of data for those specific cases. We were then left with 142 deals, which were divided into three groups. These groups are:

1) Proper LBOs or private equity deals – These are the 88 public-to-private transactions where at least one of the sponsors is a financial institution that has invested in the equity of the company; [5]

2) Pure management buyouts – These are the 42 transactions in our sample that do not have private equity fund involvement and therefore cannot be classified as private equity deals. We compare these deals with the private equity deals as they will allow us to isolate effects that may be purely due to the change in the corporation status from public to private from those that are associated with the presence of a private equity group; and

3) Other transactions – These are the 12 cases which are neither pure management buyouts nor transactions that involved financial sponsors, i.e. professional private equity funds. These transactions could involve a wealthy individual or a company. In most of our analysis we will analyse these last 12 transactions together with the 42 management buyouts as a unique group, which will be compared with the private equity deals. However, we have also computed all the tables of the paper using only the 42 pure management buyouts as a comparison to the private equity deals, and we have found no major difference.

Figure 1 shows the distribution of the deals over the years. Notice that in the first couple of years (i.e. 1998-1999) there are almost only private equity-backed LBOs, while in later years management buyouts and other transactions become a substantial fraction of the deals.

From Capital IQ we also identified the total value of the companies implied by the price paid to take them private. In Table 1, we present summary statistics for the company size.[6] In Figure 2, we show the distribution of the company size for LBOs, MBOs and other transactions. LBOs are in general larger in size than MBOs: their mean is $328 million versus $55 million for MBOs. In general, private equity companies, through their ability to raise high levels of debt, are able to acquire larger companies. The 12 other transactions also have a large average (i.e. $985 million), but that is mainly driven by one very large outlier which has a value larger than $7 billion. If we drop that outlier, these transactions are not significantly different in size from the MBOs. LBOs also have two large outliers but the mean remains significantly larger than that for MBOs, even after dropping those two outliers.

We use Capital IQ and news-runs to identify which of the 142 deals have been exited and how they were exited. Then, using the dataset Dash, we tracked the board composition of these companies for two or three years before the announcement of the buyout until the exit of the private equity group or until 2007, whichever was later.[7]

We encountered several challenges when creating this time series. Once the company was taken private, a complex ownership structure was created, with several layers of companies. Therefore, it was not clear any more which company housed the relevant board. For example, in some cases, the company that was originally taken private had a very small board of two people (e.g. the CEO and another member of management), but at the same time a new company was created, which owned the original one and had a board which made all the important decisions. In other cases, several layers of companies were created, each one owning the company below (or there were more complex ownership structures, not simply vertical) and the board that

[5] For one of these 88 buyouts we could only find the board before the company went private, not afterwards. Therefore, this company will be dropped from the analysis of changes in the boards when the companies are taken private.
[6] Information was missing on the implied company value for two MBOs, and therefore those two are not in Table 1.
[7] An exit takes place when the private equity sponsor (or the management that took it private in an MBO) sells its stake in the company, or when the company goes bankrupt. In some cases, there is an IPO, but the private equity firms retain a stake in the firm. We consider these cases exits because, although the sponsor has not sold its entire equity stake, the company is not anymore a private company, but has returned to being a public company. Secondary buyouts are also considered exits.

took the relevant decision was not housed in the company that was the direct owner of the original one, but two or three layers above that. Moreover, this structure could change over the years of the LBO, and therefore the relevant board could be housed in different companies over time. In order to identify which board to observe, we had to proceed in the following manner. First, we used the datasets Dash, Fame and Amadeus to reconstruct the post-LBO ownership structure of the various companies and their subsidiaries. Then, we downloaded the board compositions of each of these companies, in order to identify the relevant board. To identify the relevant board a certain degree of discretion had to be exercised. We took into account the hierarchical ownership structure and then looked at various aspects, for example whether an outside director was sitting on the board, or how large the board was.[8] We also looked at whether private equity general partners were sitting on the board, since they tended to sit only on the relevant board, while a subset of the management directors was reported in all the other boards. This was repeated for each year, since the relevant board was not necessarily in the same company through the entire time period (although in most cases it was). We went through several iterations, until we felt comfortable with our choice of company and its board. In cases where there was uncertainty about which board was the relevant one, we considered more than one board and also conducted the analysis with the alternative boards.

We used Capital IQ to determine the announcement date of the transaction. Since we only observe the board once per year at fixed dates, the date in which we observe the board could be very close to the announcement date, or almost a year afterwards. Therefore, we identified the year before and the year after the company was taken private by looking at the directors of the first board observed after the announcement date and the last board before the announcement date. By comparing these boards and the identities of the directors, we could determine whether the first board after the announcement date was still the board of the public company (i.e. the transition to private company had not been completed yet) or it was already the board of the private company. In some cases, however, the board on the first date after the announcement was still a transitional board (especially when the board date was close to the announcement date). For example, immediately after the transaction, not all new board members had been nominated to the board. In some cases, the CEO was only present in the second board following the transaction, since at the time of the first board the CEO had not yet been assigned. For this reason, the analysis in Section 3 has been conducted comparing the characteristics of the board prior to the announcement to the second board after the announcement date, instead of the first board.[9]

The data report the date of birth and country of residence of each director of the board. The data also provide information on how many other boards the director was also involved in (the Dash dataset, which reports the board starts in 1996, two years before the first LBO in the dataset, but it also reports how many directorships the director had before 1996, although we do not have that information year by year). The data also include information (SIC code) on which industries the companies belong to, the number of employees they have and their turnover. From Capital IQ we can also determine which private equity funds were involved in each leveraged buyout. Finally, using Capital IQ and press coverage we found how many deals had been exited and what type of exit they had. Sixty-five of the 142 deals were not exited as of August 2007: of these deals, 37 were pure MBOs (which are less likely to be exited anyway) and 28 were LBOs.[10] Among the 77 exited deals, 23 were secondary buyouts, 11 IPOs, two MBOs, 26 trade sales, 13 bankruptcies and two exits of an unknown type.

Finally, we looked for the identity of all the directors sitting on the boards each year. We did this using a series of datasets (i.e. Capital IQ, Fame, Amadeus, Perfect Information and a general search in press releases) and divided the directors into the following categories: CEO, management, other non-management insiders (for example, previous CEOs), outsiders and LBO sponsors. Outside directors are directors who neither work for the firm nor any of the private equity groups backing the LBO, and who have no other obvious special relationship to the firm. A director can be classified as an LBO sponsor only after the LBO. This category identifies whether the director is employed by one of the private equity funds that are backing the LBO. For all other directors (also the ones involved in the board before the LBO) we identify those who have some past or present connection to any private equity group.[11] We also identify the outside directors who are or have been CEOs of other companies.

3. CHANGES IN THE BOARD FOLLOWING AN LBO OR MBO

In this section we examine changes in board characteristics (mainly size and composition) before and after the firm was taken private and examine whether these changes are different for LBOs and MBOs.

The existing literature on public firms argues that some board characteristics (such as size and proportion of outside directors) are associated with better management incentives and thus to better firm performance.[12] Given that private equity

[8] As mentioned above, some boards were obviously only nominal boards and had only two or three people who were also in what we finally identified as the relevant board, so some boards were easy to rule out as the relevant ones.
[9] We have conducted the same analysis by taking the first board afterwards, or the board two years before going private or any combination of these cases, and the results do not change.
[10] Naturally, the most recent deals were less likely to be exited because there has not been enough time, still if one considers only the LBOs that had been announced by the end of 2000, 12 have not yet been exited.
[11] For example, they sit or have sat on the board of a private equity group, or they have taken part in the past in an LBO sponsored by a private equity group, maybe as management.

groups aim to improve firm performance, one may wonder whether some of this improved performance is achieved by changing the characteristics of the board. As mentioned in the introduction, when making the comparison one has to take into account that the situation of a public company and of a company which has recently been taken private in an LBO or an MBO is very different. A public company has dispersed ownership: as a consequence shareholders cannot monitor the management and therefore need to rely on the board to do so. On the other hand, private equity groups own a large fraction of the company that they take private, allowing them to monitor and advise management constantly and bringing the need for a board into question. That is why the boards of firms that undergo an MBO provide a useful comparison.

Board size, univariate analysis

In Table 2, Panel A, we first compare the size of the boards of companies that underwent an LBO with those that underwent an MBO or other types of transactions.[13] In the year before the companies were taken private there is no significant difference in the size of the boards of the two types of companies (both have approximately 6.5 directors). This is, to a certain extent, surprising, because one would expect that companies that are taken private in an LBO need more external intervention and therefore might have had larger (i.e. more inefficient) boards. We also checked whether prior to the LBO or MBO transactions, these boards had an outside director with ties to private equity. We expected that there would be more people with such connections in companies that subsequently underwent an LBO. We find that in 44% of the LBOs there was a director with such a connection (before the LBO), while there was only such a connection in 26% of the non-LBO cases (the difference is statistically significant).

Looking at the boards after the companies have been taken private, one can see that companies that underwent an MBO have significantly smaller boards than those that underwent LBOs (4.2 instead of 5.4 people). Boards of companies that underwent both an LBO and an MBO are significantly and substantially smaller after being taken private. The drop in board size is significantly larger for MBOs. On average, MBOs lose two directors out of six, i.e. they are 33% smaller, while LBOs lose one director out of 6.5, i.e. they are 15% smaller. The difference between MBO and LBO sizes and the changes in their sizes could be due to the fact that LBO transactions are on average larger than MBOs (in terms of implied enterprise value $328 million vs $55 million, as shown in Table 1 and Figure 2). Therefore, we construct a size-matched sample of 39 MBOs and 39 LBOs (this is the number of deals we could match) and in Panel B we conduct the same analysis as in Panel A but for the matched companies only. By size-matching the 39 MBOs with LBOs we remove any change in board size that might be inherently due to the fact that LBO transactions are on average larger than MBOs.

As we found before, we discover that prior to going private there is no significant difference in board size between companies that subsequently undergo LBOs or MBOs. We also find that there is no significant difference in board size between companies that undergo LBOs and MBOs after the private equity transaction. The drop in board size when the company goes private is also not significantly different for LBOs and MBOs. In other words, once we take into account the size of the company, there is a considerable drop in board size in both cases.

The decrease in board size is consistent with the existing literature about boards of public companies, which suggests that public board sizes are correlated with company performance. This is also consistent with Kaplan and Gertner (1996) who look at boards of reverse LBOs (after they went public) and find that reverse LBOs have smaller boards than the other firms trading in the market, matched by size and industry.

Some companies may have been taken private because the private equity sponsors thought their performance could be improved, but not because the management was inefficient. In such cases, while the company was public the board may have been working in an efficient manner, and therefore may not need to be changed. In 45 out of the 87 private equity deals the CEO was replaced.[14] When the CEO was not replaced, it suggested that the CEO may have been doing his/her job effectively. Note that in a few cases after the company has been taken private a representative of the private equity fund backing the LBO assumes the functional role of CEO and there is no official CEO. Since the previous CEO is no longer present in these cases, we consider them to be cases where the CEO has been replaced. In Panel C of Table 2 we look at private equity deals only and distinguish between cases in which the CEO changed and cases in which they did not.

We interpret a change in CEO to mean that the CEO's performance prior to the company going private was deemed unsatisfactory by the new sponsor. Although an unsatisfactory performance of the CEO does not necessarily imply that the board was not doing its job, there is a higher probability that the board was not putting enough pressure on the CEO. However, we find that when there was a change in the CEO, the board declined in size less than when there was no CEO change, although the difference is not statistically significant.

Board composition

Figure 3 presents charts with the composition of the board before and after going private for LBOs, MBOs and other

[12] Note that this literature can only establish a correlation, not a causality (see also the conclusions of this paper). Performance can be measured in different ways: probability of exit, company value at exit, or looking at different financial measures such as operating profits.
[13] We have also compared changes in the board size of LBOs and pure MBOs only, with no difference in the results.
[14] We now talk of 87 deals since we have dropped the case for which we did not have board characteristics after the company was taken private.

transactions. To begin with, note that members of the private equity groups actively sit on the board of firms that have undergone LBOs: the percentage of LBO sponsors sitting on the board after an LBO is 31%. This implies that private equity firms are active investors. Figure 3 also shows that before being taken private through MBOs, boards have a larger proportion of insiders than is the case for both LBOs and other transactions. Insiders (defined as CEO, other management and other non-management insiders) make up 61% of the board in MBOs, 55% in LBOs and 45% in the other transactions. For MBOs and LBOs, the proportion of outsiders drops dramatically after the company is taken private: 11.8% for MBOs (this includes outsiders with PE connections) and 9.3% for LBOs. Given the size of the board afterwards (5.4 for LBOs and 4.2 for all others), we find that most of the companies have no outsider on the board.[15] The role of expert outsiders in private equity boards is often mentioned, since it is usually assumed that outsiders have an important advisory role, because of their industry knowledge (see, for example, Kester and Luehrman 1995). However, our analysis shows that there are few outsiders on company boards after a private equity transaction.

To make sure this result was not driven by some anomalies, we have performed the following checks. First, we have looked at the change in the board composition if we drop the companies in the real estate industry (since the private equity firms backing real estate deals are usually different) but the composition did not change (the percentage of outsiders increased by 1%). Second, we check whether this result could be due to the difficulty in identifying outsiders. In the case of LBOs, 7% of the seats were on average occupied by individuals whose identity we could not determine with certainty, and therefore were classified as unknown. It is possible that most of these individuals are outsiders. If we assume that all unknown individuals are outsiders, this will constitute an upper bound to the number of outsiders sitting on the board of a private equity firm. In such cases, on average outsiders make up 16% of the board. Given an average board size of 5.43 individuals (as reported in Table 2), this tells us that the average number of outsiders on a private equity board is 0.87, i.e. still less than one person per board (and in fact there are several deals where no outsider was sitting on the board).

In MBOs, 1% of the board is made up of people with some prior or present private equity connections.

The percentage change of insiders on boards after an LBO is not statistically significant, but increases significantly after MBOs (the mean increases from 61% to 86%). After an MBO, a company removes all outside directors and replaces some, not all, with insiders, thereby decreasing the average size of the board. This is consistent with the view that following an MBO the company is completely owned by the managers. Following an LBO, although management may also have an equity stake, the board is comprised of both owners and managers. The private equity firms sit on the board and assume roles similar to that of outside directors who monitor the managers. The proportion of outsiders and LBO sponsors remains more or less unchanged post-LBO transaction: the mean decreases from 43% to 40% and the decrease is not statistically significant. In LBOs the presence of insiders on the board remains unchanged, and the outside directors are replaced by LBO sponsors, i.e. by directors from the private equity funds backing the deal.

In some cases there may be a higher need for private equity involvement in the board, either for monitoring or advisory support. In Table 3, we separate the LBOs into two groups: LBOs where the CEO was replaced when the company was acquired by a private equity group and LBOs where the CEO was not replaced. In companies where the CEO was replaced it is likely that the CEO was not performing satisfactorily before the LBO transaction. We may therefore expect to observe fewer outside directors on the boards of these companies before they undergo the LBO, since more outside directors are usually associated with better manager performance (as in Weisbach 1988). In Panel A, we look at the percentage of outsiders sitting on the boards of these two groups. Despite our expectations, there is no significant difference between the two groups. However, when we look in Panel B at the percentage of insiders on the board, we find that when there was no CEO change, the fraction of insiders in the board increases after the company goes private, while it decreases if the CEO was replaced. The difference is statistically significant. Similarly in Panel C, the percentage of LBO sponsors is 25% when there is no change of CEO and 37% when there is a change. In this last case, the LBO sponsors are more heavily involved. The difference between the two cases is statistically significant. In other words, when the management team performed well before the buyout or had the confidence of the private equity sponsors, their presence on the board did not change (or slightly increased on average). When the CEO changes post-LBO, the presence of insiders on the board is reduced and the LBO sponsors are more heavily involved. Such a change suggests that the private equity sponsors believed that there was room for improved performance and considered the presence of insiders on the board excessive and possibly responsible for the company's unsatisfactory performance.

We also looked at the change in the average age of the board following an MBO or an LBO.[16] In the case of an MBO there is no significant change, while in the case of an LBO the board is on average seven or eight years younger. In general, the private equity directors are much younger than the outside directors who were sitting on the board when the company was public. In fact, Figure 4 shows the age

[15] In the other transactions the fraction of outsiders is more substantial, 30.7%, but this could be due to the fact that it is more difficult in this case to establish a connection with the insiders (since often the acquirer is another company or a private individual) and therefore we may be overstating the fraction of outsiders.

[16] The age is measured at the time of the board: to the extent that some people remain on the board, they will automatically be one or two years older.

distribution of the LBO sponsors, management and outside directors. It is immediately clear that LBO sponsors are the youngest group, while outsiders are the oldest group. There is no significant difference between the cases where the CEO was changed and the cases where the CEO was not changed. Since the previous analysis highlighted that private equity directors tend to replace outside directors, we compare their average age. Looking at private equity deals only, the average age of outside directors when the company is public is 59 years (ranging from a minimum board average of 55 to a maximum of 68), while the average age of the directors representing the private equity firms is 42 (going from a minimum board average of 37 to a maximum of 47.5). Clearly, the directors replacing the outside directors post-LBO transaction are much younger.

Exit

Another way to capture whether a certain LBO was a more challenging deal (one that would require more effort from the private equity firm sponsoring the deal) is to see whether the deal has been exited by 2007. Clearly, exit is an ex post measure of success. Private equity firms go through a very thorough due diligence process before acquiring a company and have a good idea of what challenges lie ahead. Therefore, if the expectations of the private equity firms are on average correct (and given their expertise, one should hope they are), then one can assume that the LBO sponsors, on average, already have a clear idea which deals will be the most challenging ones. Therefore, we use the fact that a deal was exited in 2007 as a proxy for whether the private equity firm expected the deal to be difficult at the time of the LBO.[17]

The bankruptcy cases have been added to the non-exits, so that an exit is always a positive resolution (since non-exits are meant to capture difficult deals). However, an exit through a secondary buyout may not necessarily be a positive outcome and may also indicate that the restructuring of the firm has not been completed, therefore we have conducted the analysis considering secondary buyouts, both exits and non-exits, with no significant difference. The analysis is restricted to LBOs only, since usually in MBOs the management does not plan to exit the company, at least in the short term.

In Table 4, Panel A, we show that the average size of the board decreases for both exited and non-exited LBO deals. There is no statistically significant difference between the two groups. When we look at the board composition (Panel B), we find that for exited deals the percentage of insiders on the board does not change, while it decreases for non-exited deals (in both cases the difference is non-significant). More importantly, the percentage of LBO sponsors on the board is higher for non-exited deals than exited deals (Panel C). Since this is the percentage of LBO sponsors on the board at the time when the company went private, and not at the time of exit, one can conclude that the private equity funds probably have a correct expectation ex ante of which deals might be the most problematic. In these deals more representatives from the private equity firm joined the board, since these are the deals that require most effort and involvement. This is also consistent with the fact (reported in Panel D) that 61% of the non-exited deals had a change in the CEO, while only 44% of the exited deals had a change in the CEO (this difference is, however, not statistically significant). In general, these results suggest that private equity sponsors put an increasing amount of effort in the companies most difficult to restructure and that at least part of the restructuring that private equity sponsors undertake gets implemented through the board.

Multivariate analysis

We now look at how the changes in the size and composition of the board depend either on various characteristics of the company or of the private equity funds sponsoring the LBO. In Table 5 we look at what affects the change in size of the board. We consider as dependent variables both the absolute and the percentage change in the size of the board (i.e. the change in the number of directors).

We first looked at the total implied value of the firm (based on the LBO offer price for the shares) as an explanatory variable. We then look at some characteristics of the private equity funds sponsoring the deal. First, we consider the number of private equity funds involved. Second, we introduce a dummy variable which takes value 1 if at least one of the private equity funds backing the firm has considerable experience. Experience is measured in terms of the number of deals recorded in Capital IQ in which the private equity firm was involved. We also distinguish between private equity funds that have a more hands-on approach, and that typically interact a lot with management, and other private equity funds. We do this in three ways. 1) We create a dummy variable that takes the value 1 if the most experienced private equity fund is affiliated with a bank, since traditionally these funds are less involved.[18] 2) We also create a dummy when the LBO sponsor is 3i, since this fund can be considered different because of its large size, government roots and traditional (though changing) reluctance to take on a hands-on role.[19] 3) We also use a more discretional approach, reading through various statements, websites and descriptions of each fund, and classifying whether each fund is active or not (by active we mean that the fund typically

[17] Some deals have only taken place in 2005, and therefore they may not be difficult deals, simply there was not enough time to exit. However, ignoring this fact works against us, in the sense that it will be more difficult to find a significant result. Therefore, if we find a significant result despite this, it means the result would be even stronger if we could take into account the fact that some deals are more recent.

[18] See Hellmann, Lindsey and Puri (2007).

[19] See Lerner, Hardymon and Leamon (2002) and the HBS case "3i Group plc: May 2006" (HBS 9-807-006) for a description of the origins and evolution of 3i. The case mentions that in early times "3i ... would provide funding to an experienced management team … and relied on the operating team's expertise in management issues. One 3i executive might be responsible for 30 or 40 companies, a ratio that precluded close involvement". The case also argues that in more recent times 3i "… began taking majority ownership positions [and started] playing a more active role in managing its companies". Yet the case also shows that 3i had 2,759 companies in its portfolio in 2001, which is considerably larger than other groups, and may thus make involvement more difficult.

follows a hands-on approach). We also introduce a real estate dummy for deals in this sector, since the private equity funds sponsoring real estate LBOs usually are completely different from the private equity funds sponsoring the other LBOs.

We also introduce some variables to capture whether the deals are expected to be more difficult, and the company may require a larger effort to turn it around. The first is a dummy variable that takes value 1 if there was a change of CEO from before to after the LBO. As already argued in the univariate analysis, one may expect that in such cases there is a larger job to be done, since the management in the period before the LBO did not seem satisfactory. Moreover, if there is already a trustworthy and experienced management in place, the private equity firm may need to be involved less. The second variable is whether the deal was exited or not. The idea is that ex post the exited deals may be the ones that were already expected to be easier (at the time of the LBO), and therefore less involvement was necessary. Finally, we consider the percentage of outsiders on the board before the LBOs. The literature on boards has often stressed that the number of outsiders on boards should increase for firms where monitoring is more necessary. Therefore, such percentage could capture firms where the business is less easy to monitor.

Looking at the results in Table 5, note first that the fact that the intercept is positive and significant confirms what we previously showed: on average, the board shrinks following an LBO. The results are not very different whether we look at the absolute or percentage change of the board size. Exited deals do not seem to have significantly different boards, but deals where the CEO changed at the time of the LBO have on average a smaller reduction in the board. This could be due to the need to put more LBO sponsors or outsiders on the board, as we will look at in Table 6. The proportion of outsiders sitting on the board before the LBO is not significant. In regression 2, we add an additional variable, which captures how many of these outsiders were CEOs themselves (or had been CEOs), since one could argue they may have a particular insight, and therefore their presence on one company board could signal that this company needs special expertise for a monitoring or advisory role. The coefficient of this variable is significant but positive: thus it means that in companies that had a larger number of CEOs as outsiders when the company was public, the board shrinks more once the company becomes private. Since these outsiders are more likely to be dropped when the company is taken private, one possible interpretation is that they are less effective than other outsiders. Finally, we see that more experienced private equity firms reduce the size of the board more.[20] This may suggest that they need less people on board to monitor the management, since their representatives are very experienced, or that they have developed a better ability to streamline the process.

In regression 4, we introduce the average size of the board before the LBO, which has a positive and significant coefficient.[21] In this regression the coefficient of firm size also becomes negative and significant. This means that larger boards tend to be reduced more than smaller boards, unless the large size of the board is due to the fact that the company is large: in this case, the reduction is less strong (in fact, notice that the coefficient of firm size is now negative and significant). This implies that boards that are more likely to have been inefficient – since they were very large even when the company was not particularly large – are reduced more drastically following an LBO.

In Table 6 we focus on the composition of the board and what affects it. The explanatory variables are the same as in Table 5, while the dependent variables are: the percentage of LBO sponsors sitting on the board measured one year after the LBO, the average percentage of LBO sponsors from the LBO until exit (or 2007 if no exit has taken place), the percentage of insiders and the percentage of outsiders. Regression 1 focuses on the proportion of LBO sponsors. Although it is not significant, the coefficient of firm size is positive, suggesting that for larger deals, which may be expected to be more complex, the private equity firm will put more of their people on the board. More importantly, the coefficient of LBO sponsors is positive and very significant. This is likely to be because when there are many private equity firms sponsoring the deal, each of them may want to have a representative on the board. In Table 5, the coefficient of this variable was negative, suggesting that when there are multiple sponsors backing the deal, the size of the board was reduced less (although the coefficient in that instance was not significant). This would be consistent with the results in Table 6: each private equity firm backing a deal will try to have some representatives sitting on the board, and this will result in slightly larger boards.[22] The coefficient of the CEO change is positive and significant: consistent with our hypothesis, private equity firms tend to take more board seats when the improvement of the business looks more difficult, either because the firm is in bad condition (and that is why the CEO was changed) or because they do not have a good management team in place to rely upon. The coefficient of exited deals is negative and significant, which is consistent with the same story. When the deal was expected to be easier to exit, the private equity firm put less of their people on board, but tried instead to sit on the boards of

[20] For example, they may have been particularly busy if they were still CEOs. More research could be conducted about this result by looking in more detail at the identity of these individuals.

[21] Since there could be a collinearity problem of the average board size with the firm size (we know from the existing literature on public companies that larger companies have larger boards) we have also run regression 4 introducing, in addition to firm size, the squared firm size. The results do not change: the coefficient of average size of the board before the LBO does not change and the t-stat decreases from 3.7 to 3.4.

[22] An alternative explanation could be that larger deals are more likely to be syndicated (and thus to have multiple sponsors) and are also more difficult to supervise (and thus may require more LBO sponsors sitting on the board). However, we are controlling for firm size and therefore this is unlikely to be the explanation.

the most difficult cases. This story is about the costs and benefits of the monitoring and advisory roles of the board. It is always good to have one more experienced LBO sponsor on the board. However, these individuals are very busy (and costly, since they could instead be used on another board) and therefore adding one more on the board is costly and it will be done only if the marginal benefit of having an additional person is higher than the cost (which is likely to happen in the more difficult deals). This is also consistent with the fact that the proportion of outsiders sitting on the board before the LBO has a positive and significant coefficient. A large proportion of outsiders on the board before the LBO could signal that the company is more complex to monitor. This could be because the type of business is more complex, or it is easier to extract benefits from control. Boone, Casares Field, Karpoff et al (2007) find that measures of the scope and complexity of the firm's operations are positively related to the proportion of independent outsiders on the board. Therefore, the proportion of outsiders sitting on the board before the LBO should indicate its complexity. If that is correct, one may imagine that after the LBOs, the private equity firms will have the same increase in the need to monitor and therefore they will put more individuals on the board.

Finally, if we look at the type of private equity sponsors, note that the 3i dummy has, as expected, a negative and significant coefficient: 3i is less likely to have a hands-on approach. The coefficient of bank-affiliated sponsors is negative (so they tend to sit less on the board) but non-significant. Surprisingly, experienced sponsors do not seem to behave any differently from less experienced ones. As an alternative criterion, in regression 2 we drop the dummies for experienced and bank-affiliated sponsors and introduce instead the dummy for active sponsors. The coefficient of this dummy is positive and significant: the claims by some private equity funds to be more hands-on and actively involved seem to be confirmed in practice. The other results do not change. In regressions 3 and 4 we run the same regression, but use as a dependent variable the average size of the board over the years following the LBO. In this way we correct for the possibility that the board following the LBO was still in a transition phase. The results do not vary and are a little stronger. Note that in these four regressions the adjusted R-square is between 22% and 34%, thus these variables explain a considerable part of the variation.

In regressions 5 and 6 we conduct the same analysis for the proportion of insiders. Not surprisingly, the results tend to be the reverse of the ones in regressions 1 to 4 (since there is a certain degree of substitution between the number of board seats for the management and the one for the LBO sponsors). However, this was not necessarily true, since a large number of LBO sponsors could imply a larger board, not necessarily a smaller proportion of insiders.[23] We find that when there are more private equity funds sponsoring the deal the proportion of insiders on the board is reduced. Therefore the request of the funds to have one of their representatives sitting on the board comes at the expense of the number of the seats left to the management team, which is not necessarily an efficient decision. Companies that had more outsiders sitting on the board prior to the LBO transaction will have fewer insiders (possibly because there is a larger need for monitoring). If the CEO were changed during the transition from public to private the company has a smaller proportion of insiders afterwards. Note that this result is stronger than the one for the proportion of LBO sponsors on the board, suggesting that probably when the CEO was changed, several other members of the management team also left and were never completely replaced in the board. Exited deals, which should be on average less challenging deals, also have a smaller proportion of insiders.

Finally, in regression 7 we look at the percentage of outsiders. Note that when running this regression in our outsiders category, we included all the people we could not identify with certainty, as outsiders are usually the hardest to find in the various datasets (or from various press coverages). This is probably adding noise to our measure of outsiders. We find only two variables which have a significant coefficient: the 3i dummy, and the dummy for a bank-affiliated sponsor. This suggests that private equity firms that do not get directly involved will rely more on very experienced outsiders to monitor management and to advise them.

4. EVOLUTION OF THE BOARD FOLLOWING AN LBO

In this section we look at the evolution of the board after the company is taken private. In Figure 5, we look at how the average board size changes over time for LBOs, MBOs and other transactions. For all three cases, there is a large decrease in size when the company is taken private. However, boards of companies that undergo MBOs and other transactions decrease in size much more than LBO boards. Moreover, immediately following the LBO, the board size seems to increase slightly, possibly with LBO sponsors and outsiders (as will be shown in Figure 6). As the number of years after the LBO increases, the board size slightly decreases. One may imagine that as the firm progresses towards its strategy implementation and the accomplishment of the restructuring, there will be less need of private equity sponsors' involvement and the board might be shrinking in size. Beyond year 7 of the PE transaction, the board size increases. However, when one looks at the board size in year 7, all the firms exited in less than seven years are not there anymore. The increase in board size in later years is therefore probably due to the fact that these are cases that turned out to be particularly difficult and in which the private equity firm had to become very involved, trying to solve particularly difficult cases.

[23] When discussing the evolution of the board after the LBO, we show in Figure 6 that over time the proportion of management is relatively constant over time, while the proportion of LBO sponsors changes more.

This view is confirmed if one looks in Figure 6 at the evolution of the board composition. When the company is taken private, the proportion of outsiders (which includes all the unknown individuals) shrinks from more than 40% to less than 20% while LBO sponsors' participation in the board increases. The proportion of insiders does not change much, but it drops dramatically in the very last years, when they are replaced by LBO sponsors and outsiders: again, these are probably the problematic cases and the private equity firms' representatives need to be more directly involved.

We then look at how often there is a change in the CEO after the company is taken private. We compute the CEO turnover both before and after the company is taken private for MBOs, LBOs and other transactions. When doing so, we do not take into account any change of CEO that takes place during the transition from public to private: we only want to look at changes in CEOs while there is no major change of ownership. It has often been argued that private equity firms are able to give their CEO a longer horizon to plan a company growth. Therefore we should observe that following an LBO, CEO turnover decreases. However, this is not what we observe. When we look at pure MBOs, we find that the CEO turnover decreases (not surprisingly, since the CEOs often own a large proportion of the shares). While before the MBO, 17% of the companies in our sample experienced a change of CEO, this happens for only 2.4% of the companies afterwards. Companies that were taken private by a private equity firm had a much higher turnover: 33.3% of the companies in our sample had a change of CEO before being taken private. This suggests that LBOs are more likely to occur in companies that have recently under-performed (and therefore the CEO has lost his/her job) but also in companies where the founder has recently retired, and a new external CEO has just been brought in (we observe several instances of this type in our sample). One would expect therefore that there would be lower CEO turnover following an LBO, but this is not what happens. The percentage of companies in our sample that experience a change in CEO after an LBO is 45%. This number decreases to 31% if we ignore any change in the CEO from the first to the second year after the LBO, on the grounds that it might still be reflecting the transition from public to private. Moreover, one could argue that since we look at only three years before the LBOs, while the years following the LBO could be many more, this is a biased comparison. Therefore, we compute the CEO turnover also in this alternative way: we compute the number of times the CEO was changed in a company, and divide by the number of years over which this was observed. If we compute it in this way, we find that the average CEO turnover is 7% both before and after the LBO. If we exclude any change from the first to the second year, the turnover becomes 4%. With this last measurement we find a reduction in the CEO turnover following an LBO, but given that there was an unusually large turnover for these companies before the LBO, the result still does not confirm the view that private equity firms give management a longer horizon.

In Table 7, we look at the turnover of people on the board. We measure this turnover in two ways. First, in Panels A and B we look at the change in the size of the board from one year to another, measured as the (absolute) change in the total number of people sitting on the board, normalized by the board size in the previous year. We measure the average change in size in the years before the LBO and in the years after the LBO. Of course, any change in size that takes place when the company goes from public to private is not included. We compute the average change in size after the LBO, both including the change in size from the first to the second year after the LBO, and excluding this transition phase. We then take the average change for a company before and after the LBO and then the average over all companies. The results are presented in Panel A of Table 7. One can see that the variation in size before going private was 10% for both MBOs and LBOs . However, LBOs have a significantly larger size variation afterwards: 21% or 16% depending on whether we consider the first year variation or not.

We also measure turnover as the number of people who changed in a board from one year to the consecutive year, normalized by the size of the board in the previous year. This measure of turnover picks up changes due to variation in the board size and changes due to turnover of people, even if the size of the board has not changed. Again, we find that LBO boards have a very high turnover. Companies that are taken private in an LBO already have higher turnover than MBO companies before going private, but while MBO companies' board turnover does not change afterwards (it either increases slightly or decreases slightly, depending on whether we include or not the change from the first to the second year after the LBO) the turnover of LBOs increases.

5. CONCLUSIONS

We have looked at the size, composition and evolution over time of boards. We find that the role of the board is crucial in private equity and that studying the boards is a good way to see how private equity general partners can be effective in restructuring a company. Having private equity partners on the board of a company can be very helpful for achieving success in restructuring a company. However, the opportunity cost of private equity firms being actively involved in the board of one deal is that they have less time to focus on other deals. We find evidence that they choose to use more of their resources in the deals they expect to require more time and attention. The successful turnaround of companies is the result of time and effort that private equity firms put into the process. Most of the funds, also, seem to prefer the use of their own employees, rather than expert outsiders.

At the same time, when looking at the evolution of boards over time from immediately after the LBO to the exit, we find a picture of continuous change: there is a large turnover both of directors and of CEOs. Further study is needed to understand what is driving all these changes. For example, we plan to look at industry- or firm-specific announcements,

to see whether these changes of CEOs follow industry- or firm-specific shocks.

The analysis in this paper has only compared the board of LBOs with the boards of MBOs. In the future, we also plan to compare the boards of LBOs with companies that stayed public, to detect any difference in the board characteristics. We also plan to conduct further research on how these boards change over time while the company is private and what causes these changes. Finally, in this paper we focused on detecting situations where private equity sponsors were very active on the board, and thus were particularly involved in the restructuring process. However, we did not provide evidence that this increased involvement of the private equity sponsors actually led to better performance of the company (in terms of value of the company, ability to exit or operating profits). Showing such a causal effect is very difficult, for two reasons. First, the corporate governance literature has often underlined (see Hermalin and Weisbach 1998 and 2003) that the choice of the board and the performance of the firm are both endogenously determined variables and causality cannot be determined. Second, financial data about companies taken private in LBOs can be unreliable, both because there is less information available about private companies and because of the complex ownership structure we highlighted in Section 2. In fact, the layers structure of companies after an LBO is such that it may be difficult to decide which company's financial data to follow. Nonetheless, there should be future research to tackle this problem.

FIGURES

Figure 1: Year distribution of the sample

This figure shows the number of public-to-private transactions that took place in the UK each year from 1998 to 2003. We distinguish between LBOs, MBOs and other transactions. The year of each transaction is determined according to the announcement date.

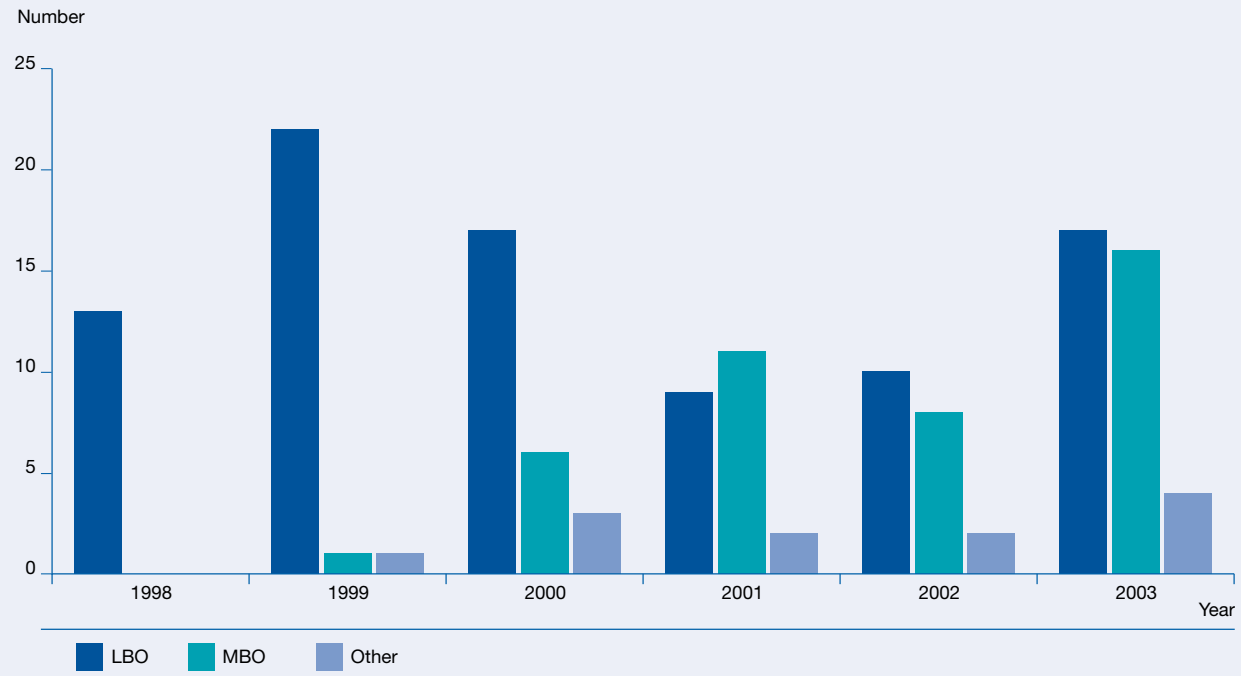


Figure 2: Transaction size distribution ($million)

This figure shows the distribution of the public-to-private transactions by transaction size. Transaction size is the value of the company, as implied by the price paid to take it private. We distinguish between LBOs, MBOs and other transactions. Since we have no data for the transaction size of two MBOs, those two transactions are not represented in the figure.

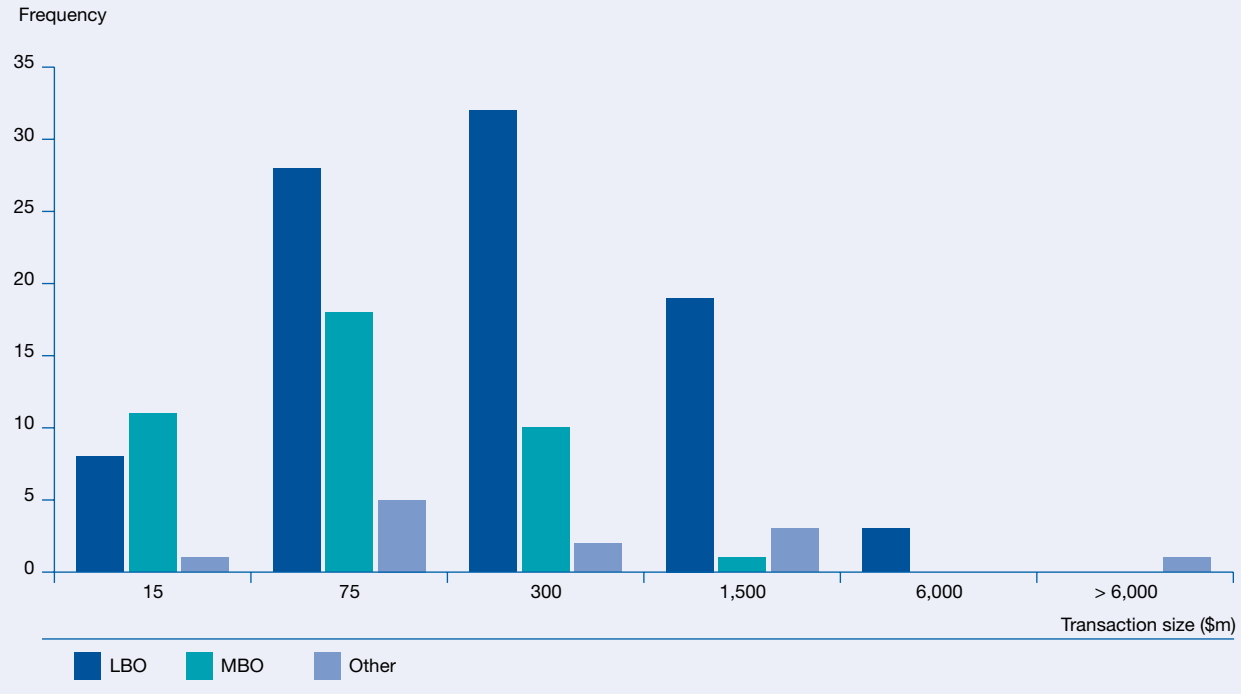


Figure 3:

This figure represents the board composition of LBOs, MBOs and other transactions. We report the composition for the last board observed before the company went private and the second board observed after the company went private. The board composition shows the different types of directors. Other insiders refer to other non-management insiders (for example, previous CEOs). Outsiders are individuals for which no special relation to the company could be found. Unknown are individuals whose identity could not be determined with certainty. LBO group are partners or employees of one of the private equity firms backing the transaction. PE connection are outside directors for whom a private equity connection could be identified (for example, they are employees or directors of a private equity firm).

Figure 3A: LBO board composition before buyout

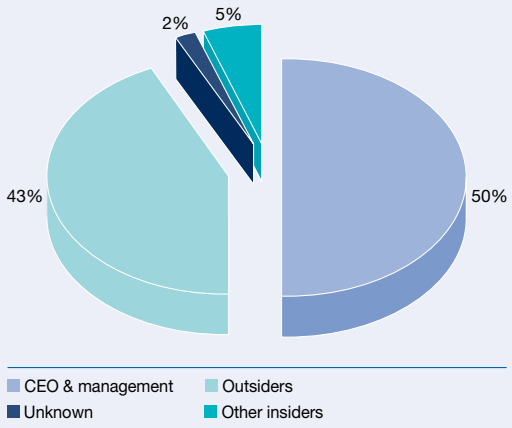


Figure 3B: LBO board composition after buyout

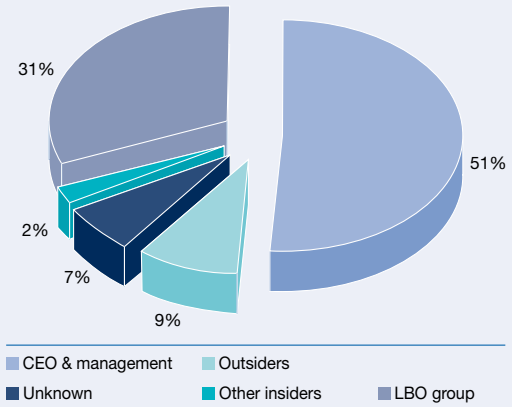


Figure 3C: MBO board composition before buyout

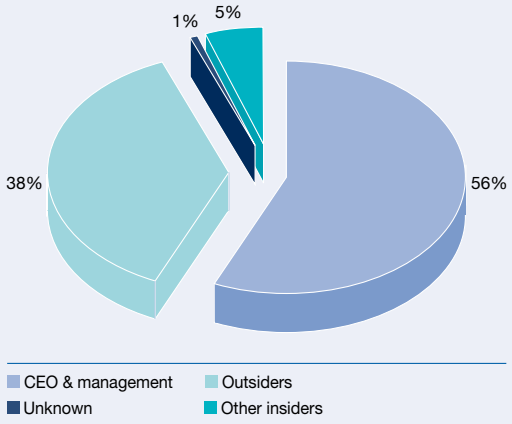


Figure 3D: MBO board composition after buyout

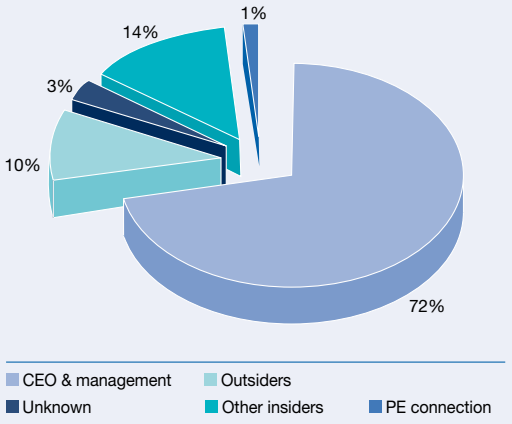


Figure 3E: Other board composition before buyout

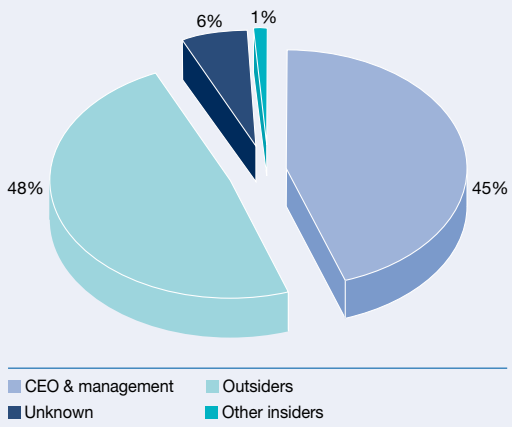
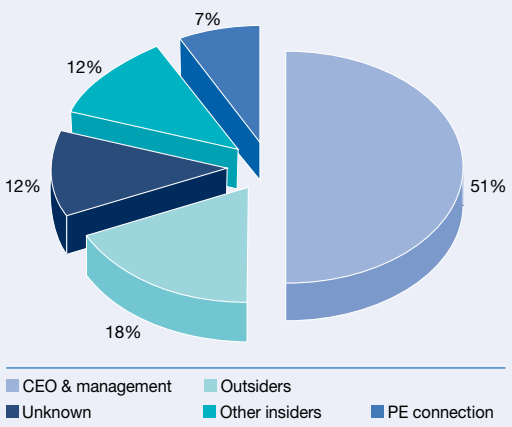


Figure 3F: Other board composition after buyout



FIGURES

Figure 4:

Age distribution for LBOs

This figure shows the age distribution of the different types of directors.

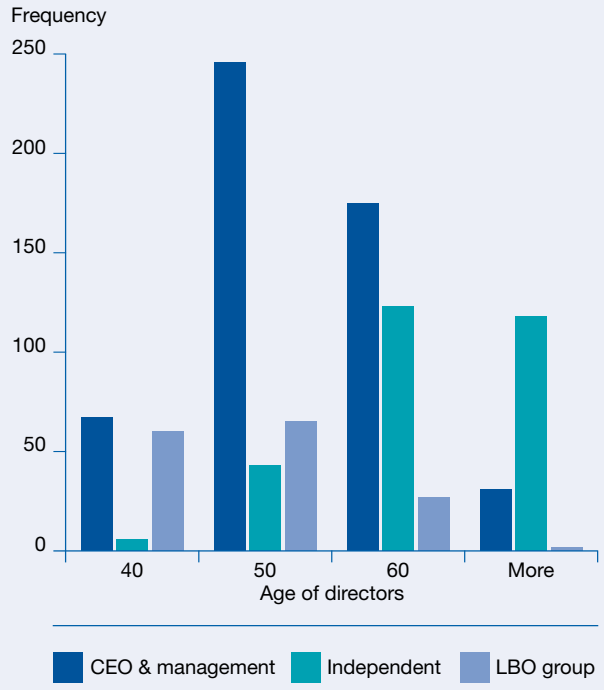


Figure 5:

Average board size over relative time

This figure shows how the size of the board changes over time, distinguishing between LBOs, MBOs and other transactions. Year 0 is the year in which the buyout takes place. The chart shows, for example, that in year 4 after the buyout LBOs had on average a board of five people. The average is taken over all the LBOs that have not been exited by year 5.

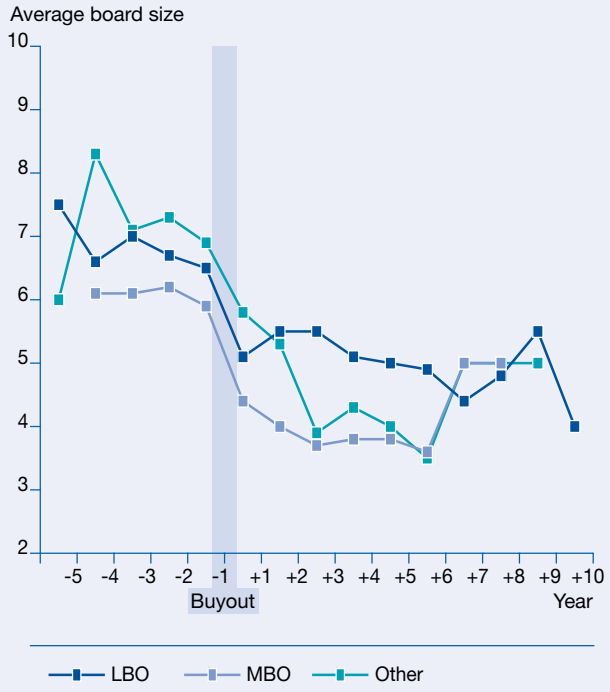
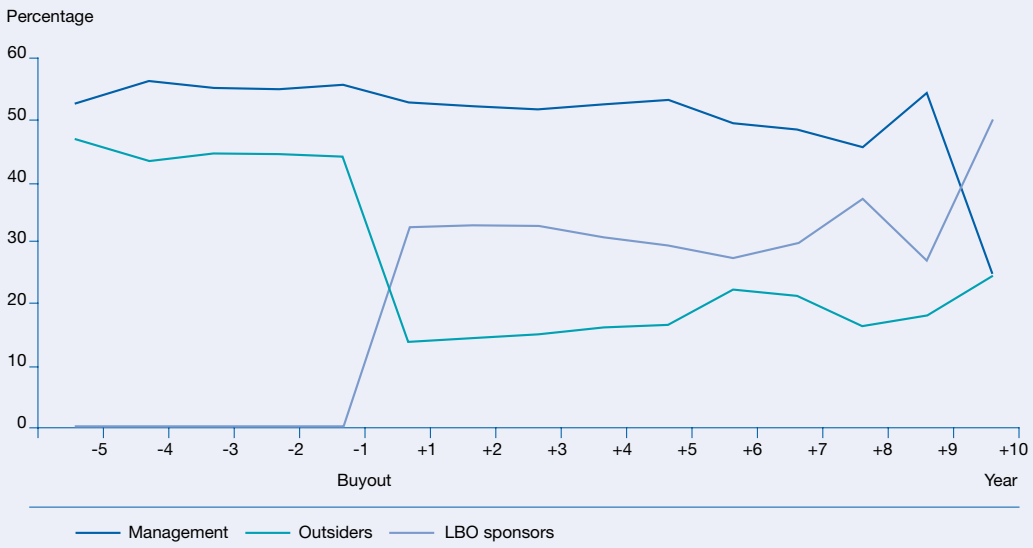


Figure 6:

Evolution of board composition for LBOs

This figure shows the evolution of the board composition for LBOs. Year 0 is the year in which the LBO takes place. The figure shows the average percentage of three groups of directors (with respect to the total number of directors): management (composed of CEO, management and other insiders), outside directors and LBO sponsors. The average in, for example, year 5 is taken over all the LBOs that have not been exited by year 5.



TABLES

Table 1: Company size descriptive statistics ($million)

This table represents some statistics about the size of the companies in the sample. Size is computed as the enterprise value implied by the price paid to take the company private. For two MBOs we do not have such information and therefore they are not represented in this table.

	Obs	Mean	Std. Dev.	Min	Max	Median
LBOs	88	327.86	685.70	0.41	5,300.00	105.47
MBOs	40	55.16	73.22	0.49	379.00	23.61
Other	12	985.00	2,192.01	8.91	7,741.58	75.30

Table 2: Change in the board size

This table shows the change in the average board size when the firm is taken private. We measure the average board size of the last board before the company is taken private (before) and of the second board observed after the company is taken private (after). T-statistics of the difference between LBOs and MBOs and of the difference between the board before and after are provided. Panel A reports statistics for all MBOs and LBOs. For one LBO we do not observe the board after the company is taken private, therefore that LBO is not represented in this table. Panel B selects 39 MBOs and 39 LBOs, matched by size. Panel C considers LBOs only and compares cases where the CEO changes after the buyout to cases where the CEO does not change.

Panel A: MBOs vs LBOs

		(m) MBO n=54	(l) LBO n=87	(m) - (l) t-stat
(b)	Before	6.22	6.51	-0.88
(a)	After	4.24	5.43	-3.16
(b) - (a)	t-stat	4.90	3.81	

	(m) MBO	(l) LBO	(m) - (l) t-stat
Change in size after event	1.98	1.08	2.00

Panel B: MBOs vs LBOs, matched sample

		(m) MBO n=39	(l) LBO n=39	(m) - (l) t-stat
(b)	Before	6.59	6.10	1.21
(a)	After	4.44	4.84	-0.97
(b) - (a)	t-stat	4.88	3.30	

	(m) MBO	(l) LBO	(m) - (l) t-stat
Change in size after event	2.15	1.26	1.64

Panel C: No CEO change vs CEO change (LBOs only)

		(m) No CEO Change	(l) CEO Change	(m) - (l) t-stat
		n=40	n=45	
(b)	Before	6.58	6.53	0.11
(a)	After	5.18	5.67	-1.09
(b) - (a)	t-stat	3.22	2.26	

	(m) No CEO change	(l) CEO change	(m) - (l) t-stat
Change in size after event	1.40	0.87	1.14

TABLES

Table 3: Change in the board composition of LBOs only

This table shows the change in the board composition when the firm is taken private. Only LBOs are considered. We measure the board composition of the last board before the company is taken private (before) and of the second board observed after the company is taken private (after). We distinguish between cases where the CEO changes after the buyout and cases where the CEO does not change. T-statistics of the difference between these two cases and of the difference between the board before and after are provided. Panel A reports the number of outside directors sitting on the board (as a percentage of total directors), Panel B reports the number of insiders (CEO, management and other insiders) and Panel C reports the number of LBO sponsors (partners or employees of private equity firms backing the LBO).

Panel A: Percentage of outsiders sitting on the board

		(m) No CEO change	(l) CEO change	(m) - (l) t-stat
		n=40	n=45	
(b)	Before	42%	44%	-0.56
(a)	After	9%	10%	-0.36
(b) - (a)	t-stat	11.04	11.53	

	(m) No CEO Change	(l) CEO Change	(m) - (l) t-stat
Change in percentage after event	34%	35%	-0.24

Panel B: Percentage of insiders sitting on the board

		(m) No CEO change	(l) CEO change	(m) - (l) t-stat
		n=40	n=45	
(b)	Before	57%	55%	0.64
(a)	After	61%	47%	2.87
(b) - (a)	t-stat	-1.01	1.80	

	(m) No CEO change	(l) CEO change	(m) - (l) t-stat
Change in percentage after event	-4%	8%	-2.28

Panel C: Percentage of LBO sponsors sitting on the board

		(m) No CEO change	(l) CEO change	(m) - (l) t-stat
		n=40	n=45	
(b)	Before	-	-	-
(a)	After	25%	37%	-2.35
(b) - (a)	t-stat	-	-	

Table 4: Differences between exited and non-exited deals (LBOs only)

Panel A: Change in the board size by exit

		(m) No exit	(l) Exit	(m) - (l) t-stat
		n=46	n=41	
(b)	Before	6.61	6.39	0.60
(a)	After	5.52	5.32	0.46
(b) - (a)	t-stat	2.86	2.50	

	(m) No exit	(l) Exit	(m) - (l) t-stat
Change in size after event	1.09	1.07	0.03

Panel B: Percentage of insiders sitting on the board

		(m) No exit	(l) Exit	(m) - (l) t-stat
		n=46	n=41	
(b)	Before	55%	55%	-0.17
(a)	After	49%	58%	-1.54
(b) - (a)	t-stat	1.27	-0.47	

	(m) No exit	(l) Exit	(m) - (l) t-stat
Change in percentage after event	5%	-2%	1.44

Panel C: Percentage of LBO sponsors sitting on the board

		(m) No exit	(l) Exit	(m) - (l) t-stat
		n=46	n=41	
(b)	Before	-	-	-
(a)	After	35%	26%	1.75
(b) - (a)	t-stat	-	-	

Panel D: Percentage of CEO changes

	(m) No exit	(l) Exit	(m) - (l) t-stat
	n=46	n=39	
CEO change	61%	44%	1.59

Table 5: Changes in the board size, multivariate analysis

This table reports regression coefficients (and T-statistics in parentheses) for various dependent variables and model specifications. The dependent variables are the board size change, defined as the difference in the number of people on the board before and after the LBO, and the percentage change in board size. Firm size is the enterprise value implied by the LBO and number of LBO sponsors is the number of PE funds backing the LBO.

Change in CEO at LBO is a dummy that takes value one if there has been a CEO change from before to after the LBO. Experienced sponsors and bank-affiliated sponsors are dummies that take value one if at least one of the PE firms backing the LBO is an experienced firm or if the leading sponsor is a bank-affiliated PE firm. 3i dummy takes value 1 if the leading sponsor is 3i. Fraction of outsiders before they LBO with CEO experience measures the number of outsiders on the board before the LBO who were or had been CEOs in other companies. Real Estate is a dummy that takes value one if the company is in the real estate sector. One, two or three asterisks means that the coefficients are significant with a confidence interval of, respectively, 10%, 5% and 1%.

Dependent variable	Board size change	Board size change	% Board size change	% Board size change
	Reg 1	Reg 2	Reg 3	Reg 4
Intercept	4.71***	4.76***	0.7***	0.08
	(3.58)	(3.67)	(3.57)	(0.31)
Firm size (billion $)	-0.42	-0.43	-0.05	-0.14***
	(-1.40)	(-1.44)	(-1.06)	(-2.90)
Change in CEO at LBO	-0.74	-1.04**	-0.12*	-0.12*
	(-1.60)	(-2.14)	(-1.78)	(-1.82)
Number of LBO sponsors	-0.51	-0.51	-0.1	-0.08
	(-1.19)	(-1.20)	(-1.51)	(-1.35)
Experienced sponsor	-1.88**	-1.98**	-0.28**	-0.25**
	(-2.16)	(-2.30)	(-2.19)	(-2.07)
Bank-affiliated sponsor	-0.71	-0.58	-0.12	-0.1
	(-1.06)	(-0.88)	(-1.22)	(-1.13)
Fraction of outsiders before the LBO	-1.08	-1.43	-0.11	-0.04
	(-0.71)	(-0.95)	(-0.47)	(-0.18)
Fraction of outsiders before the LBO with CEO exp.		1.58*		
		(1.82)		
Average size of board before LBO				0.08***
				(3.70)
Real estate	-0.66	-0.83	-0.07	0.04
	(-0.83)	(-1.06)	(-0.57)	(0.35)
Exited deal	-0.34	-0.31	-0.08	-0.09
	(-0.69)	(-0.65)	(-1.14)	(-1.35)
3i dummy	0.52	0.58	0.04	0.05
	(0.46)	(0.52)	(0.21)	(0.29)
Adjusted R-squared	6.8%	9.5%	6.2%	19.4%
N	87	87	87	87

TABLES

Table 6: Board composition, multivariate analysis

This table reports regression coefficients (and T-statistics in parentheses) for various dependent variables and model specifications. The dependent variables are the percentage of LBO sponsors sitting on the board (measured in the second year following the LBO), the average percentage of LBO sponsors sitting on the board over all years after the LBO, the percentage of insiders sitting on the board (in the second year or on average) and the percentage of outsiders on the board in the second year following the LBO. Firm size is the enterprise value implied by the LBO and number of LBO sponsors is the number of PE funds backing the LBO. Change in CEO at LBO is a dummy that takes value one if there has been a CEO change from before to after the LBO. Experienced sponsors and bank-affiliated sponsors are dummies that take value one if at least one of the PE firms backing the LBO is an experienced firm or if the leading sponsor is a bank-affiliated PE firm. 3i dummy takes value 1 if the leading sponsor is 3i. Fracton of outsiders before the LBO with CEO experience measures the number of outsiders on the board before the LBO who were or had been CEOs in other companies. Real Estate is a dummy that takes value one if the company is in the real estate sector. One, two or three asterisks means that the coefficients are significant with a confidence interval of, respectively, 10%, 5% and 1% level.

Dependent variable	% LBO sponsors	% LBO sponsors	Average % LBO sponsors	Average % LBO sponsors	% Insiders	Average % Insiders	% Outsiders
	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7
Intercept	-0.2	-0.11	0.04	-0.1	0.94***	0.94***	0.08
	(-0.17)	(-1.00)	(0.34)	(-1.05)	(6.48)	(7.31)	(0.78)
Firm size (billion $)	0.04	0.04	0.04	0.04	-0.01	-0.01	-0.02
	(1.26)	(1.15)	(1.30)	(1.38)	(-0.44)	(-0.35)	(-1.02)
Change in CEO at LBO	0.1**	0.1**	0.1**	0.11***	-0.13***	-0.13***	0.04
	(2.06)	(2.16)	(2.31)	(2.76)	(-2.63)	(-2.90)	(0.95)
Number of LBO sponsors	0.13***	0.13***	0.12***	0.11***	-0.12**	-0.11***	-0.16
	(3.02)	(2.97)	(3.06)	(3.12)	(-2.51)	(-2.68)	(-0.46)
Experienced sponsor	0.04		0.01		-0.1	-0.13	0.06
	(0.46)		(0.07)		(-1.02)	(-1.55)	(0.80)
Bank-affiliated sponsor	-0.05		-0.08		-0.05	-0.5	0.11**
	(-0.76)		(-1.38)		(-0.74)	(-0.74)	(1.98)
Fraction of outsiders before the LBO	0.29*	0.28*	0.25*	0.26**	-0.32*	-0.3**	0.35
	(1.83)	(1.82)	(1.81)	(2.03)	(-1.93)	(-2.02)	(0.28)
Active sponsor		0.04**		0.09***			
		(2.01)		(2.91)			
Real estate	0.47	0.05	0.03	0.03	0.01	0.00	-0.06
	(0.57)	(0.64)	(0.42)	(0.46)	(0.15)	(0.01)	(-0.93)
Exited deal	-0.09*	-0.09*	-0.1**	-0.13***	0.1*	0.11**	-0.02
	(-1.76)	(-1.92)	(-2.37)	(-3.15)	(1.92)	(2.27)	(-0.36)
3i dummy	-0.2*	-0.14	-0.19*	-0.1	0	0.03	0.2**
	(-1.71)	(-1.18)	(-1.91)	(-1.06)	(0.01)	(0.28)	(2.16)
Adjusted R-squared	22.0%	25.1%	27.7%	34.0%	22.2%	17.3%	5.6%
N	87	87	87	87	87	87	87

Table 7: Board turnover

Panel A: Size variation (including first year after LBO)

		(m) MBO	(l) LBO	(m) - (l) t-stat
		n=39	n=82	
(b)	Before	10%	10%	-0.16
(a)	After	12%	21%	-2.22
(b) - (a)	t-stat	-0.82	-3.69	

	(m) MBO	(l) LBO	(m) - (l) t-stat
Change in size variation after event	-3%	-11%	1.69

Panel B: Size variation (excluding first year after LBO)

		(m) MBO	(l) LBO	(m) - (l) t-stat
		n=32	n=74	
(b)	Before	10%	10%	0.04
(a)	After	10%	16%	-1.43
(b) - (a)	t-stat	-0.18	-2.79	

	(m) MBO	(l) LBO	(m) - (l) t-stat
Change in size variation after event	-1%	-6%	1.27

Panel C: Turnover (including first year after LBO)

		(m) MBO	(l) LBO	(m) - (l) t-stat
		n=39	n=82	
(b)	Before	7%	12%	-2.54
(a)	After	8%	17%	-3.77
(b) - (a)	t-stat	-0.07	-2.55	

	(m) MBO	(l) LBO	(m) - (l) t-stat
Change in size variation after event	0%	-5%	1.41

Panel D: Turnover (excluding first year after LBO)

		(m) MBO	(l) LBO	(m) - (l) t-stat
		n=39	n=82	
(b)	Before	7%	13%	-2.31
(a)	After	5%	15%	-3.78
(b) - (a)	t-stat	0.79	-1.24	

	(m) MBO	(l) LBO	(m) - (l) t-stat
Change in size variation after event	2%	-3%	1.24

REFERENCES

Adams, R. (1998), "The Dual Role of Corporate Boards as Advisors and Monitors of Management", mimeo, Stockholm School of Economics.

Adams, R. and D. Ferreira (2007), "A Theory of Friendly Boards", *Journal of Finance* 62, 217-250.

Boone, A.L., L. Casares Field, J.M. Karpoff et al (2007), "The Determinants of Corporate Board Size and Composition: An Empirical Analysis", *Journal of Financial Economics* 85, 66-101.

Coles, J.L., N.D. Daniel and L. Naveen (2007), "Boards: Does One Size Fit All?", *Journal of Financial Economics*, forthcoming.

Hellmann, T., L. Lindsey and M. Puri (2007), "Building Relationship Early: Banks in Venture Capital", *Review of Financial Studies*, forthcoming.

Hermalin, B. and M. Weisbach (1988), "Endogenously Chosen Boards of Directors and Their Monitoring of the CEO", *American Economic Review* 88, 96-118.

Hermalin, B. and M. Weisbach (2007), "Boards of Directors as an Endogenously Determined Institution: A Survey of the Economic Literature", *FRBNY Economic Policy Review* 9, 7-26.

Jensen, M. (1993), "The Modern Industrial Revolution, Exit and the Failure of Internal Control Systems", *Journal of Finance* 48, 831-880.

Kaplan, S. and R. Gertner (1996), "The Value-Maximizing Board", mimeo, University of Chicago.

Kester, W.C. and T.A. Luehrman (1995), "Rehabilitating the Leveraged Buyout", *Harvard Business Review*, May-June, 119-130.

Lerner, J. (1995), "Venture Capitalists and the Oversight of Private Firms", *Journal of Finance* 50, 301-318.

Lerner, J., F. Hardymon and A. Leamon (2002), *Venture Capital and the Private Equity: A Casebook*, John Wiley.

Linck, J.S., J.M. Netter and T. Yang (2007), "The Determinants of Board Structure", *Journal of Financial Economics*, forthcoming.

Rogers, P., T. Holland and D. Haas (2002), "Value Acceleration: Lessons from Private-Equity Masters", *Harvard Business Review*, June, 94-103.

Walker, D. (2007), "Disclosure and Transparency in Private Equity", consultation document.

Weisbach, M. (1988), "Outside Directors and CEO Turnover", *Journal of Financial Economics* 20, 431-460.

Yermack, D. (1996), "Higher Market Valuation of Companies with a Small Board of Directors", *Journal of Financial Economics* 40, 185-212.

Part 2
Case studies

European private equity cases: introduction

ANN-KRISTIN ACHLEITNER
Technische Universität München

EVA NATHUSIUS
Technische Universität München

KERRY HERMAN
Harvard Business School

JOSH LERNER
Harvard Business School

Private equity in Europe traces its roots back to the mid 1930s, with the formation of investment groups such as Charterhouse Development Capital (1934) and 3i (1945) in the UK. Differences in post-Second World War economies and focus informed these groups' activities compared to their US counterparts. Early private equity in Europe was characterized by shortages of long-term capital available to smaller companies; this originally prompted the Bank of England and UK clearing banks to focus on companies facing funding gaps. In contrast, early US players, such as American Research Development Corporation (ARD), raised institutional capital via publicly traded, closed-end investment companies to pursue the commercialization of new technologies developed in the war, characterizing future directions in the industry in that country.[1]

Europe's private equity industry remained highly fragmented until 1970, with a limited number of private equity investors. Overall, it was a less popular asset class than more traditional vehicles such as stocks, bonds or real estate. In the early 1970s, however, private equity investments began to take off in Europe. However, conditions were tough; leverage was unheard of, small deals were typical, and investors practised extreme discipline in their deal selections; on the other hand competition was virtually nil.[2]

The environment for private equity improved with changes to investment rules and tax regulations. Institutional investors, such as banks and pension funds, were allowed to undertake more diverse investments with the Bank of England's 'Competition and Credit Control' policy shift in 1971. This gave UK banks more flexibility to invest in a range of vehicles, and opened their coffers to private equity. Similar legal reforms relaxing investment rules for institutional investors followed in other European countries and were a key catalyst for the development of the European private equity market. In addition, tax regulation changes across Europe made investments in asset classes that provided capital gains more attractive, further fueling private equity investment growth.[3] Support from US institutional investors, particularly to some of the more established partnerships such as Schroders and Apax Partners, continued to fuel growth.

By the mid 1990s, accelerated by a low inflation environment, European private equity entered a period of rapid growth, and favoured investors who created conditions for growth in portfolio companies.[4] Liberalization across Europe's economies continued. In Germany, for example, the legacy of cross-shareholding in a company, with stakes held across banks, insurers and leading industrial companies – originally installed to protect companies from takeover – was dismantled. Chancellor Schroeder's government designed a system of tax incentives which enabled these stakeholders to divest their holdings in order to focus instead on core activities.[5]

Despite the turmoil of capital markets, specifically technology markets in 2000, and a slower growth in private equity in 2001, the private equity market continued to grow, driven primarily by later-stage buyout deals and the entry of many major US-based funds, with a resulting surge in mega-deals. Analysts reported increased interest in private equity throughout Europe, with institutional investors increasing their allocations and foreign pension consultants recommending targets for the first time.[6] Pension funds were quickly becoming the largest investors, with banks and insurance companies not far behind.[7] This positive trend continued, driven primarily by increasing volumes and returns in later-stage mid-sized and large buyouts. Between 1994 and 2006, portfolio volumes saw compound annual growth of 20.4% (see Exhibit 1 for development of European private equity portfolio volumes).[8]

[1] Alex Bance, "Why and How to Invest in Private Equity", An EVCA Investor Relations Committee Paper, Zaventem, March 2004.
[2] Phil Davis, "'Greed rampant at the moment'," *Financial Times*, 3 December 2007, p. 9.
[3] Alex Bance, "Why and How to Invest in Private Equity", An EVCA Investor Relations Committee Paper, Zaventem, March 2004.
[4] As Bance notes, a low inflation environment "created a particular need for growth stocks and highlighted a core skill of private equity managers, namely creating conditions for growth in portfolio companies." Alex Bance, "Why and How to Invest in Private Equity", An EVCA Investor Relations Committee Paper, Zaventem, March 2004.
[5] Paul Betts, "Will Deutschland AG battle with the giant locusts?" *Financial Times*, 8 November 2007, p. 14.
[6] According to Paris Europlace Financial Forum, "New Trends and opportunities in the Private Equity market in France and in Europe", 5 July 2001, http://www.axaprivateequity.com/gb/Press/documents/newtrends.pdf, accessed 10 November 2007.
[7] According to Paris Europlace Financial Forum, "New Trends and opportunities in the Private Equity market in France and in Europe", 5 July 2001, http://www.axaprivateequity.com/gb/Press/documents/newtrends.pdf, accessed 10 November 2007.
[8] "EVCA Yearbook 2006", European Private Equity & Venture Capital Association, Zaventem, 2006; "EVCA Yearbook 2007", European Private Equity & Venture Capital Association, Zaventem, 2007.

In 2005, some factions of Germany's political leadership – the Social Democrats – publicly attacked foreign investments in Germany, likening hedge funds and private equity groups to locusts "who feasted on German firms for profit before spitting them out".[9] Politicians called for increased legislation to protect domestic firms from possible foreign takeover.[10] The public debate spread to other European countries with discussions on issues of employment, financial instability and shareholder activism pushing for more transparency and regulation of private equity and hedge funds.[11]

While positive growth rates – both in terms of volumes and number of transactions – underlined the European-wide trend in private equity, differences across European countries remained. In 2006 the UK, with 57.7% of total amount invested in Europe,[12] represented a more mature industry. Several studies identified the UK's tax and legal conditions as more favourable to private equity,[13] enabling the industry to play a more significant economic role, both in terms of ratio of private equity investments to GDP and overall fund size to market capitalization in public markets.[14] This role was bolstered by concurrent vibrant and mature public markets in the UK, which offered investors greater possibilities for an exit via IPO. Continental Europe lagged behind the UK, and European companies relied more on debt providers than their UK counterparts. Most of these countries had long (and protectionist) histories of family firms that faced greater challenges around succession in the face of the changing Eurozone and global economies; private equity provided these firms in these countries – Germany and Italy, for example – an important alternative in the landscape of traditional financings. By 2007, however, some countries, such as Italy, were still viewed as "virgin territory", ripe for private equity investment.[15] (Exhibit 2 provides a comparison of the importance of private equity across different European countries.)

The authors analysed two European private equity cases to illustrate some of the issues raised in public debates. These cases focused on Germany and the UK, in order to highlight key differences in the private equity environment across continental Europe (Messer Griesheim in Germany) and the UK (New Look).

Messer Griesheim, Germany: key selection objectives

When the Messer Griesheim deal closed in 2001, it was the largest private equity deal in Germany, in a complex context, and the largest industrial buyout in Europe at the time. The company was owned by pharmaceutical giant Hoechst and the founding family. Goldman Sachs and Allianz Capital Partners bought out the company, with the family remaining as a shareholder. As a divisional buyout of a large industrial company, this deal represents a typical case of firm restructuring in Germany at that time. Considerable restructuring of the company took place before parts of the business were sold to Air Liquide in 2004, and the family bought the shares of Goldman Sachs and Allianz Capital Partners in the remaining portions of the company. The case offered three interesting areas for analysis.

First, employment was a key topic since the major restructuring efforts and divestitures undertaken post-buyout implied reductions in employment. In addition to analysing sheer employment numbers, additional quantitative, financial and qualitative indicators of employment were identified and analysed, allowing for a rich discussion on this complex research topic. Second, Messer Griesheim offered an interesting setting to discuss the impact of private equity on corporate governance through the interplay between family owners, industrial companies and private equity investors. Third, the opportunity for a family to regain control over parts of its original company via private equity was investigated within the case study.

New Look, UK: key selection objectives

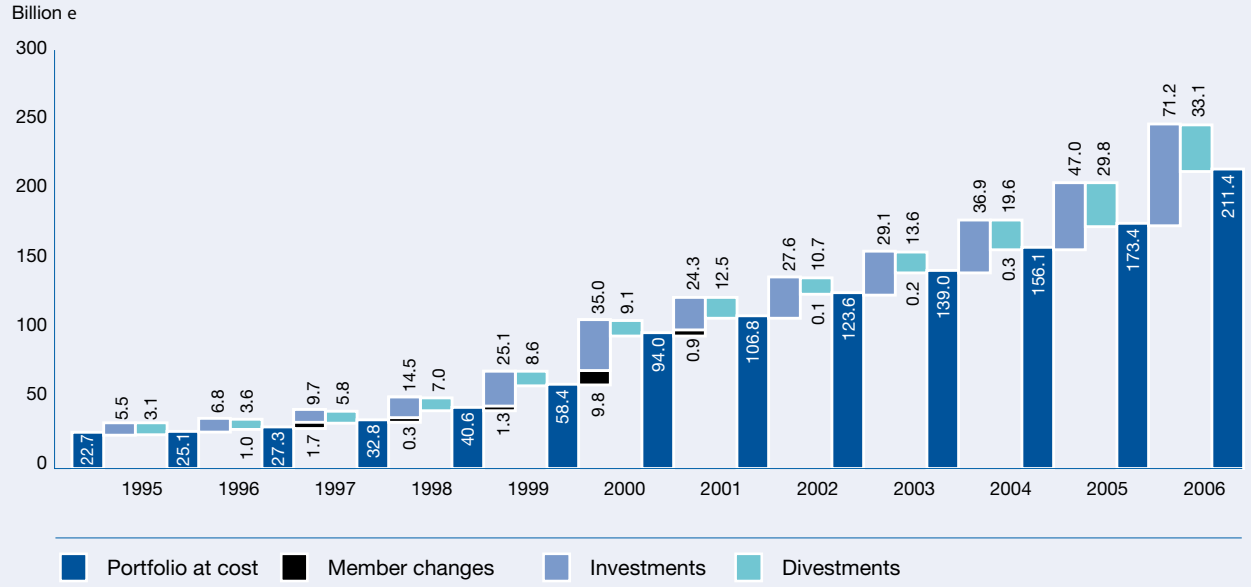
In April 2004, New Look was taken private through a buyout supported by Apax Partners and Permira, representing one of the largest UK buyouts in that year. As a public-to-private transaction, New Look was very much in the public eye as a case for why a company goes from being publicly listed to privately held. Post-buyout, New Look underwent a transformation process that led to high company growth and international expansion, offering an interesting context to analyse its success, and providing a contrast to the Messer Griesheim case.

With New Look a key area of analysis was the impact on corporate governance through the public-to-private transaction. The case offered a rich base for a discussion of the impact of private equity on strategic decision-making and corporate governance. A comparison was undertaken of New Look's corporate governance while the company was still publicly listed to the period when it was privately held. Second, as with the Messer Griesheim case, employment development post-buyout was an important topic of study. Third, the refinancing undertaken after the buyout was analysed, as significant payouts to the equity holders, as well as a recapitalization, took place within three years of the buyout.

[9] See "Locusts in lederhosen – Business in Germany," *The Economist*, 20 October 2007.
[10] By November 2007, the German government proposed that foreign investors "seeking to take large stakes (25% or more) in German companies" had to inform the government in advance, or risk a lengthy investigation into their bid; ultimately the government could block the deal, similar to the role France's Caisse des Dépôts et Consignations can play when needed. Paul Betts, "Will Deutschland AG battle with the giant locusts?" *Financial Times*, 8 November 2007, p. 14.
[11] "Shareholder activism debate: a force for good or bad?" Panel transcript, *Euromoney*, 1 October 2007, euromoney.com, accessed 28 October 2007.
[12] "EVCA Yearbook 2007", European Private Equity & Venture Capital Association, Zaventem, 2007.
[13] See the empirical studies "Private Equity in the Public Eye – 2007 Global Private Equity Environment Rankings", Apax Partners, 2006, and "Benchmarking European Tax and Legal Environments", European Private Equity & Venture Capital Association, Zaventem, 2007.
[14] "EVCA Yearbook 2007", European Private Equity & Venture Capital Association, Zaventem, 2007; http://epp.eurostat.ec.europa.eu, accessed 4 December 2007.
[15] David Lane, "Western Europe: Italy – A Most Appetising Private Equity Market – Italy's Economy is Characterized by Small and Medium-sized Family Businesses, Offering Huge Potential For Private Equity", *The Banker*, 1 November 2007, p. 1.

Exhibit 1: Private equity fund size in Europe (1994–2006)

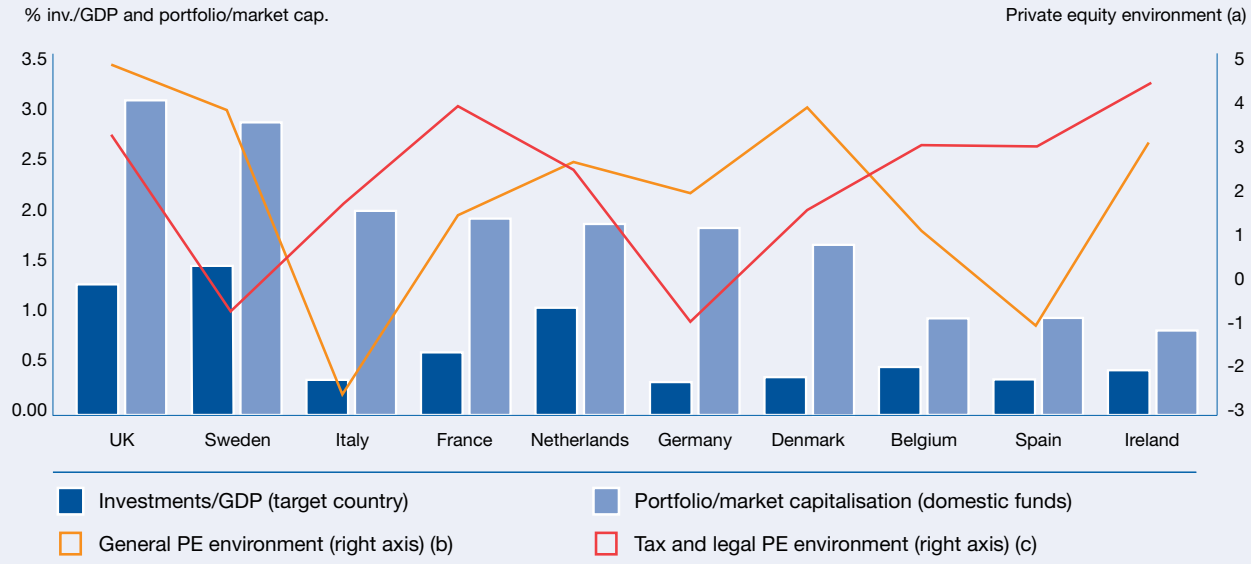
Private equity portfolio in Europe



Source: EVCA Yearbooks 1995–2007, Zaventem.

Notes: The data are based on activities of private equity funds located in Europe and are valued at costs. Divestments cover trade sales, IPOs, liquidations and other divestment types. Investments cover first and follow-up rounds of funding. Member changes are due to additions or exclusions of members in the EVCA database. An earlier version of this graph appeared in an expertise on private equity for the Federal Ministry of Finance in Germany, later published as C. Kaserer, A.-K. Achleitner, C. von Einem, D. Schiereck, "Private Equity in Deutschland – Rahmenbedingungen, ökonomische Bedeutung und Handlungsempfehlungen", Norderstedt, 2007.

Exhibit 2: Economic relevance of private equity in Europe (2006)



Source: Apax Partners (2007), EVCA (2006), EVCA (2007), Eurostat, World Federation of Exchanges.

Notes:
(a) The higher the value of the private equity environment or the tax and legal environment, the more favourable the conditions.
(b) The private equity environment indicators published by Apax Partners are based on macroeconomic data, country specific risk as well as the financing, legal/political and entrepreneurial environment.
(c) The tax and legal environment published by the EVCA represents the tax and legal environment for limited partners, fund management and investee companies as well as the environment to retain talent in investee companies and management funds. To be comparable to the Apax Partners indicators, the tax and legal environment indicator was rescaled (-6 is the worst, +6 is the best).

Messer Griesheim

ANN-KRISTIN ACHLEITNER
Technische Universität München

EVA NATHUSIUS
Technische Universität München

KERRY HERMAN
Harvard Business School

JOSH LERNER
Harvard Business School

EXECUTIVE SUMMARY

In April 2001, Allianz Capital Partners and Goldman Sachs acquired 66.2% of Messer Griesheim shares from pharmaceutical giant Hoechst, which later became Aventis. The remaining minority stake was owned by the Messer family. At €2.1 billion, the buyout represented the largest private equity deals closed in Germany and the largest industrial buyout in Europe at that time. As private equity was gaining ground in Europe and Germany, the Messer Griesheim transaction epitomized a deal where a family regained control of some of its traditional, industrial-based company's entities. An overall restructuring plan enabled the company to divest non-core entities and focus on its core activities. Despite reductions in employment, employee development remained a critical issue for management throughout the deal, as the team provided incentives to encourage key employees to stay with the core businesses. The deal also successfully navigated the delicate nature of specific corporate governance aspects of a private equity-backed family concern with global operations.

During the 1990s, Hoechst had allowed Messer Griesheim to make large investments, aimed towards expansion. By the late 1990s, industry consolidation and market conditions made it clear that these activities had been ill-conceived. In the light of a new corporate focus on life sciences activities, Hoechst initiated the early stages of a radical restructuring of the company's global operations, even prior to the Allianz Capital Partners and Goldman Sachs deal. Throughout the negotiations and after the deal was in place, management continued executing the pre-existing restructuring plan, divesting many of the company's local and far-flung businesses and streamlining the whole organization.

Private equity allowed the Messer family to restructure at a critical inflection point in its history, and offered post-investment management support enabling the Messer family to successfully address several structural issues threatening to undermine the company's future. With the exit of Allianz Capital Partners and Goldman Sachs, Messer Griesheim's German, UK and US businesses were sold to Air Liquide. The Messer family acquired the shares of Allianz Capital Partners and Goldman Sachs in the remaining entities, enabling them to gain control over a good portion of its original businesses (see Exhibit 1 for a diagram of the deal over time). The buyout brought a healthy and prospering – albeit smaller – entity into being, and was the culmination of a multi-decade effort by the Messer family to use private equity to stabilize its various businesses.

THE INDUSTRIAL GASES MARKET: 2001

By the late 1990s, industrial gases companies' valuation maintained steady levels in the face of a general downturn across the chemicals sector. The industry had been consolidated into a few large players, each focused on improved returns on capital, relying on pricing increases and keeping capital investments down. Almost all of the top five reported capital spending decreases, as much as 10% in some instances, and across the industry capital spending was down 5–6% (from 20–21% down to 11–15%). Air Liquide's CEO recalled: "We have been rather cautious, and are limiting our projects to those with rapid value creation."[1] Industrial gases companies were forced to review their strategic options and to either try to safeguard their market position in regions by extending their business or limiting their activities in less profitable regions.

By 1999, the global industrial gases sector had undergone consolidation, and Europe had seen an active year on the M&A front. Big deals had been undertaken, primarily motivated by capital intensity and pressure on margins: Air Liquide's and Air Products' combined takeover attempt of BOC had failed on anti-trust grounds, while competitor Linde had completed the successful takeover of AGA in August. Linde paid a total of €3.5 billion for AGA's equity in a combination of a private transaction and public tender offer.[2] With AGA's €800 million net debt, this brought the total value of the deal to €4.3 billion, and made Linde the fourth largest player globally and second in Europe (see Exhibit 2 for 1999 market size and market share of major producers).

Valuations at the end of the 1990s reflected the industry's high barriers to entry and the healthy margins attained once an industrial gas business of any size was established. As analysts reported, the public market valuation differed

[1] Cited in David Hunter, Natasha Alperowicz, "Industrial gases riding high, despite recession", *Chemical Week*, 23, vol. 164, no. 7, 20 February 2002.
[2] "Case Study: Messer Griesheim LBO", Goldman Sachs, *Vallendar*, 27 April 2007.

substantially from private market valuations, "with M&A transactions commanding significant premiums".[3] Private companies were willing to pay a premium for small regional companies; given the sector's distribution challenges, smaller entities could be of great value. (See Exhibit 3 for comparable M&A transactions in the industrial gases industry.)

In 2001, the global market for industrial gases represented $34.5 billion (€38.3).[4] The top five players – Linde, Air Liquide, Air Products, BOC and Praxair – accounted for over 50% of the overall market.[5] Growing at 4–5%, the industry had applications in heavy manufacturing, health care, metal production and fabrication, chemicals and refining and food and beverage markets. Products manufactured included basic industrial gases used in bulk, such as nitrogen, oxygen and hydrogen, as well as the speciality gases – air gases (atmospheric gases) and synthetic (or processed) gases – used in smaller volumes.[6] Oxygen and nitrogen are the key industrial gases; oxygen makes up 20.5% of air by volume and nitrogen 78.09%.

Gases are transported in three ways: in liquid form over roads or rail by tanks, compressed in heavy cylinders, or by pipeline. Transportation over any great distance is not economical – 200–300 kilometers is considered as the maximum distance for deliveries. Over 40% of industry volume was delivered by gas cylinders, making it primarily a local business. Merchant (or bulk) customers stored gases delivered by tanker truck or rail onsite in vacuum-insulated containers; this represented about 25% of the market. For large industrial customers, supplied via the "tonnage method", an air separation unit (ASU) was installed onsite but was operated by the industrial gas company, or supplies were piped directly to the customer by the gas company's off-site ASU. Tonnage business accounted for about 23% of gases supplied. Non-cryogenic processed gases accounted for the remaining 12%, with membrane or absorption plants installed directly at customer locations. Varying contract terms – especially length of contract – applied to the different distribution methods; tonnage contracts for example ran 10 to 20 years, with clauses passing raw material cost changes on to the customer. Merchant or bulk customers tended to have three to five year contracts and the gas cylinder business was primarily short term, with either on-the-spot purchases or contracts for less than one year.[7] These distribution challenges made the industry regional and fragmented.

The industry was also highly capital intensive, with a new ASU calling for as much as €50 million in investment. These two factors levelled the playing field somewhat for established players – small and large alike – while creating high barriers to entry. "Small players have as much chance as the giants in grasping big opportunities," one commentator noted.[8] Gas companies typically projected 1.5–2 times GDP growth for volume growth; from 1991–1999, however, adjusted for inflation, currency shifts and acquisitions, real sales growth was closer to 2%.[9] According to one analyst, historically many European chemical companies invested in projects that were unable to generate their cost of capital, and despite high operating margins, were unable to earn their cost of capital.[10] Capex spending had risen steadily to meet a perceived or expected rise in demand[11] with many industrial gas companies building larger ASUs than required to satisfy customer contracts, in the hopes of achieving economies of scale, and with an eye to covering perceived future demands in the merchant business. Growth was expected to come from new applications for industrial gases, along with an increased marketing of free capacity in the bulk business.

MESSER GRIESHEIM 1898–1994: HISTORY OF A FAMILY COMPANY

Adolf Messer founded Frankfurter Acetylen-Gas-Gesellschaft Messer & Cie in 1898, manufacturing acetylene generators and lighting fixtures in a workshop in Höchst, Germany.[12] Within a decade, the company had outgrown its small shop and moved into larger quarters in Frankfurt and by 1908 the company's product range ran from oxyacetylene cutters, welding and cutting torches, acetylene generators and pressure regulators, to oxygen systems, including those used in oxy-fuel technology. Growth continued as the company built its first ASU plant in Madrid, Spain and opened its first international office in Oslo, Norway. International expansion continued with branches established in Essen and Nuremberg under Messer & Co. and Messer Company, Philadelphia in the US. After post-Second World War rebuilding, expansion continued with the establishment of holdings and cooperative partnerships in Europe and the US.

Innovation was a cornerstone of the company's business. In 1924, it ran the first electric welding tests, and began manufacturing welding electrodes using the immersion process as early as 1930, and the fabrication of pressed material electrodes for arc welding in 1932. In 1953, the founder passed the reins over to his son, Dr. Hans Messer, with the company at 1,100 employees. The new CEO

[3] According to analysts, the acquisition multiples were 10.5x EV/EBITDA and 21.3x EV/EBIT; median LTM EBITDA and EBIT multiples of 10.0x and 17.0x, respectively, showed that the market had been willing to bear "a substantial premium for attractive industrial gases assets". "Case Study: Messer Griesheim LBO", Goldman Sachs, *Vallendar*, 27 April 2007.
[4] "Industrial gases—riding high despite recession", *Chemical Week International*, 20 February 2002.
[5] Prashant Juvekar, "Praxair", *Equity Research*, SalomonSmithBarney, 17 December 2001.
[6] Prashant Juvekar, "Praxair", *Equity Research*, SalomonSmithBarney, 17 December 2001.
[7] "Case Study: Messer Griesheim LBO", Goldman Sachs, *Vallendar*, 27 April 2007.
[8] "Face value: Private equity and family fortunes", *The Economist*, 10 July 2004.
[9] As reported in "Case Study: Messer Griesheim LBO", Goldman Sachs, *Vallendar*, 27 April 2007. The report suggests that "either the volume side has not grown as strongly as widely expected, or inflation has eroded roughly 50% of the growth (price erosion)".
[10] "Face value: Private equity and family fortunes", *The Economist*, 10 July 2004.
[11] "Case Study: Messer Griesheim LBO", Goldman Sachs, *Vallendar*, 27 April 2007.
[12] Refer to Jörg Lesczenski, "100 Prozent Messer. Die Rückkehr des Familienunternehmens", München/Zürich 2007, for further information on the history of Messer Griesheim.

realized it was not possible to grow the company organically. Messer had specialized in building plants to produce gases, but he wanted to expand into production of gases. To this end, he searched for a strong partner, and entered into discussions with BASF, a global chemicals company, which proposed a 50–50 share split, with each party getting 50% voting rights. While negotiations were underway, chemicals and pharmaceutical giant Hoechst came into the picture; a Frankfurt-based company with operations in over 100 countries, Hoechst was known for its strong R&D, and highly diverse portfolio. By 1965, Messer merged with Hoechst's Knapsack-Griesheim, forming Messer Griesheim as a two-thirds subsidiary of Hoechst concentrated in three areas: welding technology, cryogenics and industrial gases.

As part of the deal, the Hoechst team had to take on some of the proposed BASF acquisition deal structure. Notably, the Messer family expected to retain the same voting rights they would have received in the BASF acquisition, even though their share of equity – only one-third of shares in the Hoechst deal – was lower than what had been envisioned with BASF. This set the stage for ongoing Messer family-Hoechst negotiations, essentially giving the Messer family an important veto right on any subsequent sale of the Hoechst shares.

The 1970s saw continued growth as the company established more branches in Western Europe, including France, Great Britain and Spain, and North America. With borders opening in Eastern Europe by the end of the 1980s, newly established associated companies leveraged investment and sales opportunities and the company passed DM2 billion (equivalent to €1 billion), with annual net profits of DM133 million (equivalent to nearly €68 million).[13]

Up until the mid 1990s, the Messer Griesheim enterprise was considered one of the pearls of Hoechst's diversified portfolio. Relations between Messer Griesheim and Hoechst management were for the most part very good, and collaborations worked without any problems. Messer Griesheim investments were financed by its ongoing cash flow, making the company generally relatively independent from Hoechst. But as conditions shifted across Hoechst, Messer Griesheim's glow began to fade.

MESSER GRIESHEIM 1994–2001: PART OF A SHIFTING HOECHST PORTFOLIO

In 1994, former Hoechst CFO Jürgen Dormann took over as CEO, and shifted Hoechst's strategy to focus on its core activities with the ultimate aim of turning the company into a "pure" life-sciences company. Hoechst's low-profit basic- and speciality-chemical divisions were sold off as was its cosmetics unit, leaving Hoechst focused on agricultural and pharmaceutical products. As one report noted, Dormann, or "Mr. Shareholder Value" as he was known, lived up to his name – Hoechst shares more than doubled in value between 1994 and the end of 1998.[14]

Dormann's strategy was to keep only the entities in which Hoechst was able to hold a lead or second market position. At that time, Messer Griesheim did not hold a lead market position in many of its activities, and Dormann's eventual aim was to sell Hoechst's shares in the firm. However, Messer Griesheim's management felt their parent company did not have a full appreciation for the regional nuances of their business. "The criteria used by Dormann to assess lead position could not be readily applied to our market. Industrial gases are a very regional business, it is more important to take into account the leadership within a region rather than on a national or even global scale," a member of the current management team recalled.

With the decision taken to divest its Messer Griesheim shares, Hoechst worked to grow Messer Griesheim's business to make it more attractive to potential buyers. Herbert Rudolf, member of the management board and post-1993 CEO, followed an aggressive expansion strategy, supported by Dormann, acquiring existing companies and building new ASU plants, and establishing a stronger presence in Latin America, Africa, Asia and Eastern Europe.

With the death of H. Messer in 1997, the next generation Messer – son Stefan Messer – was appointed to the management board in January 1998. That year, Messer Griesheim had 24 new plants under construction, and had negotiated new contracts to build 20 cryogenic and 65 non-cryogenic plants.[15] And in 1999, Messer Griesheim announced plans to build a 3,000-tons-per-day plant for Thyssen/Krupp, requiring an investment of €50 million.[16] Rudolf had the support of the Hoechst management and Board (AR) and was able to act independently from Hoechst. "We wanted to make the pig more beautiful before we found a buyer," an insider noted. Hoechst believed it would be easier to find a buyer with a larger business with a greater number of global entities. In December 1999, Hoechst merged with Rhône-Poulenc to form Aventis, the world's sixth-largest pharmaceutical group, with Dormann becoming CEO.

The Messer Griesheim expansion came at a cost. According to one source, Messer Griesheim spent €2 billion between 1995 and 2000 on capital investments, "a whopping 25%–30% of its sales," while operating margins and returns on capital lagged behind industry averages.[17] Even the employee section of the Board voiced concerns over the investments under Rudolf. "It was problematic that Messer

[13] The Euro estimates are based on the €–DM exchange rate of €1=DM1.95583.
[14] Richard Tomlinson, "CEOs Under Fire. Mission Impossible? Jürgen Dormann's Job: To Save ABB From Itself", *Fortune*, 5 November 2002, http://www.cata.ca/files/PDF/Resource_Centres/hightech/elearning/Fortune_com.pdf, accessed 15 October 2007.
[15] "Case Study: Messer Griesheim LBO," Goldman Sachs, *Vallendar*, 27 April 2007.
[16] "Case Study: Messer Griesheim LBO," Goldman Sachs, *Vallendar*, 27 April 2007.
[17] According to Deutsche Bank analysts, cited in Natasha Alperowicz, "Messer does an about-turn: New ownership focuses on debt reduction", *Chemical Week*, 27 February 2002, http://goliath.ecnext.com/coms2/summary_0199-1480758_ITM, accessed 2 November 2007. Capex for 1998–99 was 30% of sales according to Goldman Sachs.

Griesheim was not controlled more intensively," one observer noted. "Some investments were based on overly optimistic or even false investment analysis and planning. But this only came to light three years after the investments had been made." Another source characterized this period: "Messer [Griesheim] competed very aggressively to take share in the onsite market, offering low-priced, long-term contracts, with low and sometimes no take-or-pay threshold clause, and occasionally below the cost of capital."[18] All in all, Messer Griesheim's leverage increased from €423 million in debt in 1996 to €1.6 billion in 2000 (see Exhibit 4 for Messer Griesheim's key financials). Along with the Messer family's involvement, and anti-trust issues for any merger of equals, the company's leverage and performance left Hoechst in a very difficult position in terms of exit options.

EXIT OPTIONS FOR HOECHST (AVENTIS)

As Hoechst (Aventis) continued to focus on retrenching as a pure life-sciences company and divested its agricultural and chemical concerns, the company reviewed various exit options for Messer Griesheim, including Rudolf's desire to take the company public in 1998, or a merger of equals with Swedish industrial gas concern AGA. Discussions with AGA were underway in 1998–1999, without the participation of the Messer family. Management then asked the Messer family to sign confidentiality agreements, although they had not been involved in the discussions. AGA was not alerted to the family's special voting rights, nor of their veto rights. The deal fell apart with the family boycotting negotiations; "It soon became clear that it would not be possible to stage an exit without the agreement of the Messer family," one insider recalled. "They clearly wanted to keep their stake and role in the company." "Based on the company's history," another analyst noted, "it was very likely that the family would want to uphold its entrepreneurial influence in the future."[19] Background information on the family's motivation can be found in the company chronicle written by Jörg Lesczenski.[20]

The family proposed a merger with Linde and initiated discussions with Linde's management. They agreed in theory to keep only 10% of the shares, but to retain their special voting rights. While Messer Griesheim had initiated the discussions, Hoechst management acquiesced to the discussions and the subsequent due diligence, although one insider recalled that Hoechst delayed the process and was hesitant to agree to a deal. The two sides held fundamentally different views: Hoechst sought the highest price they could get for the Messer Griesheim shares, and the Messer family was committed to keeping their special rights.

However, due to the summer 1999 merger of Linde and AGA, the Messer Griesheim deal made less sense; the newly merged company was large and another merger would have brought on anti-trust issues. Yet, some felt the anti-trust issues were not insurmountable; Linde-AGA could have sold certain entities in question to another player, Air Liquide for example, subsequent to the merger. "It was largely due to Hoechst's behaviour prior to the Linde-AGA deal that a merger between Messer Griesheim and Linde was not closed," a Messer family member said. "We would have been happy with the deal with Linde." Agreeing on an exit strategy became increasingly difficult.

A NEW CEO: THE CONSOLIDATOR

On 1 January 2000, Hoechst CFO Dr. Klaus-Jürgen Schmieder replaced Rudolf as CEO; some noted that Schmieder had gained the reputation of "consolidator" within Hoechst, and most analysts expected him to take the same approach at Messer Griesheim. Hoechst – now Aventis – publicly stated its intentions to sell its Messer Griesheim stake within the year. Along with the Linde discussions, negotiations with the US firm Praxair had also been underway, but had not been promising. Both anti-trust issues and the family's desire to retain its leadership position in the company's management brought these negotiations to a quick end. In March 2000, Aventis announced that it would divest its Messer Griesheim stake via a limited auction including financial advisors. Schmieder had already developed restructuring plans, working with strategy consultants Roland Berger who put together a plan that included the divestiture of several non-core Messer Griesheim businesses and a restructuring plan for the core activities, which among other things, called for a reduction of 850 employees. As one insider noted, "They needed to undergo serious restructuring in order to regain financial flexibility."

THE CARLYLE GROUP'S MEC DEAL: A DRY RUN?

An earlier restructuring effort in Messer Griesheim involved the divestment of Messer Griesheim's electric arc welding, filler material and cutting business in Europe. In December 1999, Messer Cutting & Welding had been disposed of by Messer Griesheim to the Messer family. In 2000, Messer Cutting & Welding acquired Swiss Castolin Eutectic under the umbrella of a new company, MEC Holding. To achieve this, the Messer family partnered with the Carlyle Group's Carlyle Europe Partners (I) fund; the Carlyle Group contributed cash for its shares of MEC Holding (51%). The Messer family contributed Messer Cutting & Welding to the entity and thereby held 49% of MEC Holding. The Carlyle Group negotiated the ability to take over the CEO position, and to change the operational business directly, should it feel the need. This deal was for the most part a side show to the Allianz Capital Partners/Goldman Sachs deal. However, it was the family's first experience with private equity investors, providing elements of a dry run for the second private equity financing of Messer Griesheim. Some of the contractual arrangements of the Allianz Capital Partners/Goldman Sachs deal were structured similarly to the Carlyle deal.

[18] According to an HSBC report, cited in Natasha Alperowicz, "Messer does an about-turn: New ownership focuses on debt reduction", *Chemical Week*, 27 February 2002, http://goliath.ecnext.com/coms2/summary_0199-1480758_ITM, accessed 2 November 2007.
[19] "Case Study: Messer Griesheim LBO," Goldman Sachs, *Vallendar*, 27 April 2007.
[20] Jörg Lesczenski, "100 Prozent Messer. Die Rückkehr des Familienunternehmens", München/Zürich 2007.

THE DEAL WITH ALLIANZ CAPITAL PARTNERS/ GOLDMAN SACHS: 2001

In 2001, Messer Griesheim was in a difficult situation, being highly leveraged and in need of additional funding just to keep things running; everyone involved knew the company was in need of external equity financing. The complexity of any potential deal was obvious from early on, due to the family's involvement, the company's weak market position and high leverage. After aggressive expansion between 1995 and 2000, and late entry into several key markets where competitors had already cherry-picked desirable holdings, the company held several questionable investments around the globe and financials that painted a poor picture. Margins were low compared to market averages and they generated negative free cash flow (see Exhibit 4 for key financials). "Their investments were often based on overly optimistic assumptions," one observer noted, "which led to decreasing margins over time. Most of these investments were unprofitable." Yet some of these holdings had strategic value to competitors, who sought to expand their own presence in certain regions, making them a prime takeover target.

S. Messer brought in Dr. Stephan Eilers, partner of Freshfields Bruckhaus Deringer, who suggested entering into negotiations with private equity investors. Again, conflict arose between Hoechst (Aventis) and the Messer family. Hoechst proposed a beauty contest with a range of private equity investors, but the Messer family refused to have an auction. Hoechst suggested selecting a number of potential investors; they ended up holding talks with Allianz Capital Partners and Goldman Sachs, among several.

ALLIANZ CAPITAL PARTNERS AND GOLDMAN SACHS

Allianz Capital Partners was a wholly-owned subsidiary of the Allianz Group, a leading global insurance, banking and asset management company. Started in 1998, Allianz Capital Partners was among the leading companies in the European direct private equity market.[21] Goldman Sachs Capital Partners, active in Europe since 1993, was the venerable Wall Street firm's private equity funds business.

Allianz Capital Partners did not have a traditional private equity fund, but instead received long-term capital directly from Allianz, and were considered an interesting partner due to their long investment horizon; they brought Goldman Sachs in very early in the negotiations. With the two partners involved, a compromise between Hoechst and Messer Griesheim was reached: the family had a partner who was aware of their long-term vision to keep control of the company; Messer Griesheim had guidance in its restructuring efforts (see Exhibit 5). Both sides found the private equity partners could provide professional support in the restructuring process. "We had to build up a trusting relationship," one Goldman Sachs team member recalled. "And we knew a deal would not be realized without the entire family's consent. This was very difficult at the beginning. Even the most senior member of the family – former Messer Griesheim CEO H. Messer's wife – insisted on meeting key investors in person."

PUTTING THE DEAL TOGETHER

From the outset, parts of the deal were informed by the Messer family's clear goal of keeping the firm in their hands after the private equity investors' exit. This prompted the investors to request the call option as well as the guarantee of voting rights.

The Call Option The call option enabled the family to buy back the Goldman Sachs and Allianz Capital Partners shares after three years; one participant noted, "even though this was an easy formula, the underlying calculations ended up being complex as they were not agreed upon beforehand."

Voting Rights The negotiations for the by-laws which entailed the special voting rights and the veto right took much longer than the negotiations for the basic formula of the call option. Prior to the buyout, the family had 50% of the voting rights; after, the investors would gain majority control with their voting rights representing their share of ownership of 66.2%. However, the family also had an additional right to veto key strategic decisions. A strategic restructuring plan that was closely based on Schmieder's original work with Roland Berger was agreed upon with the stipulation that every change of strategy required the consent of the three parties – the family, Allianz Capital Partners and Goldman Sachs. Additionally, the family held an existing change-of-control right, where in case of change of control, the Messer family had the right to buy back the Allianz Capital Partners/Goldman Sachs shares at an attractive price.

POST BUYOUT: CORPORATE GOVERNANCE

The deal negotiated a way for the Messer family to retain some control by requiring family consent for key strategic decisions. Messer Griesheim was governed by a two-tier system: a management board and a supervisory board, or "Aufsichtsrat" (AR). In addition, a sub-committee to the supervisory board, a shareholder committee, or "Gesellschafterausschuss" was formed.

S. Messer, Schmieder, Jürgen Schöttler and Peter Stocks had been members of the management board prior to the deal and continued post buyout. In contrast, both the supervisory board and the shareholder committee were impacted by the deal's negotiations. The supervisory board itself was comprised of a shareholder section and an employee section, with equal representation. The shareholder group was divided equally between the family and Goldman Sachs, each with three representatives. The Messer family selected Dr. Jürgen Heraeus, Wilhelm von Storm and Dr. Gerhard Rüschen, while Goldman Sachs chose Dr. Alexander Dibelius, Udo Stark and Stephen Trevor. In addition, six employee representatives were members of the supervisory board.

The shareholder committee included only representatives of the family and representatives of Goldman Sachs with no employee representation. Those representatives who were members of the supervisory board for the family and Goldman

[21] http://www.allianz.com/en/allianz_group/about_us/index1.html, accessed 2 October 2007.

Sachs were also members of the shareholder committee. In addition, the Messer family appointed Eilers and Goldman Sachs selected Wesley Clark to be representatives on the shareholder committee. Due to legal issues, Allianz Capital Partners did not have a representative on the supervisory board or the shareholder committee.

Goldman Sachs appointed its representatives to the supervisory board and the shareholder committee without any input from the Messer family. Similarly, there were no discussions between the investors and the Messer family over who should represent the family on the supervisory board or the shareholder committee. The members of the supervisory board and the shareholder committee did not change throughout the entirety of the deal.

S. Messer selected Heraeus because he also ran a major family business with global operations; he became chairman of the supervisory board. Von Storm, who had been with Messer Griesheim for over 40 years, was selected because he knew the company and the Eastern European business very well. Rüschen had close ties with the family. Eilers had been involved in the deal from the start, recommending Allianz Capital Partners and Goldman Sachs early on to Messer Griesheim management; he became the lead lawyer for the transaction; S. Messer noted that "having a lawyer by my side when closing the deal, but also in the phase just after, was extremely helpful".

The AR played a critical role in maintaining cohesion between management and employees. Fritz Klingelhöfer, one of the employee representatives, became co-chairman of the supervisory board. He and other employee members of the AR had warned management about the risks involved in some of the late 1990 investments; predicting it would not be possible to turn those investments into successful businesses. The employee section of the Board was made up of long-term Messer Griesheim employees and remained constant through the deal, with employee and union representatives in equal share. A member of Messer Griesheim's management recalled: "These representatives were carefully selected, with industry knowledge and experience, who understood the business model and everyday business problems. They did not have extreme, unrealistic views they wanted to push through." Union representatives were present in AR meetings, and were also available for additional discussions with employee representatives.

The shareholder committee focused on high-level strategic decisions and did not have much influence on operational issues. Operational issues were discussed in monthly meetings, which usually lasted a full day, and included members of the AR/shareholder committee along with additional representatives from the private equity investors, as well as directors and finance/accounting managers from Messer Griesheim's side. These meetings decided the details on the restructuring and divestiture plan. And while in these meetings Messer Griesheim opened its books to show the status of the undertakings, and the details of the financial plans were monitored closely throughout, the Goldman Sachs and Allianz Capital Partners representatives did not intervene directly in any operational decisions. "They mainly requested information rather than influencing the operations," one team member said. Conflicts sometimes arose between Messer Griesheim and the private equity investors, as S. Messer saw value potential in some of the entities that were later divested; but as one observer noted "these were minor conflicts".

Dibelius, co-chairman of Goldman Sachs Germany at the time, brought Wesley Clark in as compliance director. In 1999, the company had faced an instance of fraud and compliance problems in South America where a manager, originally hired by Hoechst and sent to South America by Dormann to build up Messer Griesheim's business there, had embezzled several million dollars. Clark institutionalized strict rules of compliance, and initiated many reports that were circulated throughout the employee community, leading to a change in corporate culture. Compliance quickly became regarded as an important company policy and employees were educated on the ethics and morale values of the company.

POST BUYOUT: MESSER GRIESHEIM EMPLOYEES

Well before the private equity investors began negotiations, the employees were aware that the business was in trouble. As early as 2000, Schmieder had been open with the company's employees about Messer Griesheim's difficult situation, and employees were integrated into the early restructuring process. "Schmieder made it clear that restructuring and divestitures would be required in order to sustain the business," one Messer Griesheim employee recalled.

Employee development had been a key initiative since 2000, with a new strategy in place for managing different levels of management across the company's global operations and different tools introduced to improve the development of management and employees. Across the board, the main goal was to enhance the company's personnel development at all levels across all regions. A key programme aimed to improve upper management succession and included developing a database which tracked positions as they were likely to come open and matched the most appropriate successors to the open positions. When Goldman Sachs and Allianz Capital Partners came into the picture, they did not change these programmes, however, they were intrigued by them and requested detailed information on the status. "Their interest and attention gave the programme an additional emphasis to the importance of improving management quality," one manager recalled. "Our programme was always targeted towards this goal, but the private equity investor's requirements and their focus on the data helped push the programme forward."

According to management, employees felt the deal with Goldman Sachs and Allianz Capital Partners was a logical step towards improving Messer Griesheim's situation, yet their day-to-day work lives remained stable. Throughout

the deal, the private equity investors had little to no contact with the employees and nothing actually changed in their everyday operations; the private equity investors were only visible to the management team and directors of certain divisions. The only contact the private equity investor team had with employees was through a company-wide symposium, held in 2002, sponsored by Messer Griesheim management. This covered a broad range of topics touching on the future of Messer Griesheim, including the exit of the private equity investors.

Overall, continuity with Messer Griesheim employees was the order of the day post-buyout. No contracts were changed from full to part time, no contract terms were changed, pension obligations remained unchanged, and the quality of people employed by region remained constant. Resources for employee development were expanded and, via the AR, employees were informed of the buyout decision as well as subsequent strategic decisions. Employees had the opportunity to participate in share options schemes (see below). Messer Griesheim employees found their environment remained stable and were for the most part satisfied.

Employee reductions

Roland Berger's restructuring plans had always called for employment reductions in order to restructure the company's core activities, but these were also inevitable as part of divesting non-core entities. The divestitures, excepting two, were sold to strategic buyers; the team sought out entities with a pre-existing presence in the market. "None of these businesses would have survived on a stand-alone basis," one team member noted. It was presumed that the strategic buyers would employ a majority of each divestiture's existing staff. From December 2000 to December 2003, the restructuring process was in full swing. Messer Griesheim's full-time equivalent headcount decreased by 11.2% from 10,200 to 7,144 in that time (see Exhibit 6). Of the 3,056 employee reductions, about 80% were through divestitures, according to Goldman Sachs, and did not represent job loss, as most of these employees were later taken on by the entities' strategic buyers. This is mirrored in the increasing number of employees in certain regions at other major producers in the same period (see Exhibit 7 for employment data across competitors).

The original restructuring plan for the core activities proposed a reduction of 850 employees and the goal to realize €100 million in savings mainly on employee costs. Most felt a reduction in employment was necessary, regardless of any buyout. Roland Berger had originally gone through every department of every entity and analysed the saving potentials. "These savings were followed," a team member said, "but in a less aggressive way. The number of actual reductions was less than what was originally suggested."

Goldman Sachs and Allianz Capital Partners felt headcount was an important indicator and in their regular updates they required detailed information on full-time equivalent headcount. Employee costs were often considered a variable that could be easily reduced. "In reality it was not so simple," an observer noted. It took a long time before Messer Griesheim was able to substantially reduce their employees in their core businesses; this required discussions with their employee representatives (Betriebsrat). "The reductions were taken very seriously, and the Betriebsrat understood the necessity of the initiatives," another team member said. Messer Griesheim's HR group involved each department's management in all reduction decisions, explaining why certain reductions were required.

According to Goldman Sachs, about 350 employees, mostly located in Germany, lost their contracts due to restructuring efforts in their core entities. A portion of these layoffs was due to the outsourcing of Messer Griesheim's German haulage operations, which was seen as a necessary step prior to the sale to Air Liquide, and affected about 100 employees. All of them received offers from another German haulage company, but the contract offered carried conditions that, while standard for the haulage industry, differed from their prior Messer Griesheim contract. Given the nature of the industry, employees could not easily be shifted to a lower cost structure, such as moving employees across borders. "The industrial gases business is regional," one insider said, "and employees need to be where operations were located." As revenue per employee and EBITDA per employee data show, the company was able to divest its less successful entities, increasing employee productivity substantially; EBITDA per employee increased dramatically, up 16.9% (see Exhibit 6).

Employee incentives

By German standards at that time, the deal introduced an innovative employee incentive programme. An exit bonus was put in place in parallel to the Allianz Capital Partners/Goldman Sachs deal and was offered to the first and second management level of each department. Managers were able to buy shares in the holding company, using their own money, and would receive shares at the same price as Allianz Capital Partners/Goldman Sachs. The minimum amount for participation, however, was one-third of the manager's annual salary, and it was clear Allianz Capital Partners/Goldman Sachs expected certain managers to take part in the programme; this exerted some pressure on Messer Griesheim's management. As the holding period of the private equity investors was uncertain, the programme was a longer-term incentive for employees to stay with Messer Griesheim.

Despite the programme's favourable aspects, employees were sceptical. While the internet boom had familiarized some with stock option schemes, there were still very few programmes of this kind in Germany, leading to a natural distrust amongst employees of Messer Griesheim's German and European operations. The programme had much higher acceptance in the US where such programmes were more commonplace; more employees took part, and invested on average a higher amount compared to Messer Griesheim's other regions. Employees knew the company was highly

leveraged and in a difficult situation. Further, one-third of an employee's annual income was a huge investment for most managers – many were afraid to risk such a large sum. Messer Griesheim's top management spent a great deal of time in one-on-one meetings with the managers to explain the programme, and that its level of risk was in fact less than imagined given the participation of the private equity investors. In the end, about 85%–90% of Messer Griesheim managers participated, some investing a great deal of their money. One manager invested €1 million.

EXIT: EMPOWERMENT OF THE FAMILY

The exit agreement stipulated a window for a Messer Griesheim IPO for which agreement from all parties was required up until 30 June 2003. Between 1 April 2003 and 30 September 2003, the Messer family could exercise its call option and buy back the Allianz Capital Partners/Goldman Sachs shares. As of 1 January 2004, the investors then had the right to pursue an IPO or sell their shares to the highest bidder. A "drag along" right existed that would also have forced the family to sell their shares to the same bidder.

It became clear that strategic buyers were willing to pay strategic premiums, and, therefore, an IPO was unlikely to offer the same value potential as a trade sale. In the second half of 2003, the pressure on the Messer family to exercise their call option increased and initial talks with potential buyers were initiated. The Messer family was not able to buy back the whole entity and, therefore, aimed at gaining control at least over parts of the business. At first they hoped to keep at least half of the German operations and additional parts of the business from Allianz Capital Partners and Goldman Sachs while selling the rest of the company to a strategic buyer. Germany was the home country and seen as the heart of the company. S. Messer had proposed Air Liquide as a possible buyer; the investors had considered a public auction. However, as Goldman Sachs initiated the auction for half of the Messer Griesheim German concerns and additional businesses in the UK and the US, incoming bids were too low. Goldman Sachs advised that as the core business the German concerns were the most attractive part for any buyer, and the team realized they had to sell the German operations in their entirety. A second auction, including the entire German business, was set up; again only a few bids came in. In March 2004, with an additional €100 million added to their offer, Air Liquide acquired Messer Griesheim's German activities, as well as its US and UK concerns, for €2.7 billion. The other parts of Messer Griesheim were bought back by the Messer family. Most felt Air Liquide did not overpay; the sales multiple was comparable to other deals. Some felt a higher price might have been gained for the entire company, but this might have raised anti-trust issues.

The final exit was in May 2004. Messer Griesheim's German, UK and US operations were sold to Air Liquide. The Messer family bought back the remaining interests in Western Europe, Eastern Europe, China and Peru. The deal was closed after the end of the call window, however, as the investors were able to see the company's positive development and a successful exit seemed on the horizon; they therefore decided to extend the call period. S. Messer was installed as CEO, and subsidiaries in Germany, UK and the US were sold to Air Liquide. A holding company was set up, trading under the name Messer Group, encompassing all remaining subsidiaries in Europe, China and Peru (see Exhibit 8). Schmieder joined the management board of Air Liquide after the exit of Allianz Capital Partners/Goldman Sachs and S. Messer took over the position as CEO in the newly founded Messer Group.

Coming full circle, in 2005, the Messer family purchased the outstanding MEC Holding shares held by the Carlyle Group, acquiring all the shares in the company's welding and cutting division; in 2006, both businesses of the Messer Group passed the €1 billion sales mark and looked to expand activities in Europe and Asia.

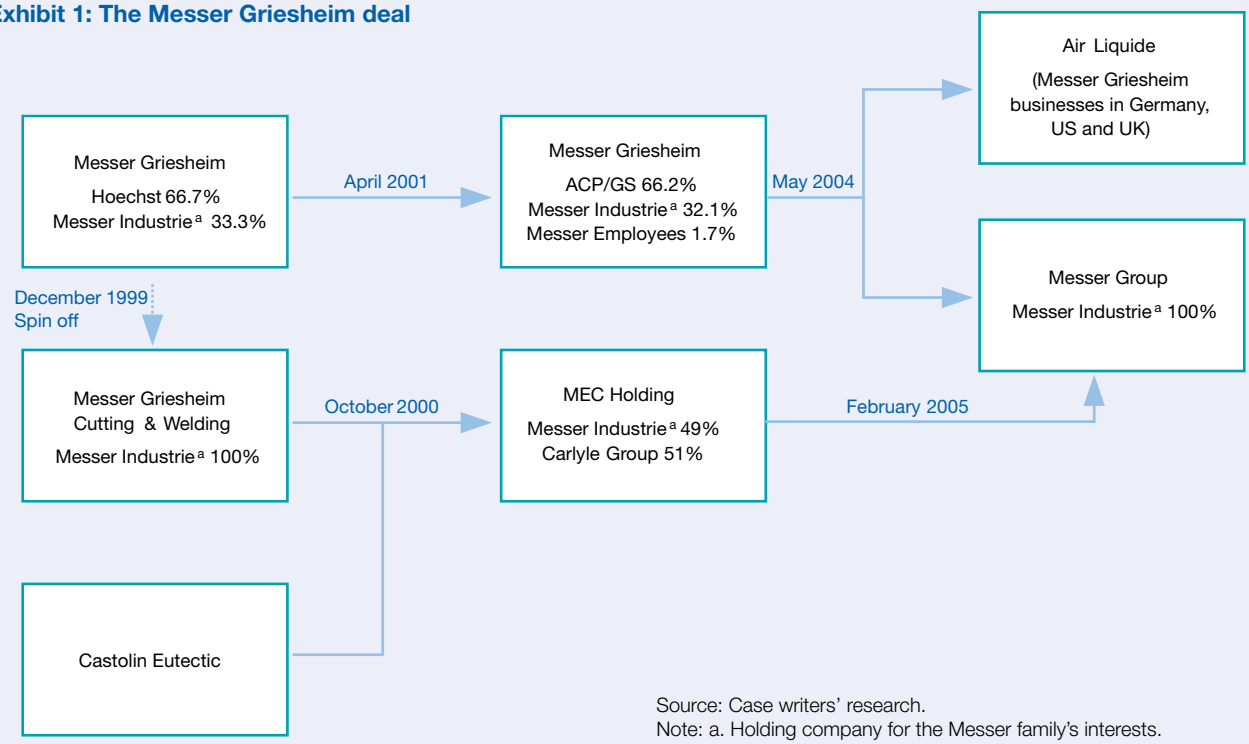
Postscript: The Messer Griesheim deal – a loss leader for investors?

The Messer Griesheim deal represents a unique case where the break-up of a company was not motivated by investors, but rather was initiated by the family who saw the opportunity to regain control over attractive parts of the business, albeit not the favoured German operations. For the investors, the strategy did not maximize their return; a higher return could probably have been realized by selling the company in its entirety to the highest bidder. By allowing the Messer family to partly buy back their company, the investors gave away further return potential, since a strategic buyer might have paid a higher price.

There were two rationales behind this: the Air Liquide deal was highly profitable, so the investors were able to achieve a high return on that side of the deal (8x EBITDA exit multiple); and it enhanced the relationship of trust between the family and investors. Goldman Sachs/Allianz Capital Partners provided the company with the required equity financing to buy out Hoechst and they developed and maintained a good relationship with the family; Goldman Sachs/Allianz Capital Partners enhanced this trust by helping the family regain power over parts of Messer Griesheim businesses. Rather than emphasizing the effort to maximize returns, the regain of control over various parts of the Messer family's businesses enhanced the good reputation of both Goldman Sachs and Allianz Capital Partners in the market – particularly as the Air Liquide deal was already providing a high return. As a commentator in *The Economist* noted, "Goldman Sachs and Allianz Capital [Partners] would love it to be known, from this example, that although they might have made more money if they had found an industrial buyer [for the whole entity], they can be fairy godmothers to family firms who might be wary of using private equity."[22]

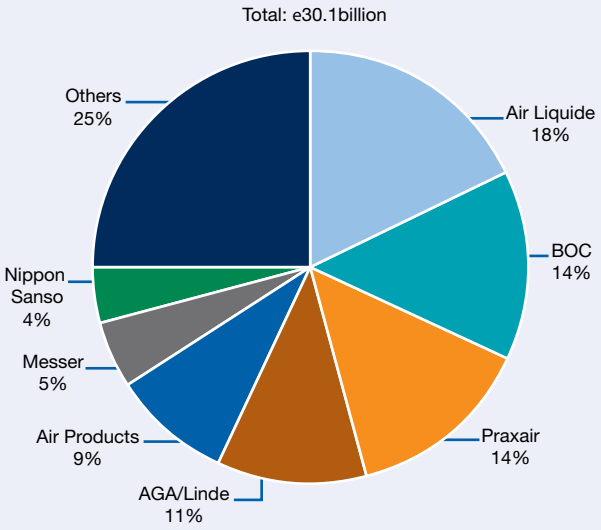
[22] "Face value. Private equity and family fortunes". *The Economist*, 10 July 2004.

Exhibit 1: The Messer Griesheim deal



Source: Case writers' research.
Note: a. Holding company for the Messer family's interests.

Exhibit 2: Market size and market shares of major producers (1999)



Source: "Case Study: Messer Griesheim LBO", Goldman Sachs, Vallendar, 27 April 2007.

Exhibit 3: Comparison of comparable M&A transactions in the industrial gases industry (1993–2000)

Target	Date	Acquirer	Enterprise Value (in US $m)	Levered LTM Multiple of Sales	EBITDA	EBIT	Comments
Europe							
WA Hoek's Machine	Mar-00	Linde	206	1.99x	9.4x	16.4x	Cash transaction to raise stake from 65% to 100%
AGA	Aug-99	Linde	4,500	2.49x	10.5x	21.3x	Cash tender offer for remaining 86%
BOC [failed]	Jul-99	Air Products+Air Liquide	14,060	2.39x	11.4x	17.6x	Withdrawn cash tender offer
BOC (Benelux and Ger operations)	Jan-99	Air Liquide	186	2.49x	NA	19.4x	Cash acquisition of a 100% stake
Calor Group Plc	Jan-97	SHV Holding Co Ltd	383	2.19x	16.1x	32.8x	Cash tender offer for remaining 48.4%
Carburos Metalicos	Oct-96	Air Products	587	2.20x	9.2x	13.7x	Cash transaction to raise stake from 26% to 97%
Soudure Autogene Française	Dec-94	Air Liquide	81	0.57x	NA	NA	Cash transaction to raise stake from 52% to 97%
Argon	Jul-93	Praxair Iberica	43	0.60x	NA	3.3x	Cash tender offer to raise stake from 48% to 98%
			Mean	1.87x	11.3x	17.8x	
			Median	2.20x	10.5x	17.6x	
North America							
Gas Tech	Sep-97	Praxair	58	1.35x	NA	NA	Cash transaction to raise stake from 43% to 98%
Praxair (Separation Plants)	Nov-96	AGA	200	3.33x	NA	NA	Acquisition of 5 ASUs
CBI	Mar-96	Praxair	2,149	1.10x	7.6x	12.7x	Combined cash/stock tender offer for remaining 99%
			Mean	1.93x	7.6x	12.7x	
			Median	1.35x	7.6x	12.7x	
			Overall Max	3.33x	16.1x	32.8x	
			Overall Mean	1.88x	10.7x	17.2x	
			Overall Median	2.19x	10.0x	17.0x	
			Overall Min	0.57x	7.6x	3.3x	

Source: "Case Study: Messer Griesheim LBO", Goldman Sachs, Vallendar, 27 April 2007.
Note: Debt assumed to be included in the consideration when the target was a division, plant or a subsidiary where no balance sheet data was available.

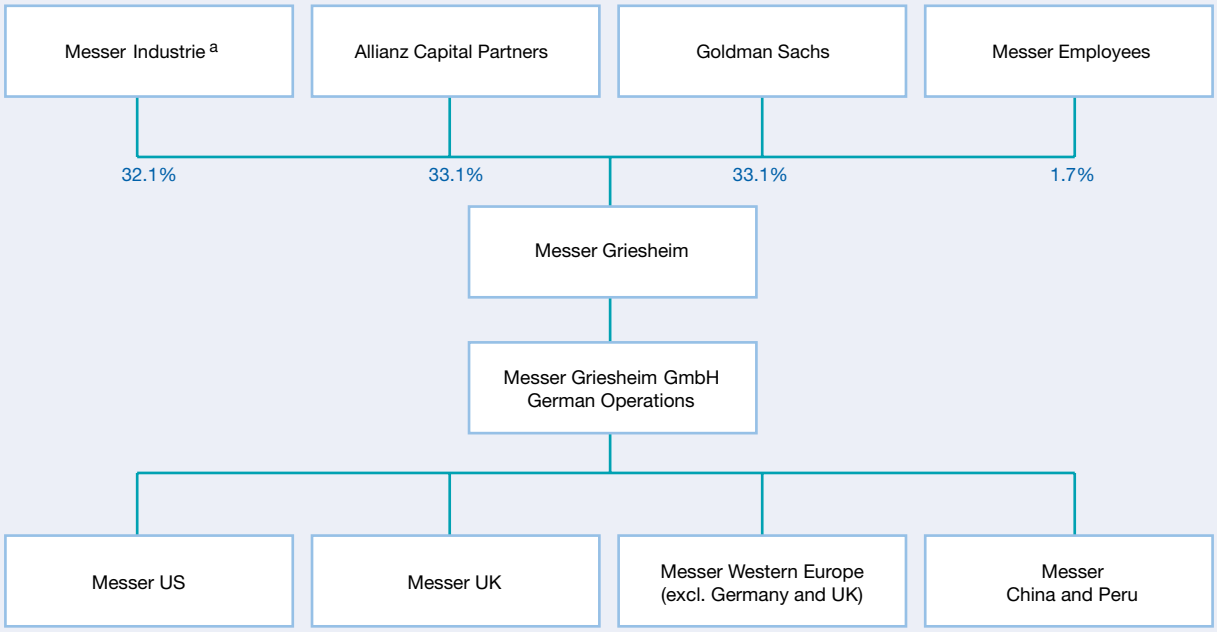
Exhibit 4: Messer Griesheim key financials (1996–2003)

In € Million

Key Financials	1996	1997	1998	1999	2000	2001	2002	2003	CAGR 1996 to 1999	CAGR 2000 to 2003
Revenues	1,148	1,269	1,477	1,492	1,696	1,621	1,526	1,498	9.1%	(4.1%)
% Growth		10.5%	16.4%	1.0%	13.7%	(4.4%)	(5.9%)	(1.8%)		
EBITDA	287	307	336	308	359	371	403	402	2.4%	3.8%
% of Sales	25.0%	24.2%	22.7%	20.6%	21.2%	22.9%	26.4%	26.8%	(6.2%)	8.2%
Capex	299	425	561	557	322	129	136	127	23.0%	(26.7%)
% of Sales	26.0%	33.5%	38.0%	37.3%	19.0%	8.0%	8.9%	8.5%	12.8%	(23.6%)
Net Debt	423	689	1,007	1,356	1,627	1,393	1,240	1,117	47.4%	(11.8%)

Source: "Case Study: Messer Griesheim LBO", Goldman Sachs, Vallendar, 27 April 2007, Goldman Sachs, PF Headcount Analysis, "Messer Griesheim", 9 July 2007, p. 11.

Exhibit 5: Post buyout structure



Source: Goldman Sachs.
Note: a. Holding company for the Messer family's interests.

Exhibit 6: Messer Griesheim headcount analysis and employee productivity (Dec 2000–Dec 2003)

Number of employees	Dec-00	Dec-01	Dec-02	Dec-03	Total Change	CAGR Dec-00 to Dec-03
Germany	2,600	2,244	2,208	2,134	(466)	(6.4%)
North America	1,400	1,163	996	1,093	(307)	(7.9%)
Western Europe (excluding Germany)	1,100	1,017	997	916	(184)	(5.9%)
Eastern Europe	2,600	2,369	2,283	2,130	(470)	(6.4%)
Asia, Africa and Latin America	2,500	1,555	741	871	(1,629)	(29.6%)
Total Employees	10,200	8,348	7,225	7,144	(3,056)	(11.2%)
Employee Productivity (in € thousands)						
Revenue per employee	166	194	211	210		8.0%
EBITDA per employee	35	44	56	56		16.9%
Capex per employee	32	15	19	18		(17.4%)

Source: Goldman Sachs, PF Headcount Analysis, "Messer Griesheim", 9 July 2007, pp. 13-14, case writers' research.

Notes:
2001: During the eight month period ended 31 December 2001, pursuant to the divestiture programme, Messer Griesheim completed disposals of their home care business in Germany, their health care business in Canada, and their non-cryogenic plant production operations in Germany, the US, Italy and China. Messer Griesheim have also completed disposals of their operations in Argentina, Brazil, Mexico, South Africa and South Korea, their nitric oxide business in Germany, and their carbon dioxide business in the US. Messer Griesheim have entered into agreements to sell their operations in Trinidad and Tobago.

2002: Disposals of Messer Griesheim's home care business in Germany, health care business in Canada and non-cryogenic plant production operations in Germany, the US, Italy and China. Messer Griesheim have also completed disposals of their operations in Argentina, Brazil, Canada, Egypt, Mexico, South Africa, South Korea, Trinidad and Tobago and Venezuela, their nitric oxide business in Austria, substantially all their carbon dioxide business in the US and their nitrogen services business in the UK. As at 31 December 2002, other than the joint ventures in Central America and China and Messer Griesheim's subsidiaries in Indonesia and Peru, they had completed the divestitures targeted to be completed by year end 2002. In January 2003, Messer Griesheim sold their operations in Indonesia to PT Tira Austenite Tbk.

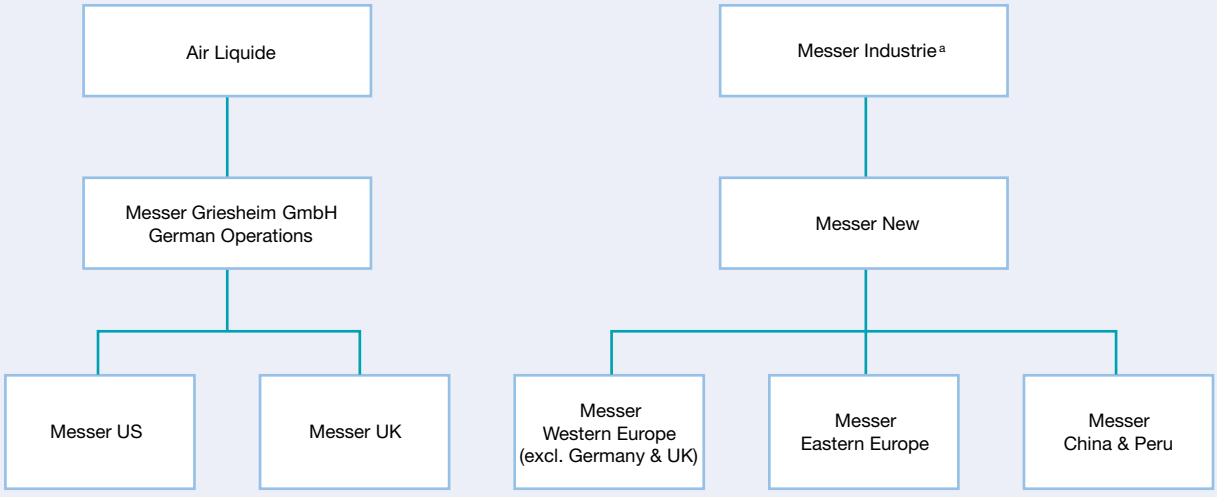
2003: Pursuant to Messer Griesheim's divestiture programme, as at 31 December 2003, they had completed disposals of their home care business in Germany, their health care business in Canada, and their non-cryogenic plant production operations in Germany, the US, Italy and China. Messer Griesheim had also completed disposals of their operations in Argentina, Brazil, Canada, Egypt, Mexico, South Africa, South Korea, Trinidad and Tobago, Venezuela, Indonesia, Malaysia and Central America, their nitric oxide business in Austria, substantially all their carbon dioxide business in the US and their nitrogen services business in the UK.

Exhibit 7: Comparison of employment at major producers (2000–2003)

Number of employees	2000	2001	2002	2003	Total Change	CAGR 2000 to 2003
Linde						
Germany	18,475	18,380	18,154	17,807	(668)	(1.2%)
Europe (excl. Germany)	20,436	19,693	19,637	19,921	(515)	(0.8%)
North/South America	6,371	6,256	6,340	6,292	(79)	(0.4%)
Asia	1,409	1,577	1,885	2,139	730	14.9%
Australia/Africa	435	494	505	503	68	5.0%
Total Employees	47,126	46,400	46,521	46,662	(464)	(0.3%)
Thereof Gas	18,661	17,689	17,500	17,420	(1,241)	(2.3%)
Air Liquide						
France	9,393	9,856	9,856	10,208	815	2.8%
Europe (excl. France)	8,787	8,932	8,932	8,932	145	0.5%
Americas	8,181	8,008	7,392	7,337	(844)	(3.6%)
Asia Pacific	3,030	3,080	3,388	4,147	1,117	11.0%
Africa	909	924	1,232	1,276	367	12.0%
Total Employees	30,300	30,800	30,800	31,900	1,600	1.7%
BOC						
Europe	11,398	12,173	13,213	12,353	955	2.7%
Americas	6,969	7,305	7,243	7,451	482	2.3%
Africa	17,137	16,120	17,435	17,138	1	0.0%
Asia/Pacific	7,205	7,573	8,389	7,565	360	1.6%
Total Employees	42,709	43,171	46,280	44,507	1,798	1.4%
Praxair	23,430	24,271	25,010	25,438	2,008	2.8%
Airgas	8,000	N/A	>8500	N/A		

Source: Annual reports.

Exhibit 8: Structure post-exit of Allianz Capital Partners/Goldman Sachs



Source: Goldman Sachs.
Note: a. Holding company for the Messer family's interests.

New Look

ANN-KRISTIN ACHLEITNER
Technische Universität München

EVA NATHUSIUS
Technische Universität München

KERRY HERMAN
Harvard Business School

JOSH LERNER
Harvard Business School

EXECUTIVE SUMMARY
In July 2003, UK fashion retailer New Look was taken private with the support of Apax Partners/Permira. The management of New Look, originally listed publicly in 1998, wanted to transform the company to improve performance and take advantage of several opportunities they believed the UK and European retail sector offered. These transformations would increase business risk and require substantial investments and patience from investors. Given the pressures a listed company faced to meet expectations on short-term performance, management felt the public markets would not provide the right environment for their ambitious new plans. Apax Partners also believed that New Look would be better positioned to take advantage of these long-term opportunities if taken private. Apax Partners partnered with Permira to do the deal. In April 2004, Apax Partners/Permira each invested £100 million in a buy-out vehicle that purchased New Look; each assumed 30.1% stake, founder Tom Singh held 23.3% and other management held 13.4% (3.1% was assumed by Dubai-based retail giant Landmark).

The deal represented a growth story: under the buyout management's investment, New Look grew EBITDA annually by an average of 14.6% between 2004 and 2007 and increased its full-time equivalent headcount by 7.7% per year on average in the same period. As active shareholders, the private equity partners supported New Look in making the long-term investments required in the transformation process and helped both to strengthen its management team around CEO Phil Wrigley and to increase its capital efficiency. The transformation process had three key initiatives. First was investment in a new larger distribution centre, and re-locating it more centrally in England. Second was a continued and accelerated roll-out of larger store formats, enabling New Look to offer a wider product range in a more conducive retail environment and to include men's and children's wear as counterweights to the cyclicality associated with women's fashion. When the company found itself in a strong enough position to expand to markets beyond the UK, it implemented the third key initiative: pursuing international expansion in France, Belgium, Ireland, Kuwait, and Dubai.

The New Look case presents an example of a company that pursued an ambitious growth plan with the support of private equity partners. The envisioned transformation process turned out to be highly successful with increasing efficiencies and profits as well as an increase of over 3,500 employees over four years.

THE UK RETAIL SECTOR: 1998–2004
By the late 1990s, clothing retailers typically benefited from healthy margins and positive cash flow and generated high returns on capital, making them fundamentally attractive to investors. Yet the sector came with risks as well; fashion was notoriously cyclical – even a warm month during the winter could spell disaster – and for trend-setting brands, one season's miss could represent tremendous losses. Analysts noted that clothing markets were naturally fragmented due to the fact that customers drive demand for niche concepts. Low barriers to entry into the industry meant competition was high. In the UK there were three significant full-priced selling cycles: Christmas, back-to-school and Easter.

Like-for-like (LFL) sales, or same-store sales, were dependent mainly on three things: the company's local consumer environment (the store's location); merchandising, essentially the appeal of the retailer's clothing offerings; and the maturity of the retailer's stores. LFL sales growth drove a retailer's ability to leverage annual operating cost increases, so opportunities for space expansion and growth in market share determined sustainable growth.

The late 1990s saw several significant forces affecting the retail consumer.[1] Work and leisure patterns had changed, and a "money rich, time poor" consumer had emerged, with a concomitant increase in spending on leisure. Demographics had also changed with a decline in younger people, a large portion in their middle age, and an increase in single-person households; all of which had implications for spending patterns. The retail sector witnessed an increase in consolidation of sales and a decrease in shop units. According to one study, the number of small, single independent retailers fell in the UK in tandem with their market share.

[1] The following section draws in part on Tim Dixon and Andrew Marston, "The impact of e-commerce on retail real estate in the UK," *Journal of Real Estate Portfolio Management*, 1 May 2002, vol. 8, no. 2, p. 153.

By the end of 2000, official figures indicated the British economy had been in the most sustained period of low inflation since the Great Depression. For retailers, price deflation, especially in sectors such as shoes and clothes, had come at a time when UK retailers' margins were already being squeezed. Globalization was the watchword for retailers, who, with saturated domestic markets and need for growth, continued to globalize through mergers and acquisitions, franchising, and catalogue and the internet. Global shortages of real estate to build stores – especially with increasing restrictions in Western Europe – were also thought to play a role in the retail sector's increased merger activity. Catalogue and mail-order shopping also continued to grow, comprising 4% of total retail sales in 2000, making the UK the third-largest catalogue market, behind the US and Germany.[2]

Finally, brands had become an increasingly important aspect of the shopping experience. Research indicated that brands had grown in importance in determining what people buy. Consumers were more likely to make purchases to satisfy their "wants" as opposed to their "needs".[3]

From 2000 to 2002 retail trends faced increasing pressure in the face of a global economic slowdown, fuelled by a recession, a bursting internet bubble and terrorist attacks. By 2002, most analysts worried consumers had snapped their wallets firmly shut throughout the Eurozone. Two slow Christmas seasons in a row continued to impact performance and by 2003 retailers were regularly discounting clothing earlier in the season in the hopes of getting some lift in their sales.

The economic slowdown throughout the retail sector continued to put downward pressure on sales, and with interest rates rising by late 2003, many predicted conditions to get worse. Most warned that the UK's protracted consumer boom was coming to an end, and a rash of mergers and acquisitions activity in the sector seemed to confirm the market's uncertainty.[4] Department stores Selfridges and Allders, as well as fashion retailer Arcadia Group, succumbed to takeover bids.[5]

HISTORY OF A FASHION RETAILER: NEW LOOK (1969–2003)

In 1969, Tom Singh opened the first New Look store in Taunton, England. New Look was conceived as a "high street" retail store, offering fashion for less to young and adult women. Its product focus included clothing, lingerie, and shoes. New Look's premise leveraged short supply-chain lead times, proposing to bring new fashion lines from the drawing board to the racks in two weeks, refreshing style ranges regularly. Growth was limited to the UK in the early years, but by 1988, New Look had gained a significant profile nationally and crossed the Channel, opening stores in France. By 1990, it had a total of 70 stores. By 1994, that had increased to 200. In 1995 the company launched stores in Scotland as well as their own in-house brand 915, a casual girl's wear line.[6]

Singh's first attempt to take the company public, in 1994, failed. Concerns over having so much of his family's wealth tied up in one business so closely linked to the cyclical and unpredictable nature of the fashion world prompted Singh to disperse his holdings: "I did not want to have all my eggs in one basket," he recalled. In 1996, two private equity investors, Prudential Venture Managers and BZW Private Equity, acquired a 75% stake in New Look and two years later in 1998 New Look was listed on the London stock exchange. Pre-tax profits in 1998 were £38.9 million (a 53-week year), and the company had 409 stores across the UK and 31 in continental Europe.[7]

From 1998 to 2001 the UK clothing market experienced a slowdown, and the chain's share price hit a low of 50p in March 2001 (the June 1998 IPO price had been 168.5p; see Exhibit 1 and Exhibit 2 for New Look's share price development between 1998 and 2004). The clothing market had witnessed an intensely competitive period during this time. Analysts worried New Look had "drifted away" from its staple customer – the fashion oriented 20 to 45-year-old woman, with about 50% of New Look's customer base over 25 – with its move towards a younger demographic: teenagers. Intended to expand the stores' customer base, analysts felt this shift had in fact alienated the brand's core customer base, which found it "hard to buy anything they wanted amid the confusion of the small cramped stores selling product ranging from lifestyle and homeware product to skimpy tops".[8]

Stores were increasingly cramped, and in need of refurbishment. The company had extended into lifestyle products, such as candles and pillows, which some believed made stores seem cluttered and distracted from the chain's core offering – clothing. Additionally, analysts pointed to the company's poor merchandising offering limited choices, and overstretched logistics function. The 480 stores nationwide were still serviced by a distribution centre in Weymouth in the south of England, making timely and efficient delivery across the chain's network challenging.

In 2001, much of the public market's criticism focused on New Look's store size and its expansion into France. Over 70% of the chain's space was accounted for by stores under 4,000 square feet and average store size was 2,000 square

[2] Tim Dixon and Andrew Marston, "The unpace of e-commerce on retail real estate in the UK", Journal of Real Estate Portfolio Magazine, 1 May 2002, (2002), vol. 8, no 2, p153.
[3] The authors cite Jones Lang LaSalle (2000), see Dixon and Marston (2002).
[4] Laura Board, "New Look founder may exit," *Daily Deal*, 14 July 2003.
[5] Laura Board, "New Look founder may exit", *Daily Deal*, 14 July 2003.
[6] http://www.newlook.co.uk/, accessed 2 December 2007.
[7] "Oh Lucky Jim – Growth still to come", SG Equity Research, 13 November 1998.
[8] Gillian Hilditch, Michael Morris, Matthew Sparkhall-Brown and Ed Steele, "New Look. Still in Fashion", HSBC, 11 April 2002.

feet. This restricted store space was seen as holding back like-for-like (LFL) sales development. As one analyst noted: "The small stores are physically unable to generate any more sales." Additionally, analysts claimed, the company had ventured into France "without the appropriate level of local expertise" and had been running a loss in that market for some time.

As the retail environment in the UK improved, and New Look worked to address its performance issues, analysts began to note improvement in the company's performance in early 2002. The management team had undergone changes, appointing new managing and operations directors, and had turned its attention to cutting head office costs by 10%, primarily by reducing headcount. The acquisition and merger with MIM France, a company with a similar profile and target consumer, but with intimate knowledge of the French market, shored up New Look's French operations. The chain's stores in France were rebranded as MIM, and duplicate locations were closed. Analysts projected a £4 million profit for 2002, after a loss of £1 million in 2001. Share price had also improved, rising 474% under management's efforts to cut costs, drive sales and increase market share.[9]

By 2002, profits were up a reported 70%.[10] New Look had become the fourth largest womenswear retailer in the UK with an estimated 3% of the market.[11] Homewares and lifestyle products were discontinued, coats and tailoring were successfully added and within the year coats had gone from zero to a £5 million business. A new line, Inspire, aimed at women sizes 16 to 24, was launched to great acclaim and filled a gap in the market.

The retailer's performance continued to improve into 2003 and management saw the opportunity to move New Look beyond refurbishing stores and smaller-scale cost-cutting, and into the broader transformation they envisioned, including investing in a new distribution centre, a further roll-out of larger-format stores and a more aggressive international expansion. New Look's management wanted to continue to improve the chain's performance, but they were also eager to capture additional opportunities. Fashion retailing was undergoing a consolidation – Littlewoods or Etam, for example, struggled to find a good market position. New Look's management wanted to take advantage of these shifts and push for further growth.

The public markets continued to pound the company on its fluctuating LFL sales track record.[12] Internally the management anticipated the public markets would be unsupportive of their vision since it would require longer-term investments and put pressure on short-term performance. They spoke with a number of analysts about their plans to test how public markets might react to their plans. Analysts reacted quite negatively to the company's ambitious plans, as they saw that the risk and complexity of New Look's business would increase significantly with the proposed transformation. "The transformation implied making infrastructure investments," said then-COO Phil Wrigley, which meant raising more cash. He explained: "As a public company we felt that an allergic reaction from the City was quite possible as communication possibilities with analysts are limited." Singh also recalled, "The public markets were unsupportive of our strategy."

New Look's management felt it would have taken enormous effort, time and resources to explain to the City the rationale behind the chain's future transformation, diverting time and resources from implementing the strategy itself. "You spend a lot of time with investors explaining your business and these investors do not truly understand your market," Singh noted. Yet abandoning their vision for New Look's transformation was not a viable option. "We felt that not undergoing a transformation process would mean a big risk for our brand – a risk to miss out on great market opportunities," one team member said. The management team decided to continue considering alternative options to achieve their vision.

A PUBLIC-TO-PRIVATE TRANSACTION IN EARLY 2004

Singh saw a public-to-private transaction as a way to sell part of his family's share in the chain. Singh had business contacts with Apax Partners, who had retail expertise, and the team decided to approach the private equity firm with the concept of a public-to-private transaction for New Look.

Apax Partners was a global private equity group operating since the late 1970s; in 2007, it had over $20 billion in funds advised worldwide. The group covered five sectors: technology & telecommunications; media; retail and consumer; healthcare; and financial and business services. After reviewing the opportunity, Apax Partners confirmed the deal's attractiveness and, due to the size of the deal, they brought Permira in as a partner. Permira, active since 1985, advised 19 funds totalling approximately €20 billion in 2007, and also had expertise in retail among several sectors such as chemicals; industrial products and services; and technology, media and telecommunications. New Look's conviction that the public markets would not have supported its growth strategy drove the proposal of a deal.

By late summer 2003, New Look was trading at 310.5p per share. In early September, Singh put forward an indicative offer of 330p a share (equivalent to a valuation of £662 million) for New Look, supported by Apax Partners/ Permira. In October 2003, the partners raised their indicative offer and the independent directors of New Look agreed to

[9] Gillian Hilditch, Michael Morris, Matthew Sparkhall-Brown and Ed Steele, "New Look. Still in Fashion", HSBC, 11 April 2002.
[10] Bruce Hubbard, Elizabeth Barton, Charles Nichols, Richard Edwards and Costanza Mardones, "New Look Group. Look What You Started", Equity Research: United Kingdom, Schroeder SalomonSmithBarney, 29 May 2002.
[11] Gillian Hilditch, Michael Morris, Matthew Sparkhall-Brown and Ed Steele, "New Look. Still in Fashion", HSBC, 11 April 2002.
[12] "New Look group – summer moved on", Citigroup SmithBarney, 30 May 2003.

enter into a period of due diligence. A slowdown in sales of winter clothing first increased doubts about the takeover bid materialising, however, on 13 February 2004, Singh put forward a 348p per share (£699 million valuation) proposal to bring the business back under private control (see Exhibit 1 and Exhibit 2 for the development of New Look's share price prior to the proposal). On 16 March 2004, more than 99% of investors voted to accept the offer (only Fidelity lodged a no vote).[13] New Look joined Debenhams, Selfridges and Hamleys as a private retailer.

A PRIVATE NEW LOOK: 2004–2007

New Look set off on its transformation as soon as the public-to-private transaction was closed. The agenda included three main initiatives: building a new distribution centre and reorganizing the company's logistics, adding new stores in the UK and shifting over to the larger store format extending a men's and children's wear line while also focusing the women's line more closely on fashion offerings, and expanding internationally. In addition, the management team was strengthened and, within the next two years, the company's capital structure was changed.

Corporate Governance: A Public versus Private New Look

Post-buyout, both the executive and non-executive boards were changed. Wrigley, the COO and main advocator of the new vision for New Look, was installed as CEO. He brought several new members to the management board, including Paul Marchant as managing director for Buying Merchandising and Design, and Michael Lemmer as international director. Singh also took on a more hands-on role as managing director, commercial and executive member of the board. These changes were necessary, as one private equity investor noted: "The new management team changed the direction of New Look and changed the pace at which it was managed. The change in the management team made the growth story happen."

The board initially consisted of four additional non-executive members, two from each private equity firm. The two board members from Apax Partners were Alex Fortescue (head of Retail and Consumer Sector in Europe) and Mirko Meyer-Schönherr. When Meyer-Schönherr left Apax Partners, Matthew Brockman, previously a board observer, became non-executive board member. Martin Clarke (head of Consumer Sector) and Leanne Buckham were the Permira board members. Both investment partners were committed to continuity on the board through the deal and up to exit. "We do not change board members in the life cycle of a company," one partner said. "We believe that it is all about the relationship with the management and it is important to have consistency over time."

Fortescue was chairman of the board until Richard Lapthorne, non-executive director and chairman of Cable & Wireless, was brought in by the private equity investors. If New Look went back to the public markets the team wanted someone with experience in managing a public company chairing the board. They felt they had already covered retail experience sufficiently with the other board members and, therefore, wanted to have someone with public market experience.

The management team saw the company had benefited from having been publicly listed as it had disciplined management in becoming more professional in their corporate governance and reporting. Many of the changes due to increased information requirements by public investors were still kept post-buyout and highly valued by the management team.

The corporate governance as well as strategic decision-making processes in New Look still changed substantially in other respects, due to the different shareholder structure post-buyout, also leading to changes in the board. All three parties – the management team, Singh and Apax Partners/Permira – had the expectation of a close relationship with each other, with the private equity investors fulfilling the role of a more active investor compared to investors on public markets. Due to this closer relationship, both the investors as well as the management were willing to take more risk with their decisions and to follow through with the envisioned initiatives for the transformation process. "New Look doubled the rate of investments," Fortescue recalled. "They were willing to take more risk in exchange for longer term success. We were willing to take more risks as well, given our relationship with New Look was closer than it would have been for investors on the public market."

The three parties today agree that their expectations were met and they all evaluate the collaboration as highly positive. The private equity partners monitored the business activities closely and supported the strategic decisions made by the management team. They had detailed discussions on key strategic decisions that had to be made in board meetings. Apax Partners/Permira did not impact day-to-day operations but had a vital role in making high level strategic decisions. "Before the buyout, public investors were mainly concerned about how well New Look performed financially. After the buyout, the primary debate was on what would be the right strategy going forward, so the board was more a power house focussing on strategy rather than financials," Fortescue said. A new monitoring system for operating indicators was put in place and used to monitor the company more closely.

A New Distribution Centre In July 2004, the company announced it would make a £400 million investment in a new distribution centre in Newcastle-under-Lyme, which opened in 2005. This larger distribution centre in a more central location made a great deal of sense from the perspective of mid- and long-term performance. However, as Alastair Miller, current CFO of New Look, recalled: "If we had still been public at that time, Wrigley and I would have spent most of our time in road shows around the City explaining to

[13] Susie Mesure, "Fidelity refuses to back Singh's pounds 700m buyout of New Look chain," *The Independent*, 16 March 2004.

institutional investors why this initiative was necessary." Given the cash-intensive aspect of the investment, building the new distribution centre required a willingness to accept a short-term slowdown in profit growth. One year later the press reported strong progress in New Look's transformation.[14] Changes to both the chain's distribution network and its design team contributed to an 18.8% rise in total sales during the 14 weeks up to 1 January 2005, according to management. New Look doubled the number of designers working on new ranges to 22 and also strengthened its buying and merchandising team[15] (see Exhibit 3 for New Look's key financials).

Larger Store Format Management felt the threat of market consolidation and the need for New Look to broaden its presence in the market. In the UK, this was done in part by sheer physical presence, e.g. through acquisitions of the leases and/or property of 30 former C&A stores and new store openings. In addition, a rebrand campaign was launched in 2004: "The New Now" gave New Look a more upmarket image, and presented a clean, modern fashion-oriented store image consistently across the chain.

The management team and the new investors looked closely at expanding the company's clothing and accessories ranges, wanting to roll out their larger store format further by offering a wide range for the whole family. They followed a rollout of menswear across many stores after the buyout and also launched a separate children's clothing line.

International Expansion Management pushed expansion into other European countries and the Middle East with new store openings in France, Belgium, Ireland and Dubai. "Expanding into Europe and Dubai was another key driver in their transformation process," said an insider. "This too would have been difficult to pursue while listed on public markets without being punished by decreasing price shares."

New Look Employees

The public-to-private transaction was supported both by the management team and New Look's employees. Employees across the ranks, from middle management and beyond, were very excited about the deal, as they felt this would give the company the opportunity to expand the brand further and with it, their own career development, as New Look's presence grew in the market.

Employee Incentives According to Wrigley, many employees felt the public-to-private transaction brought a culture of inclusion to the company. While New Look had been publicly listed, employees had always had the opportunity to own shares; however, post-buyout, a new programme was set up, giving management and a large proportion of employees the opportunity to become New Look shareholders. Committed to taking as many people with them as possible, the management wanted a vehicle for employees to directly participate in New Look's transformation process. Twenty of New Look's extended management team invested directly in the company as it went private. Four levels of managers were able to participate: executive directors, operative directors, controllers, senior managers and select store managers with a particularly good performance rating. To give a wider group of employees the chance to participate in New Look's development, The New Look Trust for Employees was set up, enabling employees to indirectly hold shares in the company as beneficial owners of The Trust. By mid-2006, over 300 people had invested in the option scheme via The Trust, rising to nearly 500 in 2007. The participation schemes were developed jointly by shareholders and management. Shareholders proposed the structure and the amount of equity available and worked with advisors to turn them into reality. Management worked on allocating the equity among employees and communicating the message.

The private equity partners were committed to maintaining the status quo in terms of New Look's employment policies. It was considered a general policy for both investors to safeguard the existing employment rights in a company where growing the business is the key management objective. One of the private equity investors said: "It was very clear early on that New Look was a growth story, not a restructuring story. The turnover of staff is relatively high in retail and our aim was to keep employees longer, to increase retention particularly for key people." Therefore, there were no changes to terms or conditions of employment including staff benefits, e.g. staff discount, life assurance, income protection for senior managers, medical insurance or company cars, and the bonus scheme remained unchanged. Training and development programmes for employees remained in place and were reviewed and improved in the normal course of events. As employment conditions were unaffected by the buyout, employee satisfaction remained constant.

Employment Growth The company did not buy any new entities, continuing to grow organically. From March 2004 to March 2007, group employee numbers grew by 8.9% per annum, from 12,166 to 15,708 employees; full-time equivalent headcount grew from 6,498 to 8,120 (see Exhibit 4 for employment development). New Look was able to outperform some of its main UK competitors, such as Marks & Spencer and Debenhams, who realized less employment growth over the same period. However, several market players had even greater average number of employee increases (see Exhibit 5 for employment information across select competitors).

Employment increased across different categories and functions, with slightly higher growth in part-time employees compared to full-time employees. Group employee costs grew annually by an average of 14.0% from 2004 to 2007. Employees in administration and distribution were decreased between 2003 and 2007 in order to increase efficiencies in production and distribution. The higher efficiencies were also captured in increasing employment productivity, e.g. with EBITDA per employee increasing 6.4% per year between March 2004 and March 2007 (refer to Exhibit 4).

[14] Liz Morrell, "New Look grows up", Retail Week, 8 April 2005.
[15] "Happy Progress at New Look", 4 January 2005, www.newlook.co.uk, accessed 4 December 2007.

The new distribution centre impacted on employment, as many of the Weymouth employees would not relocate. The management team worked hard to mitigate the negative outcome of this investment. The announcement of the new distribution centre was made public in July 2004, with the closure of the Weymouth distribution centre scheduled for November 2005. The company undertook a major communications programme to ensure all employees fully understood the business rationale for the move and were kept up to date with all activities. New Look put a retention bonus scheme in place to encourage employees to remain with the company through to closure, and a full programme of retraining was made available to assist employees in re-deployment. With this scheme, New Look was able to reduce its staff turnover rate from 28.9% to 16.2%. The new distribution centre opened in September 2005, with its full complement of 530 employees; the Weymouth distribution centre closed two months later. Approximately 15 employees were brought into vacant positions in the head office, and 20 employees relocated and joined the new logistics contractor at the new site. The remaining 545 staff, mostly warehouse operatives and drivers, left New Look. The distribution centre commenced operations under the management of DTS Logistics, part of Clipper Group, in September 2005. In December 2006, New Look took over full management control of the warehouse operations; all staff employed by Clipper transferred to New Look and were employed under the same conditions.

Refinancing

While New Look was not under financial pressure post-transaction, Apax Partners/Permira's suggestions to improve New Look's capital structure were a key contribution. "We very much benefited from their expertise in raising finance," an insider noted. In January 2005, a refinancing package was undertaken. While not a "proper refinancing", there was a surplus of funds for several reasons, including cost reductions, an increase in creditor days, and an EBITDA growth enabling a payout of £100 million in May 2005 to the equity holders. By July 2005, an additional £240 million was returned on the basis of additional substantial EBITDA and profit growth, and excess cash.

New Look found that with the private equity investors on board, and consequently closer monitoring of the company, debt providers were willing to increase the company's leverage even though the firm's transformation process represented greater risks. Through a debt restructuring in 2006 (which rolled interest up in capital value as opposed to a cash payout) the partners were able to take advantage of the uptick in the payment-in-kind (PiK) market. Share structures adjusted slightly, as management holdings increased to 15.7% (see Exhibit 6 for details on leverage over time, and Exhibit 7 for shareholder data over time). In the course of negotiations with debt providers, management received the offer to further increase New Look's leverage. Apax Partners/Permira advised the management to turn down the offer, suggesting New Look steer clear of an aggressive financing strategy, and potentially putting pressure on cash. As Miller recalled, "They prevented us from getting overleveraged and encouraged us to stay under a certain leverage ratio."

The management, Singh and Apax Partners/Permira all agreed that the refinancings had no impact on the management side of the company, nor did they restrict the company's growth or investments. "Our financial health was never threatened," Wrigley noted: "We could always sleep well at night." Apax Partners/Permira had not initially expected to be able to refinance the business, but the opportunity arose, and they were able to take advantage of it and got back two times their invested capital.

NEW LOOK 2007: LOOKING FOR AN EXIT?

In early 2007, Apax Partners/Permira and New Look's management considered possible exit strategies. The average time horizon for a private equity investment was coming close and New Look offered the additional growth potential necessary to attract a secondary buyout. Even though the expansion within the UK was relatively advanced, there were still many opportunities to extend internationalization across Europe and the Middle East.

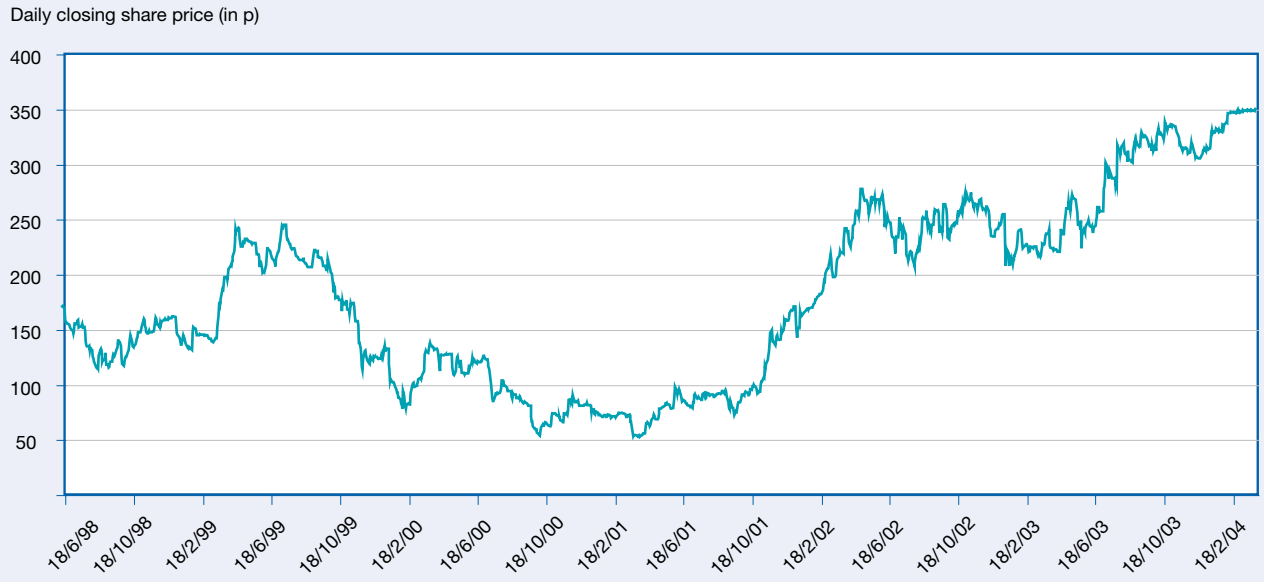
The poor reception for other fashion retail public offerings in early 2007, including Debenhams and Sports Direct, influenced the team to decide against a public listing. The management team and Apax Partners/Permira felt that public markets might not differentiate between New Look, still in the middle of an expansion phase, and other listed fashion retailers at various lifecycle stages (e.g. undergoing restructuring). With part of the transformation process still ahead, New Look had further infrastructure investments planned that would once again put pressure on short-term performance. Therefore, all agreed it was not the right time to pursue a public offering.

Instead, the team pursued an exit via a secondary buyout. The potential of a secondary buyout lay in the continuation of New Look's current growth strategy – further expanding in Europe and internationally, and continuing to change over from small to large stores. A sale process was run, but this did not result in a successful outcome as credit market turmoil and concerns regarding general consumer spending growth in the UK emerged. Following the process, Apax Partners/Permira made a firm decision against any exit of New Look in the near future, opting instead to keep the retailer in their fold and focussing on continued company growth.

With exit discussions precluded, one of the private equity partners looked back on the deal: "This case is all about company growth. Private equity was enlisted to help grow a company. Once New Look was private, we were able to make long-term investment decisions. If New Look were still public, I don't believe they would have been able to follow the same growth path they've achieved today."

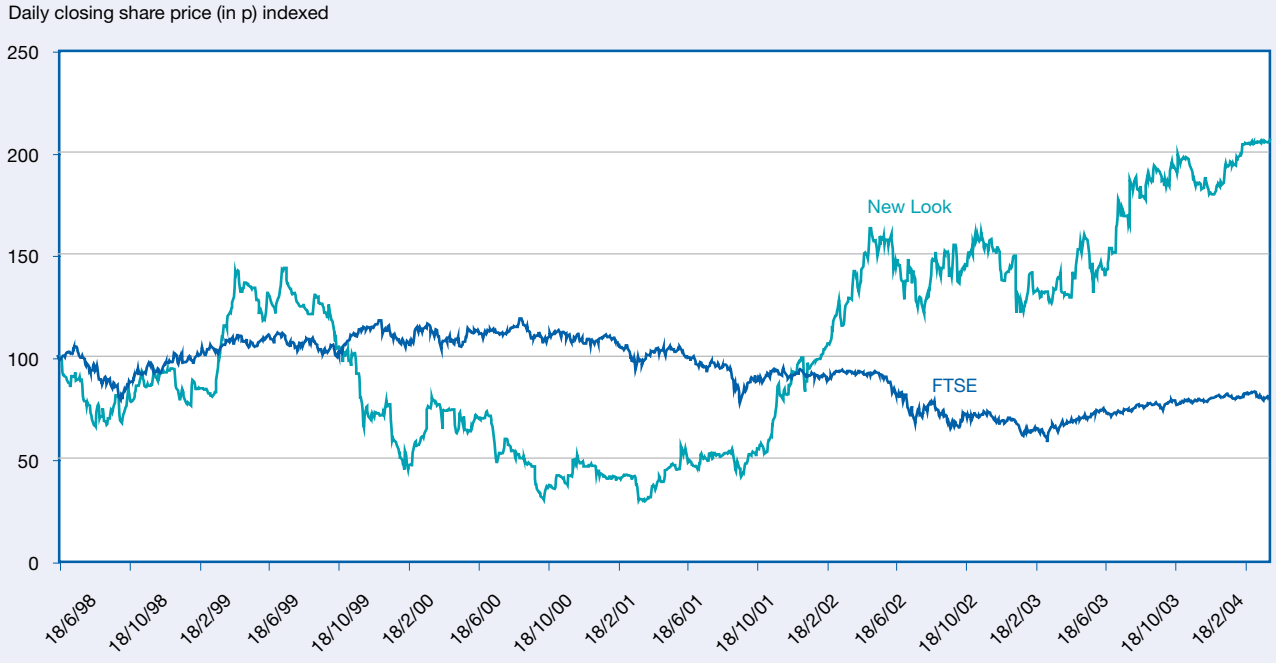
Although a public listing did not appear viable in 2007, New Look's management team considered it a potential option in the near future, believing that when New Look had built a successful and sustainable business internationally, public investors would have the confidence to back the company again. In addition, the broader strategic positioning of New Look could help to reduce cyclicality, enabling the company to manage the pressures of public markets again. In 2007, however, the private equity investors, the management team and Singh all believed a public listing only made sense at a later stage in New Look's transformation process.

Exhibit 1: New Look daily closing share price



Source: Thomson Financial's Datastream, accessed 5 December 2007.

Exhibit 2: New Look daily closing share price vs FTSE all shares



Source: Thomson Financial's Datastream, accessed 5 December 2007.

Exhibit 3: New Look key financials

In £ million

Key financials	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	CAGR 1998/99 - 2002/03	CAGR 2003/04 - 2006/07
Sales (ex. vat)	419	470	584	643	696	813	862	1,017	15.4%	13.5%
% Growth		12.2%	24.3%	10.1%	8.2%	16.9%	6.0%	18.0%		
EBITDA	62	50	84	109	118	160	174	177	20.7%	14.6%
% of Sales	14.8%	10.6%	14.4%	17.0%	16.9%	19.6%	20.2%	17.4%		
% Growth		(28.1%)	35.1%	17.9%	(0.4%)	16.2%	2.8%	(14.0%)		
CAPEX	31	28	20	39	42	59	70	98	8.0%	32.6%
% Growth		(9.7%)	(28.6%)	95.0%	7.7%	40.5%	18.6%	40.0%		

Source: New Look, casewriters' research.

Exhibit 4: Employment development at New Look (2003/04 – 2006/07)

	2003/04	2004/05	2005/06	2006/07	Total change	CAGR 2003/04 - 2006/07
Average group employees						
Retailing	11,020	11,428	12,754	14,806	3,786	10.3%
Admin & distribution	1,146	1,141	1,021	902	(244)	(7.7%)
Total group employees	**12,166**	**12,569**	**13,775**	**15,708**	**3,542**	**8.9%**
Group FTE employees	6,498	6,942	7,377	8,120	1,622	7.7%
Average UK employees						
UK employees	10,999	11,216	11,912	13,410	2,411	6.8%
UK FTE employees	5,548	5,928	5,976	6,689	1,141	6.4%
Employee cost (in £ million)						
Branch	66	74	82	101		14.9%
Distribution	16	17	18	25		17.6%
Head office	22	23	28	28		8.2%
Total employee cost	**104**	**113**	**129**	**154**		**14.0%**
Employee cost per FTE employee (in £ thousands)	19	19	22	23		7.1%
Employee productivity (in £ thousands)						
Revenue per FTE employee	107	117	117	125		5.4%
EBITDA per FTE employee	18	23	24	22		6.4%

Source: New Look.

Exhibit 5: Employment development at competitors (2003–2006)

Average employees	2003	2004	2005	2006	Total change	CAGR Dec-00 to Dec-03
NEXT						
NEXT brand	32,580	39,179	44,945	45,360	12,780	11.7%
NEXT sourcing	N/A	N/A	3,038	3,596		
Ventura	3,494	4,366	6,567	8,447	4,953	34.2%
Other activities	2,600	2,765	52	51	(2,549)	(73.0%)
Total employees	**38,674**	**46,310**	**54,602**	**57,454**	**18,780**	**14.1%**
Marks & Spencer						
UK stores	57,526	60,427	61,132	62,288	4,762	2.7%
UK Head Office	3,613	3,674	3,332	3,057	(556)	(5.4%)
Financial services	1,467	1,619	-	-	(1,467)	(100.0%)
Overseas	4,527	4,381	4,399	2,959	(1,568)	(13.2%)
Total employees	**67,133**	**70,101**	**68,863**	**68,304**	**1,171**	**0.6%**
H&M						
United Kingdom	2,794	3,095	3,408	3,617	823	9.0%
Other European countries	22,696	25,011	27,836	30,990	8,294	10.9%
Canada	8	125	294	608	600	323.6%
USA	2,255	2,812	2,406	4,383	2,128	24.8%
Other countries	656	658	670	770	114	5.5%
Total employees	**28,409**	**31,701**	**34,614**	**40,368**	**11,959**	**12.4%**
Debenhams[a]						
Full time			7,845	8,358	513	6.5%
Part time			15,495	16,358	863	5.6%
Total employees			**23,340**	**24,716**	**1,376**	**5.9%**

Source: Annual reports.
Note: a. Total change and CAGR refers to the period 2005 to 2006.

Exhibit 6: New Look's leverage data in 2004 and 2007

In £ million	Apr-04	Leverage ratio (x EBITDA[a])	Mar-07	Leverage ratio (x EBITDA[b])
Senior Debt	335	2.9x	579	3.3x
Second Lien	-		80	
Total Senior	**335**	**2.9x**	**659**	**3.7x**
Mezzanine	100		60	
Total Debt Requiring Cash payment	**435**	**3.7x**	**719**	**4.1x**
PiK Debt	-		401	
Total Drawn Debt	**435**	**3.7x**	**1,120**	**6.3x**

Source: New Look.
Notes: a. Multiples of LTM EBITDA of £118m
b. Multiples of LTM EBITDA of £177m.

Exhibit 7: New Look shareholdings in 2004 and 2006

	Apr 04	Post Jun 06 PIK
Apax Partners	30.1%	27.8%
Permira	30.1%	27.8%
Tom Singh & family	23.3%	22.5%
Landmark	3.1%	2.9%
Management	13.4%	15.7%
Warrant holders	-	3.3%
Total	100.0%	100.0%

Source: New Look.

Chinese private equity cases: introduction*

LILY FANG
INSEAD

ROGER LEEDS
School of Advanced International Studies, Johns Hopkins University

The two cases, Hony Capital and China Glass Holdings, and 3i Group plc and Little Sheep, profile two different types of private equity investment in China: the former is a buyout transaction, but with uniquely Chinese characteristics that reflect the country's legal and economic realities; the latter is a classic growth capital private equity investment. Yet both cases have strikingly similar key factors that are critical for private equity success, especially in emerging market environments where the industry is much less well established than in the US and Europe. Rather than focusing on the financial analytics of private equity transactions, these cases concentrate primarily on the post-investment role played by the two private equity funds as they worked closely with senior management of their portfolio companies to build value, enhance competitiveness and strengthen their capacity to gain access to international capital markets.

The case of Hony Capital and China Glass Holdings describes the privatization and subsequent restructuring of a state-owned glass manufacturing enterprise that was purchased in its entirety by a Chinese private equity fund. In 2003 Hony Capital had only recently been created, and was one of the very first Chinese private equity funds founded and staffed by local personnel and investors. At the time, Jiangsu Glass Company (later renamed China Glass) was a mid-size flat glass manufacturer about to lose its privileged government ownership status, and thus would be forced to fend for itself in a rapidly growing, increasingly competitive Chinese market. Once the private equity transaction was consummated, the Hony deal team and China Glass management worked as one to successfully complete an IPO on the Hong Kong Stock Exchange, execute an ambitious acquisition strategy and attract a world-class strategic partner. As a result, five years after the original transaction, China Glass has risen to become a market leader in its sector and Hony is poised to exit with an enviable financial return on its original investment.

In sharp contrast, 3i Group plc and Little Sheep tells the story of an entrepreneur whose hobby turned into one of the largest and best-known restaurant chains in China. Unlike the new and wholly Chinese Hony Capital, 3i is a well-established global private equity firm founded 60 years ago in Britain. Contrary to the conventional wisdom about the importance of business and government connections in China, there was originally no tie connecting 3i and Little Sheep. Instead, this deal started with a cold call to a senior executive at Little Sheep by a mid-level 3i investment officer who was bullish on the Chinese food and beverage sector. Personal chemistry was critical to success, first for 3i to win the mandate, and then for the investor and company to forge a close, constructive working relationship. Together they focused on restructuring Little Sheep's management team, strengthening corporate governance practices, and revamping the company's franchising strategy. As a result, the company has significantly enhanced its competitiveness and is well positioned to finance its future expansion plans by raising capital through a public offering.

Leaving aside the obvious differences between the two transactions, the cases highlight some important similarities that often are present in emerging markets private equity. For example, when the private equity investors entered the picture, both sectors were inefficient and highly fragmented, yet in the midst of rapid growth and increasing competition. Both companies were at a critical juncture: either they strengthened their competitive position with a more professionally executed expansion strategy, or they would struggle to survive. In both cases, a strong working relationship underpinned by mutual trust and respect was key to executing the restructuring strategy. Significantly, in contrast to many transactions in the US and Europe, value-creation in both companies was achieved without any changes in the senior management team.[1] The active involvement of the private equity investor transformed both companies' business strategies, strengthened management teams, revamped the composition and practices of the boards of directors, elevated corporate governance standards and enhanced access to capital. As a result, both businesses became much more competitive not only because of the injection of new capital, but also the expertise and hands-on involvement of the private equity investor. Also, as often occurs in successful emerging markets private equity transactions, these two cases demonstrate that the learning curve for the senior management teams of the portfolio companies was steep but incalculably beneficial.

* The authors wish to acknowledge their appreciation for the excellent research support provided by Brian DeLacey.

[1] Little Sheep added two senior executives but not at the expense of the original management team.

Executive Summary: 3i Group plc and Little Sheep

In 2006, a large, well-established global private equity firm invested in a rapidly growing Chinese restaurant chain that originated in Inner Mongolia. This case describes why and how a productive, though unlikely, relationship was forged between these two firms, and the result of their collaboration. 3i, a highly respected global private equity firm, first established a presence in Asia in 2001. Three years later, the firm became aware of a rapidly growing restaurant chain called Little Sheep. Due to its meteoric growth and national brand name recognition, the founder of Little Sheep had been approached by prestigious investors with attractive offers of financing. As the founder later explained, he favoured 3i over other prospective investors because of a strong belief that 3i had the expertise and commitment to add value on a number of fronts, from corporate governance to helping revamp the firm's franchising strategy.

Executive Summary: Hony Capital and China Glass Holdings

This case traces the 2004 buyout of a state-owned flat glass manufacturer, Jiangsu Glass, by Hony Capital, a recently created Chinese private equity fund, and the value creation that resulted from the transaction. Once in control, Hony rapidly orchestrated a major growth-oriented restructuring of the company, a successful IPO on the Hong Kong Stock Exchange (with a new name, China Glass), and the acquisition of seven Chinese glass manufacturing companies. As a result, in the time span of about three years China Glass was transformed from a relatively obscure, mid-size glass manufacturing company to one of the largest, most efficient producers in China.

A striking feature of this transaction was the close, collaborative working relationship between the Hony deal team and the senior management of China Glass from the very beginning, even during the due diligence phase. This early and sustained bond between the key stakeholders facilitated and accelerated the major changes required to take the company to a new, higher level. An active, engaged board of directors was established, revamped governance practices were put in place and internationally acceptable accounting and financial reporting standards were implemented. These reforms enhanced the company's credibility with investors, attracted one of the world's largest glass manufacturers as a strategic partner and investor, and created a solid foundation for rapid growth. Today, China Glass is one of the few Chinese glass manufacturers listed overseas and is trading at an estimated forward P/E ratio of about 23, twice the industry average. Since the buyout, daily production capacity has increased more than five-fold from 900 tons in 2003 to 5,230 tons in September 2007. Revenues have grown from $44.5 million to more than $250 million.[2] The transformation has also positioned China Glass to be more competitive in global markets by shifting its product mix towards high value-add, high margin varieties.

[2] All US dollar figures are approximate, converted from local currency at an exchange rate of $1USD = RMB 7.5.

Hony Capital and China Glass Holdings*

LILY FANG

INSEAD

ROGER LEEDS

School of Advanced International Studies, Johns Hopkins University

"We knew that the Chinese glass industry was undergoing rapid consolidation that would increasingly favour larger players. We could not survive as we were structured; either we would be acquired by one of our larger competitors, or we would become an acquirer. …"
Zhou Cheng, CEO, China Glass

"We are company builders… I've given up trying to be loved as a private equity investor in China. But if I successfully execute value-creation in an honest way, I can be respected."
John Zhao, CEO, Hony Capital

EXECUTIVE SUMMARY

This case traces the 2004 buyout of a state-owned flat glass manufacturer, Jiangsu Glass, by Hony Capital, a recently created Chinese private equity fund, and the value-creation that resulted from the transaction. Once in control, Hony rapidly orchestrated a major growth-oriented restructuring of the company, a successful IPO on the Hong Kong Stock Exchange (with a new name, China Glass), a US dollar-denominated bond offering in Singapore, other capital raising events and the acquisition of seven Chinese glass manufacturing companies. As a result, in the time span of about three years China Glass was transformed from a relatively obscure, mid-size glass manufacturing company to one of the largest, most efficient producers in China.

One striking feature of this transaction was the close, collaborative working relationship between the Hony deal team and the senior management of China Glass from the very beginning, even during the due diligence phase. This early and sustained bond between the key stakeholders facilitated and accelerated the major changes required to take the company to a new, higher level. An active, engaged board of directors was established, revamped governance practices were put in place and internationally acceptable accounting and financial reporting standards were implemented. These reforms enhanced the company's credibility with investors, attracted one of the world's largest glass manufacturers as a strategic partner and investor, and created a solid foundation for rapid growth. Today, China Glass is one of the few Chinese glass manufacturers listed overseas and is trading at an estimated forward P/E ratio of about 23, twice the industry average. Since the buyout, daily production capacity has increased more than five-fold from 900 tons in 2003 to 5,230 tons in September 2007. Revenues have grown from $44.5 million to more than $250 million.[1] The transformation has also positioned China Glass to be far more competitive in global markets by shifting its product mix towards high value-add, high margin varieties. As a result, exports since the buyout have increased from 10% of sales to 30%.

The significant value-creation generated by this private equity transaction can be attributed to a number of noteworthy features described in the case, including:

- The close alignment of interests among the three major stakeholders in the transaction: the seller, a municipal government intent on privatizing the company quickly; the company's senior management, also keen to seize the moment and rapidly transform the enterprise into a market leader; and the buyer, a recently launched private equity fund that was sharply focused on executing a buyout strategy that would capitalize on new privatization opportunities generated by a shift in government policy.

- The shared vision of the private equity investor and company management about precisely what needed to be achieved to rapidly build a more competitive, growth-oriented company immediately after the deal was completed.

- The strong belief by the private equity investor that a key factor for post-investment success was the retention of senior management and the introduction of a new incentive-based compensation structure that would motivate management to work towards a shared set of objectives.

- The onset in China of a significant policy shift, captured by the central government's 2002 directive that "the government is not in the business of running businesses".

- An industrial sector that was undergoing rapid consolidation and robust growth, which created very attractive acquisition opportunities for savvy investors.

This case also sheds considerable light on the significant differences between buyouts in China and most other emerging market countries, compared with the US and Europe. For example:

- Public-to-private: Many buyouts in the US and Europe have involved the outright purchase of publicly listed firms

* The authors express their appreciation for the research and editing support provided by Brian DeLacey.

[1] All US dollar figures are approximate, converted from local currency at an exchange rate of $1USD=RMB 7.5.

going private; there have been virtually no emerging markets transactions of this type. In the few cases where buyouts have occurred in China, the seller has invariably been the State (i.e., privatization), and in most cases the new controlling shareholder has been a local rather than foreign private equity entity.

- Leverage: Buyouts in the US and Europe tend to be highly leveraged, often involving 60%-80% of debt financing. In China, as in most emerging markets, private equity deals involve relatively little or no debt. This may change over time as credit markets deepen and legal frameworks adjust to permit more leveraged transactions, but not in the near-term.

- Transaction size: Buyouts in the US and Europe frequently run into the hundreds of millions, or even billions of dollars. Very few companies of comparable size exist in emerging market countries, and most private equity transactions are far smaller.[2]

- Politics and foreign ownership: The spectre of foreign investors gaining control of large, high visibility enterprises has begun to trigger a political backlash in China, just as it has in other emerging market countries as well as in the US and many other Western countries. These political sensitivities are likely to remain prominent features of the private equity landscape for the foreseeable future, and will influence public policies and investor behaviour.

HONY CAPITAL

Hony origins and background

Hony Capital was founded in January 2003 with an investment of $38 million from a single investor, Legend Holdings, one of China's best-known companies. Legend was established as a personal computer business with 11 engineers in 1984 by the government-owned Chinese Academy of Sciences, and became internationally recognized when one of its subsidiaries, Lenovo (previously named Legend Computers), acquired IBM's personal computer business in 2005. Although widely viewed as one of China's greatest "private" sector success stories, today 65% of Legend Holdings is still owned by the state-owned Chinese Academy of Sciences.

When Liu Chuanzhi, founder of Legend Computers and president of Legend Holdings, launched Hony Capital, most large Chinese companies were state-owned enterprises (SOEs). Obtaining government approval for buyouts involved navigating through a complicated maze of regulatory and political hurdles that few understood. But Liu, with his long experience building Legend, understood what the government was trying to achieve during the gradual transition to a market economy, and he proved adept at manoeuvring within the bureaucracy. His vision for Hony from the outset was to apply Legend's knowledge of government, its financial resources and its expertise managing successful Chinese companies to selectively acquire SOEs, restructure them, and then exit. He believed that China had reached a critical juncture that was likely to create untold opportunities for the nascent private equity industry:

"First, China's traditional industries all have huge room for growth, so the returns on private equity can be even higher than those on venture capital. In other countries, there are limits to the growth of traditional industries, but in China traditional industries like construction materials, textiles or food and beverages have limited risk and very fast growth, so they are very suited to private equity investment.

"Second, because private enterprises in China lack resources, private equity can act like irrigation, stimulating qualitative change as soon as it enters.

"Third, private equity serves as a good tool for China to reform state-enterprise ownership and management-incentive systems. … Private equity can value enterprises and management at market prices, allowing state enterprises to reform in a more acceptable fashion."[3]

Liu's first task was to find a leader for Legend's new fund. To this end he turned to John Zhao, a senior advisor to the CEO of Lenovo. Zhao had grown up in Jiangsu province, attended Nanjing University, worked briefly as an engineer at the state-owned Jiangsu Electronics Company before immigrating to the United States to pursue graduate studies. Zhao had earned two Masters of Science degrees and an MBA from Northwestern University's Kellogg School of Business in Chicago before spending about 10 years working in a number of high-tech companies and Silicon Valley start-ups. He returned to China in 2002, first to work as a senior advisor to Lenovo's CEO, and then as Hony Capital's first CEO. Reflecting on his decision to return to China after he had successfully settled in the US, Zhao explained: "China is my roots. In my mind, there was no doubt that this is where I would eventually return."

Pursuing Liu's vision, Zhao immediately began to build Hony Capital into one of China's first private equity funds, founded and fully staffed by Chinese. By 2007, Hony had grown to 27 professionals, including seven managing directors, two directors, and one vice president. With the exception of one foreign employee, the team remains virtually 100% Chinese, most of whom were not Western-educated and came from operational, rather than financial, backgrounds. According to Zhao, hiring a world-class professional staff was one of his biggest challenges. He believed that success in the Chinese PE market required a very different kind of professional, and he proactively recruited individuals who had in-depth local knowledge and strong operating expertise.

[2] In 2006 the average deal size in China was about $45 million, and only $30 million in India. ("Asia Private Equity Overview, 2007", Bain and Company, March 2007).
[3] Yu Ning and Song Yanjua, "Defining Private Equity's Future in China", Caijing Magazine, published on www.wsj.com, 12 July 2007.

Hony's Chinese name means ambition and perseverance, two traits considered critically important for all Hony professionals. New recruits were given two books that they were expected to have read by the end of their first week on the job. One was The House of Morgan: An American Banking Dynasty and the Rise of Modern Finance.[4] The book resonated with Zhao because of the apparent similarities between the US at the turn of the 20th century and present-day China. He believed that Morgan's rise a century ago captured the essence of Hony's opportunity now. The second book, Goldman Sachs: The Culture of Success,[5] focused on the embedded culture that contributed to the investment bank's sustained success, and reflected Zhao's vision for Hony. "The people of Goldman Sachs are intense and proud," wrote one of Goldman's leaders in the 1993 annual review, "and they aren't willing to settle for less than being the very best in each of our significant operations."[6]

In addition to building a professional staff, the new CEO began to flesh out Hony's investment strategy. Though few transactions existed at the time, Zhao never wavered from Liu's vision of creating a private equity fund whose primary focus would be on purchasing controlling stakes in Chinese SOEs. Zhao first hired McKinsey & Company to conduct a top-down analysis of 99 broad sectors in the Chinese economy. Based on the study, the consulting firm recommended to Zhao and his team an investment strategy that focused on a few high growth sectors such as pharmaceuticals, heavy equipment and construction materials. Secondary interests included consumer goods, retail, media and financial services. Although float glass was not specifically included in McKinsey's list of recommended industries, the Hony team believed that it had potential. Zhao explained that this early exercise with McKinsey gave the Hony team focus and discipline as they began to grow their private equity business.

Since the first fund, Hony has gone on to raise two additional funds and by 2007 it had about $720 million of total committed capital. After relying 100% on Legend for the first fund, the second and third funds attracted some of the world's most prestigious LP investors, including the Stanford University endowment, Goldman Sachs, Temasek Holdings, the Gates foundations and the Rothschild family. (See **Exhibit 1** for summary information on Hony Capital funds.)

The Hony investment model

"In the simplest terms," Zhao explained, "we're a company builder. The key success factor in our business is post-investment execution." Of course, the leaders of many private equity firms might express a similar view, but when Zhao elaborated on Hony's investment model, some of the major differences between the Chinese and Western approaches to buyouts became apparent. As Zhao explained: "Hony's deals differ in at least a half-dozen ways from typical buyout deals in the US and Europe. We focus on privatizations of state-owned enterprises rather than publicly listed private-sector companies; given the state of China's credit markets, leverage is not a significant factor in our transactions; we will not do a deal that involves significant asset stripping or major layoffs; we do an enormous amount of due diligence on management because we are only interested in deals where we have full confidence in the existing management team; and possibly of greatest importance, we must have a high level of confidence early in the due diligence process that our interests and management's are fully aligned about what needs to be done after we invest to build value in the company. We help the management team to become market leaders in their industry by focusing on formulating strategy and vision. However, we don't want to be in a position where we have to interfere with daily operations."

Zhao believed this approach, coupled with the team's deep knowledge of Chinese business culture and the policy environment, would give Hony a considerable competitive advantage as the private equity industry continued to grow and mature. Hony was also well placed to continuously generate attractive deal flow, he believed, because his team recognized the investment opportunities in a market far less efficient than that of developed countries. Hony could selectively capitalize on these inefficiencies because its local knowledge was extensive and it understood better than most the nexus between China's public policy agenda and the requirements for continued private sector growth. "Very few value-added investors are looking at the deals we do," Zhao explained. "If we make the right judgments about company managers, we will succeed in most cases. China does not yet have a professional management class by Western standards, so making good people decisions is a key factor for success."

FLOAT GLASS INDUSTRY OVERVIEW[7]

Opportunities in industry consolidation and cyclicality

Global demand for flat glass between 1985 and 2004 had consistently grown at a rate approximately 1% faster than global GDP, an encouraging sign for investors in a country such as China that had been registering annual GDP increases of at least 9% for more than two decades. Furthermore, China is the single largest country in the glass market, accounting for about a third of both global production and consumption. Domestic demand was poised to expand further with laws and regulations requiring building materials to have technological innovations and higher energy efficiency.

In 2003, when Hony was contemplating the Jiangsu Glass buyout, China's flat glass industry was extremely large yet highly fragmented. With China's economy growing at breakneck speed, every business related to the construction industry was booming. Yet compared to the global glass

[4] Ron Chernow, New York, Grove Press, 2001.
[5] Lisa Endlich, New York, Touchstone, 2000.
[6] Lisa Endlich, Goldman Sachs: The Culture of Success, (New York, Touchstone, 2000), p180.
[7] Materials on the industry overview are adapted from the China Glass Offering Prospectus, published 13 June 2005, p45-52.

industry standard where the top five manufacturers held a 70% share of the world market, the top five in China only accounted for about 20% of the domestic market. Zhao and his team believed the industry was poised for consolidation, following the trend already occurring in many other sectors that were striving to enhance efficiency through larger scale. Hony also observed the considerable cyclicality in the industry, and forecasted that prices would peak in late 2004 or early 2005 before beginning a two-year downturn. (See **Exhibit 2** for an illustration of glass industry cyclicality.) Tactically, these forecasts guided Hony's timetable for the buyout and the subsequent IPO in early 2005.

CHINA GLASS HOLDINGS OVERVIEW

Jiangsu Glass, located about halfway between Beijing and Shanghai, was owned primarily by the municipal government of Suqian (a city in northern Jiangsu Province), with minority stakes held by two other government-owned asset management companies. In 1996, the company had suffered huge losses and Suqian Vice Mayor Zhou Cheng was appointed as the new CEO. He was given a mandate by the government to clean house and turn around the money-losing operation. Although Zhou knew virtually nothing about the glass manufacturing industry, he quickly set out to streamline the company by disposing of all non-essential assets, such as a hospital, a health clinic, schools and other facilities typically owned and operated by SOEs in China. He also revamped the company's balance sheet by successfully orchestrating a major debt restructuring.

The turnaround of Jiangsu Glass, led by Zhou, gradually began to transform the company into one of China's most efficient float glass producers, albeit with a relatively small production capacity, even by domestic Chinese standards. Before the Hony investment, Jiangsu Glass had two float glass production lines with a combined daily capacity of 900 tons. Accounting for just 2% of the domestic market, it was ranked tenth in size among Chinese flat glass producers. But it was number one in terms of return on total assets (before tax and interest), according to the China Building Materials Quantity Supervision Association.

Notwithstanding this impressive turnaround, by 2003 the municipal government had decided to privatize Jiangsu Glass, paying heed to the 2002 Party Congress directive that "the government is not in the business of running businesses", and therefore every effort would be made by the government to divest itself of businesses in highly competitive industries. In China, this significant policy shift was widely heralded as "state steps back, people step forward". Having successfully restructured the company, Zhou faced the challenge of severing ties with the local government and competing as a private company.

Just as Hony was being launched in mid-2003, Hony CEO John Zhao arranged to meet Zhou for the first time. Although their initial encounter lasted less than an hour, even at this early stage the two CEOs concluded that they were thinking along similar lines about how to execute a buyout of the company and what was required to transform Jiangsu Glass into one of China's premier flat glass manufacturers. They shared the conviction that the trend in China's flat glass industry was moving irreversibly towards greater consolidation, resulting in fewer and larger companies. In order to thrive in this more competitive environment, Jiangsu Glass would need to rapidly expand production. This in turn would require access to both additional financial resources and industry expertise. But instead of looking for a glass industry player as an acquirer/investor, Jiangsu Glass preferred to work with Hony, a private equity player. Zhou explained: "Ideally we wanted to work with an investor like Hony that shared our vision about how to grow the company. We would not have maintained our independence and control if we merged with a competitor from the industry."

THE HONY-CHINA GLASS TRANSACTION

An alignment of interests

Unlike many private equity transactions that are marked by protracted negotiations and at least some tension between buyer and seller, Hony's purchase of Jiangsu Glass was facilitated by a commonality of interests and objectives among the three principal stakeholders:

- The company owner: The Suqian municipal government was a highly motivated seller. As the Mayor explained, "The privatization of SOEs under our control was part of the larger Chinese policy to reduce the government's financial burden and strengthen the private sector's role in the economy. We agreed with this new emphasis by the central government because we were overburdened by responsibilities to oversee SOEs, and unable to provide them with the financial resources they needed to grow and compete."

- The company management: CEO Zhou Cheng explained: "We knew the Chinese glass industry was undergoing rapid consolidation that would increasingly favour a few of the largest players, and therefore we could not survive as currently structured. Either we would be acquired by one of our larger competitors, or we needed to become an acquirer, which would take additional capital."

- The private equity investor: The Jiangsu Glass profile was well-suited to the investment criteria established by the recently created Hony Capital. According to Zhao: "We were actively seeking buyout opportunities [privatizations], and construction materials were a very good bet in a country growing consistently at a 10% annual rate. Moreover, the single most important criteria for us was a high level of confidence in management, and after my first conversation with Zhou Cheng I believed he was a person we could work with. Just as we were getting started, Jiangsu Glass presented us with an excellent investment opportunity."

Establishing early agreement on post-investment objectives and strategy

This initial compatibility of objectives allowed due diligence to proceed rapidly and smoothly, with a minimal amount of friction along the way. One of the most striking aspects of this pre-closing period was the time and attention devoted to planning and agreeing on the post-investment strategy. Zhao's criteria with all Hony deals is that there must be a clear agreement pre-investment on the post-investment value-creation strategy. This, he believes, requires a clear alignment of interest between Hony and management about how to grow the company. This was clearly the case with Jiangsu Glass.

Both sides agreed from the outset that their singular focus should be on the execution of a number of concrete actions that would transform the company into a market leader. But given the industry's cyclicality and their expectation that prices were likely to peak in late 2004 or early 2005, time was of the essence to raise capital on favourable terms. Among the most important components of this strategy were:

- CEO Zhou Cheng would relinquish his position as an official of Suqian City and work full-time for the company
- Preparations would begin immediately to position the company to execute an IPO on the Hong Kong Stock Exchange (HKSE) as soon as legally possible. (To conform with HKSE listing requirements, the company would need to be legally transformed from a Chinese joint stock company to a limited liability company, and then, prior to the IPO, a wholly foreign-owned enterprise.)
- Proceeds from the IPO would be utilized to build additional production lines and to expand production via acquisitions
- Immediate efforts would be made to identify acquisition targets
- Immediate efforts would be made to attract a world-class glass manufacturer as a shareholder and strategic partner

Structuring and closing the transaction

The key to implementing the post-investment growth strategy was executing the IPO as quickly as possible, ideally by mid-2005. Rather than listing on one of the two domestic stock exchanges, from the outset, Hony targeted the China Glass listing for the more demanding HKSE, where its more rigorous listing requirements would demonstrate to international investors that the company satisfied the highest standards of financial reporting, transparency and corporate governance.

But the HKSE listing requirements stipulated there must be no material change in company ownership for at least one year prior to the offering, in addition to a number of other listing requirements (e.g., independent audit, compliance with HKSE GAAP). In order to meet their aggressive IPO timetable and remain in compliance with HKSE regulations, therefore, a legal purchase agreement was first signed on 31 December 2003 whereby Hony Capital took control of Jiangsu Glass from the Suqian State-owned Assets Supervision and Administration Commission, with an independent valuation conducted two weeks later and the agreed sum paid by Hony in February 2004. Hony then spent 10 more months negotiating for and completing the transaction of the remaining minority shares from two government-owned asset management companies. The entire process was finally completed in December 2004, a year after the legal share purchase agreement had been signed.

Although unusual by Western standards, this methodical and drawn-out process of negotiations, valuations and approvals is not unusual for Chinese SOE privatizations. Even as negotiations were continuing, Hony assumed the role of controlling shareholder and immediately began to make changes in the company in preparation for the anticipated IPO. During this interim period, prior to the final acquisition of the minority stakes, the company's entire accounting and financial reporting systems were revamped, an independent audit was conducted and a new Board of Directors was established. In addition, with an eye to enhancing the company's perceived value with prospective IPO investors, a formal long-term relationship was negotiated with a highly reputable, globally recognized strategic investor, as described in the next section. (See **Exhibit 3** for the major steps in the time line of the transaction.)

In sum, Hony acquired the stakes of Jiangsu Glass for RMB 93 million (about US$13 million),[8] an amount that equalled about one third of Hony's entire first fund. Zhao believed "our willingness to make such a relatively large commitment shortly after we had established our first fund was a good indication of our confidence in the company".

EXECUTING THE VALUE ENHANCEMENT STRATEGY

Hony and the Jiangsu Glass management team had a shared vision for the post-buyout company from the very beginning of their interaction. By the time the buyout of the controlling stake was officially closed in February 2004, they also reached complete agreement about the strategy to achieve the vision. The most urgent task was to prepare the newly named China Glass for the HKSE IPO. Once the company held a deeper pool of long-term capital, attention would shift to transforming the company by expanding capacity through the construction of new production lines and a series of acquisitions. In pursuit of these objectives, some of the significant actions included:

Creating financial incentives for key management

First, Hony's 100% ownership stake was immediately reduced to 96% with a pre-arranged agreement to sell 4% of its shares to the company's seven most senior managers at the same price Hony originally paid for its shares. Simultaneously, it was

[8] As is customary in Chinese practice, the valuation is based on net asset value plus the assumption of all outstanding debt obligations.

agreed that an additional 8% of Hony's shares would be transferred to company management at the same price upon its successful completion of the IPO. To ensure that the designated executives could afford the two share purchases, local banks and Hony agreed to provide loans on favourable terms. In return for this generous share purchase agreement, the executives signed long-term contracts obligating them to remain with the company. Thus, Hony clearly understood the importance of ensuring a stable, highly motivated management team that would work seamlessly to build value. The value-creation objective was most likely to be achieved by creating an incentive-based executive compensation scheme linked directly to company performance.

Attracting a world-class strategic investor

Zhao and his Hony colleagues recognized from the outset the imperative of attracting a highly credible international strategic partner to enhance the value of the deal, both for the operational and technological expertise it would offer and the prestige it would add at the time of the IPO. A large, financially strong strategic investor with a long-term commitment to China's glass industry also provided Hony with an attractive exit route when the timing was right.

In 2004, even before the deal closed, Hony entered into discussions with senior executives at UK-based Pilkington, at the time the world's largest flat glass producer with 23 glass plants in 11 countries. Although Pilkington had been operating in China through several joint ventures since the 1980s its senior management was convinced the company had to implement a more aggressive strategy in order to capture a larger share in the country that accounted for one third of the world market. The optimal strategy, they believed, was to acquire a major stake in one of the premier domestic manufacturers.

During the due diligence phase of the Jiangsu deal, Zhao was introduced to Gerry Gray, the senior Pilkington executive responsible for implementing the firm's China strategy. According to Gray: "I knew that no deal in China would ever be legally airtight, but if we could find a partner with whom we had a high level of trust, we could make it work. From the first meeting I had a strong sense that we could trust John, and this has served as the cornerstone of our relationship ever since."

Based on pre-close negotiations, Pilkington initially subscribed to 9.9% of the China Glass shares at the IPO offer price. Hony and Pilkington also entered into two call-option agreements whereby Pilkington would eventually have the right to acquire all of Hony's shares in China Glass. The first call option, which had to be exercised within 18 months of the IPO, gave Pilkington the right to acquire 20% of China Glass shares from Hony at a 5% premium to the IPO price.[9] The second option, which must be exercised by 2011, allows Pilkington to acquire all of Hony's remaining shares in China Glass at the 12-month average price prior to the purchase. This carefully orchestrated arrangement offered tangible benefits to both investors. Hony was seeking a strong strategic partner with a long and successful global track record and a potential exit route, while Pilkington wanted to establish a stronger foothold in China by having the option to take control of a major domestic manufacturer, thus allowing the firm to become the dominant foreign player in the domestic flat glass market.

Preparing for the IPO

In addition to creating the new incentive-based executive compensation scheme and attracting a reputable strategic investor, Hony helped China Glass in a series of major structural reforms to transform the formerly state-owned company into an attractive publicly listed company. These included:

- Board restructuring: Prior to the Hony buyout, even the company's CEO acknowledged that, like most SOEs, the board was merely a rubber stamp, providing virtually no meaningful oversight or governance of the company. Once the Hony deal was sealed, board composition, structure and functions were dramatically changed to provide the company with corporate governance standards and practices that met the international benchmarks expected by investors of publicly listed companies. For example:
  - The new board would be comprised of three senior members of management, two Hony representatives and three independent directors unrelated to the company. It was further agreed that the board composition would further change after the IPO to include two representatives from Pilkington. (See **Exhibit 4** for profiles of board members prior to the IPO.)
  - Hony CEO John Zhao became chairman of the board
  - A number of committees, including audit, compensation, and compliance committees, were created
  - Regularly scheduled board meetings were mandated at approximately one-month intervals
  - Management was instructed to provide all board members with monthly financial and operating reports, using a newly created standard format
- New accounting and audit standards: Immediate steps were also taken to establish accounting standards and practices that would fully comply with the Generally Accepted Accounting Principles (GAAP) required by Hong Kong Stock Exchange. An annual independent audit would also be performed for the first time in the company's history.
- Obtaining international certifications: Operational standards were improved and benchmarked against international standards. Prior to the IPO, the company received an ISO9001 certification for its quality assurance system and another ISO certification for its environmental management systems.

[9] This option has already been exercised in March 2007, increasing Pilkington's holding in China Glass to 29.9% at the time.

Executing the IPO

Each of the initiatives taken in the months immediately before and after Hony closed the transaction at the end of 2004 were building blocks for creating a more professionally managed, internationally competitive company. The ultimate objective of these reforms was to establish credibility with prospective investors and regulators, which would position the company to gain continuous access to diversified sources of capital and a platform to expand – a necessity for China Glass's long-term growth and competitiveness. Moreover, a successful IPO would eliminate the company's financial dependence on the State, and place it squarely in the ranks of private companies that are continuously subjected to the discipline of market forces. In other words, the future availability and cost of capital would be a function of market perceptions of company performance rather than government considerations.

As the controlling shareholder, Hony took charge of guiding the company through the entire underwriting process, selecting the investment bank and financial advisors, overseeing the preparation of the prospectus, registering the offering with the Hong Kong authorities, orchestrating and running the road show and establishing the timing and pricing of the offering. Zhou believed that "Hony's hands-on involvement at every step of the process was critical to the successful outcome of the IPO".

In June 2005, only seven months after Hony closed the buyout transaction, China Glass Holdings Ltd issued 90 million new shares on the HKSE, raising US$25 million of capital, the bulk of which was applied to meet the previously agreed strategic objective of rapidly expanding production capacity. As one measure of how far the company had come in a short period of time, the offering was eight times over-subscribed even though the IPO price represented a 12.8 P/E ratio, well above the prevailing industry average of about 8.0. Post-IPO, Hony continued to control the company, albeit with a diluted equity stake now of 62.56%; management held 12.44%, Pilkington held 9.9% and the remaining 15.1% was in the hands of the public shareholders.

Creating a market leader: executing an acquisition-led growth strategy

From the very beginning of their strategic discussions, Hony and China Glass management shared the understanding that a successful listing would be only the beginning of China Glass's fight to become China's premier flat glass manufacturer. Pre-IPO, ranked tenth in scale among domestic manufacturers, China Glass was in a tenuous position facing the inevitable onslaught of industry consolidation. "Either we will be acquired by one of our larger competitors, or we would become an acquirer," explained Zhou. Post-IPO, armed with the international brand recognition and the permanent source of diversified capital afforded by the listing, China Glass was ready to be the latter.

In February 2006, only eight months after China Glass's HKSE listing, the company announced its intention to undertake a major acquisition on an unprecedented scale in the history of the Chinese glass industry. The transaction involved the acquisition of seven glass manufacturers with a combined daily capacity of 4,780 tons, more than three times China Glass's own capacity. The expansion took the company from three production lines to 14, making it China's largest listed flat glass producer. With one stroke, not only did this acquisition extend China Glass's footprint to all the economically important regions of the country, but it also resulted in a significantly more diversified and technically advanced product portfolio, containing varieties such as low-e glass, super-thin glass, silicon glass and solar glass.

Hony led China Glass through every stage of the transaction, serving as both the strategic mastermind and the execution specialist. The Hony team played a critical role in selecting the acquisition targets, designing a feasible financing strategy, mobilizing the required capital and guiding the company through a web of technical complexities. When the entire transaction was finally completely in mid-2007, China Glass had established itself as the leading Chinese glass manufacturer. When asked about Hony's role in the acquisition strategy, Zhou said without hesitation: "Without Hony, we could never have dreamed of taking China Glass where it is today." (See **Exhibit 5** and **Exhibit 6** for a summary of recent acquisitions by China Glass, and the company's post-acquisition capacity and product portfolio information respectively.)

Expanding access to international capital markets

In July 2007, two years after the IPO, a much larger and completely restructured China Glass again demonstrated its ability to access capital from international sources on competitive terms. Returning to the public securities market, the company successfully issued a US$100 million ($95.8 million net after fees and commissions), five-year, 9.625% US-dollar denominated note in Singapore. The bulk of the proceeds from this bond issue were used to strengthen the company's balance sheet by refinancing and extending the maturities of existing debt obligations. Hony was again instrumental in marketing and placing this offering.

Employment practices

Through the years, Hony never wavered from one of the fundamental tenets of its investment philosophy: buyout success in China depends on the retention of key management personnel. Zhao explained: "We will only make an investment when we are convinced there is a complete alignment of interests with senior management about what needs to be done post-investment to grow the company. Consistent with this approach is our conviction that we will not do a deal that requires a change of management." In the China Glass case, as of mid-2007 there had been no management turnover, no abnormal layoffs associated with the buyout and employee wages and benefits had been structured to ensure competitiveness with industry standards.

RESULTS

In the three years following the Hony buyout, China Glass became the country's largest publicly listed flat glass manufacturer in terms of production and sales, the largest flat glass exporter by volume with more than 300 customers in 80 countries, and the most technologically advanced flat glass manufacturer. (**Exhibit 7** highlights the company's financial performance during this period of time.) The company's stock price more than doubled since its debut on the Hong Kong Stock Exchange and has outperformed the Hang Seng Index, especially after the completion of the acquisitions in spring 2007. (See **Exhibit 8** for China Glass's stock performance chart.)

With China Glass now well positioned for further growth, Hony has begun to cede much of its hands-on involvement. Zhao stepped down as chairman of the board in September 2007 and preparations were underway for orderly changes in senior management. Zhou voluntarily vacated his CEO post, but remained active in his new role as chairman of the board. His replacement as CEO previously occupied the same position with Weihai Blue Star Group, one of the largest glass manufacturers acquired by China Glass. Zhou candidly explained why he was willing to move "upstairs" and relinquish the CEO position: "The company has grown much larger now and needs more professional management. After all, I was not an expert in the glass business when I first became CEO of Jiangsu Glass almost 10 years ago. The new CEO has spent his entire career in the glass industry and has more expertise than I do, so this is the right thing to do in the interests of China Glass's next stage of growth."

CONCLUSIONS

In 2003, Zhou Cheng clearly had recognized that the company's future hinged upon a choice between two starkly different strategic options: "We could not survive as structured. Either we would be acquired by one of our larger competitors or we needed to become an acquirer, which would take additional capital." His personal preference was clear, but without the right financial and strategic partners, there was no hope of transforming the company into an acquirer. Then, he was introduced to Hony Capital, a private equity fund with the financial resources, the expertise and the shared vision of how to transform Jiangsu Glass into a market leader.

At the same time, John Zhao saw in Jiangsu Glass a company that met the investment criteria for his new fund. Hony Capital was a company builder, according to Zhao, not simply a financial engineer. He liked and respected the CEO, he was bullish about the flat glass industry, he fully understood the government's new privatization priorities and he had the foresight to clearly envision what Jiangsu Glass could become once Hony was in control.

Together, these two CEOs and their respective teams demonstrated the potential for value-creation when interests are aligned and a productive collaboration between acquirer and acquired ensues. In short order the state-owned Jiangsu Glass became Hong Kong-listed China Glass and rapidly underwent a dramatic transition from China's tenth largest flat glass manufacturer to the leading producer with the most efficient operations and the largest market share.

As of this writing, Hony Capital's ultimate financial return on the China Glass investment remains unknown as it has not completely exited its equity ownership. However, as of 31 October 2007, the investment was valued at 5.75 times Hony's invested capital, and partial exits had already returned 1.26 times the invested capital to the fund. Even though its equity stake has been gradually diluted to 32.8%,[10] Hony remained China Glass's largest shareholder and, provided that China Glass continues its strong recent performance, the private equity group is poised to realize substantial gains before 2011 when it divests its remaining shares to Pilkington.

Beyond the expected financial returns, however, Zhao and his team are proud of their role as company builders and are content to delay their exit until they are confident the company is on a sound footing. Although this degree of patience may seem at odds with the stereotype of buyout titans in the US and Europe, Zhao fully understands and appreciates the environment he works in and wants to ensure China Glass has an opportunity to consolidate the gains made since the IPO.

"We must do this business the China way," Zhao explains, "and we must not impose Western standards on China." Even the most seasoned Western investors are confounded by "the China way", but Hony Capital's approach with China Glass demonstrates that there is more than one path to success in the buyout industry. With four years of private equity experience under his belt, Zhao understands what he must do to succeed in China: "I've given up trying to be loved as a PE investor in China. But if I successfully execute value-creation in an honest way, I can be respected." Judging by Hony's success in raising Fund II ($87 million) and III ($580 million), apparently this approach has resonated with some of the world's most sophisticated international investors. Even if they do not fully grasp "the China way", their confidence in Hony's unique buyout approach is validated by their capital commitment.

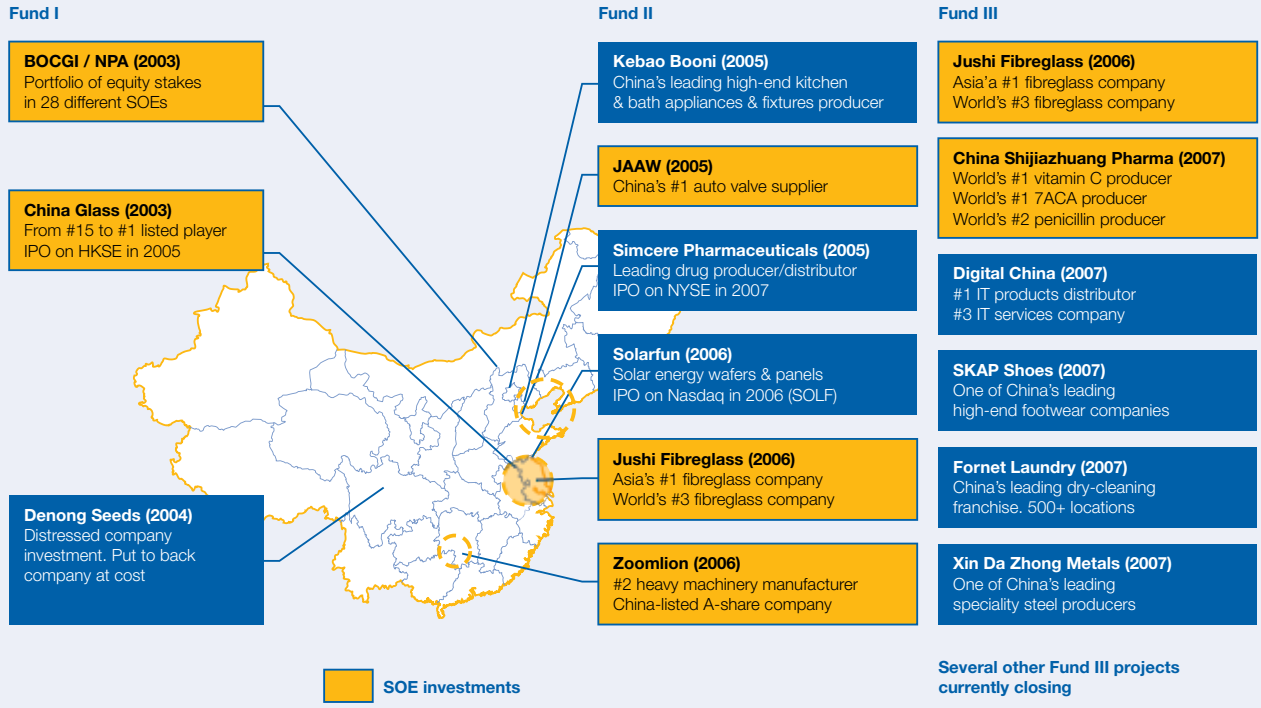
[10] As of 31 October 2007, China Glass's shareholding structure is as follows: Hony Capital holds 32.8%; Pilkington holds 29.9%; Management holds 9.56%; The International Finance Corporation (IFC) holds 8.1%; other shareholders hold the remaining 19.64%.

Exhibit 1A: Summary of Hony Capital funds (as of 31 October 2007)

Fund	Year formed	Amount raised	$ deployed	Total value	Return
I	2003	$38 million	$37.1 million	$159.1 million	4.29x
II	2004	$87 million	$70.5 million	$533.8 million	7.57x
III	2006	$580 million	$273.3 million	NA	NA

Exhibit 1B: Hony Capital portfolio companies (as of 31 October 2007)

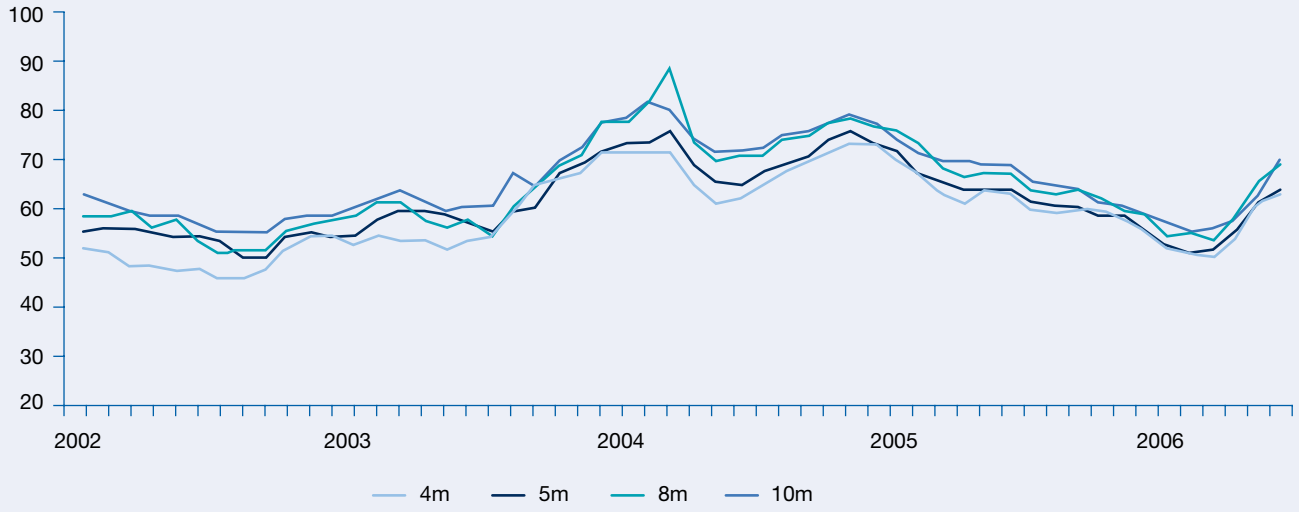
Investment Portfolio



Source: Hony Capital documents.

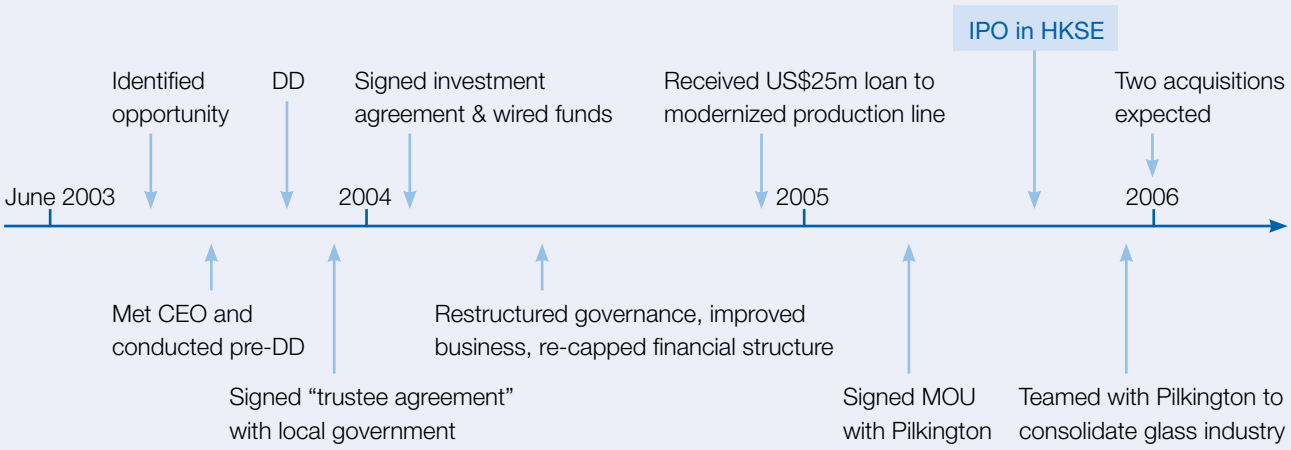
Exhibit 2: An illustration of glass industry cyclicality

Prices have started to recover since early 2006 due to slowdown in growth of additional capacities



Source: Company documents.

Exhibit 3: Time line of the Hony-China Glass transaction



Source: Company documents.

Exhibit 4: Members of the China Glass board of directors (as of June 2005, prior to IPO)

Executive Directors

Mr Zhou Cheng, aged 48, is an executive director of our company and our Chief Executive Officer. Mr Zhou is a senior engineer. He graduated from Nanjing Institute of Chemical Engineering in 1980, majoring in inorganic chemistry. Mr Zhou joined the Group in January 1997 and has previously served as head of Jiangsu Glass Factory and chairman and general manager of Jiangsu Glass Group. He has 25 years of experience in the inorganic chemical industry, the building materials industry and enterprise administration and management.

Mr Li Ping, aged 44, is an executive director and senior vice president of our company and Chairman of the board of Su Hua Da. He graduated in 1982 from Zhejiang University, majoring in materials, with a Bachelor's in Engineering and a Master's in Business Administration. He is a BA senior engineer at postgraduate level. Mr Li joined the Group in February 1982 and has formerly worked as deputy head of Jiangsu Glass Factory, deputy general manager and general manager of Jiangsu Glass Group. He has 23 years of experience in the building materials industry and enterprise management.

Mr Lu Guo, aged 42, is an executive director and vice president of our company, a director and general manager of Su Hua Da. Mr Lu is a senior engineer. He graduated in 1984 with a Bachelor's degree from Wuhan Institute of Building Material, majoring in glass. Mr Lu joined the Group in August 1984 and has worked as head of a branch factory of Jiangsu Glass Factory, assistant to the general manager and deputy general manager of Jiangsu Glass Group. He has over 20 years of experience in the PRC glass industry.

Non-Executive Directors

Mr Liu Jinduo, aged 66, is a non-executive director of our company. Mr Liu has extensive experience in enterprise management. Before retiring in 2001 he served as vice president of Legend Holdings Limited. He is currently also a director of Easylead Management Limited and was appointed as a Director of our Company in January 2005.

Mr Zhao John Huan, aged 42, is a non-executive director of our company and the Chairman of our board of directors. Mr Zhao graduated from Nanjing University with a Bachelor's degree and from Northwestern University in the US with a Master's degree. Mr Zhao has extensive experience in senior management positions at several US and PRC companies. Mr Zhao is currently a vice president of Legend Holdings Limited and was appointed as a Director of our Company in January 2005.

Independent Directors

Mr Song Jun, aged 44, is an independent non-executive director of our company. Mr Song graduated from Tsinghua University in 1990 with a PhD in Physics. Mr Song has served as a senior manager in numerous affiliated companies of Tsinghua University and has extensive experience in management and operations. Mr Song is currently also the deputy secretary of Tsinghua University as well as the chief executive officer of Tsinghua Holdings Company Limited and was appointed as a Director of our Company in January 2005.

Mr Zhang Baiheng, aged 44, is an independent non-executive director of our Company. He was an officer of the China Air Force. Mr Zhang has extensive experience in the building material industry, and he currently serves as the general secretary of the China Architectural and Industrial Glass Association and was appointed as a Director of our Company in January 2005.

Mr Wong Wai Ming, aged 47, an independent non-executive director of our company, is the former chief executive officer of Sing Tao News Corporation Limited, a listed company in Hong Kong principally engaged in media ownership and services, human capital management and broadband content and distribution. Mr. Wong is a chartered accountant and holds a Bachelor's in Science from the University of Manchester, Institute of Science and Technology in the UK. Mr Wong is also an independent non-executive director of Lenovo Group Limited and Linmark Group Limited; both companies are listed on the Main Board of the Stock Exchange. He was appointed as a Director of our Company in January 2005.

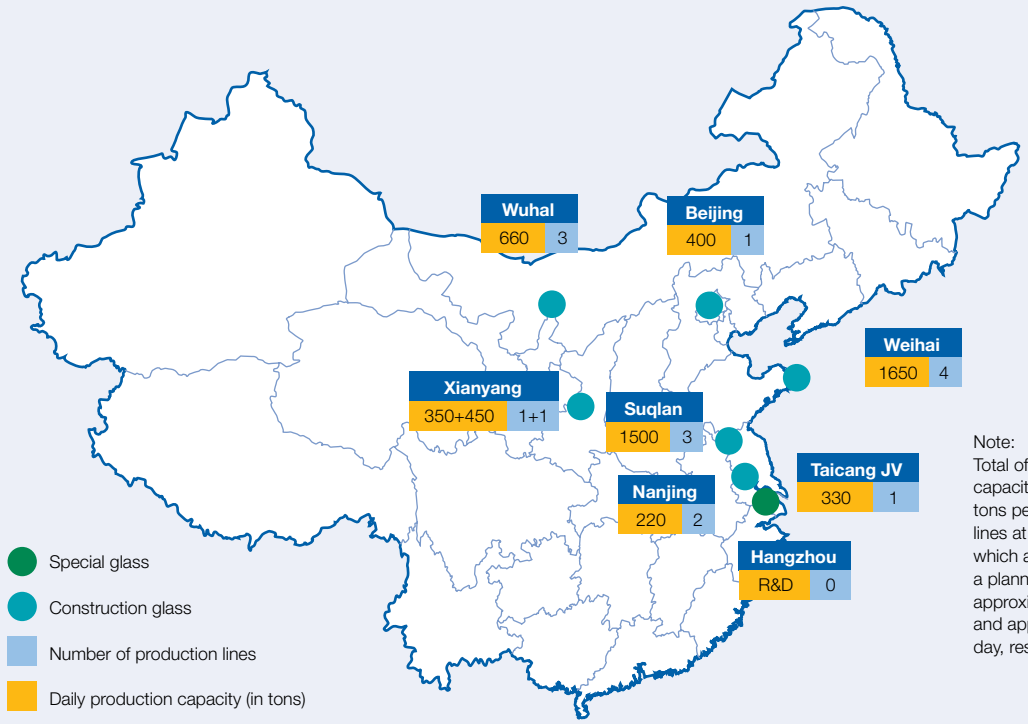
Source: China Glass IPO prospectus, 13 June 2005.

Exhibit 5: Summary of acquisitions by China Glass, 2006-2007

Acquisition target	Date of completion	Target geography	Target description	Capabilities acquired
		Phase I		
Shaanxi Blue Star Co. Ltd	1-Oct-06	Shaanxi Province, Northern China	Shaanxi Blue Star is primarily engaged in the production and sale of glass and glass products as well as research and development of glass technology. It has one production line with a melting capacity of approximately 350 tons per day.	Additional capacity
Beijing Qinchang Glass Co. Ltd	22-Nov-06	Beijing	Beijing Qinchang is primarily engaged in the manufacturing and sale of glass products. It has one production line with a melting capacity of approximately 400 tons per day.	Additional capacity
		Phase II		
Weihai Blue Star Glass Co. Ltd	28-Feb-07	Weihai, Shangdong Province, East Coast of China	Weihai Blue Star is principally engaged in the production and sale of glass products and development of glass industry technology. Weihai Blue Star has three production lines and a total melting capacity of approximately 1,200 tons per day.	Additional capacity and technology
Weihai Blue Star Technology Industrial Park	28-Feb-07	Weihai, Shangdong Province, East Coast of China	Weihai Tech Park is primarily engaged in the production and sale of glass and glass products. It has one production line of float glass, one production line of sheet glass and one production line of rolled glass, with a melting capacity of approximately 450 tons per day, approximately 160 tons per day and approximately 60 tons per day, respectively.	Additional capacity
Wuhai Blue Star Glass Group	28-Feb-07	Inner Mongolia, Northern China	Wuhai Blue Star is primarily engaged in the manufacturing, marketing and distribution of glass and glass products. Wuhai Blue Star has three production lines with a melting capacity of approximately 60, 250 and 350 tons per day, respectively.	Additional capacity
Hangzhou Blue Star New Materials Technology Co. Ltd	7-Mar-07	Hang Zhou, Zhe Jiang Province, East Coast of China	Hangzhou Blue Star is primarily engaged in the research and development of glass production technology. As of 31 May 2007, Hangzhou Blue Star (formerly known as Zhejiang University Blue Star New Materials Technology Co. Ltd.) owned seven PRC registered patents and two PRC registered patents pending.	Technology: various patents
Zhongbo Technology Co. Ltd	8-Mar-07	Weihai, Shangdong Province, East Coast of China	Zhongbo Technology is primarily engaged in the production and sale of glass products, including low-emission online coating glass. Zhongbo Technology has one production line with a melting capacity of approximately 450 tons per day.	Technology – Low-e glass and extra-thin glass

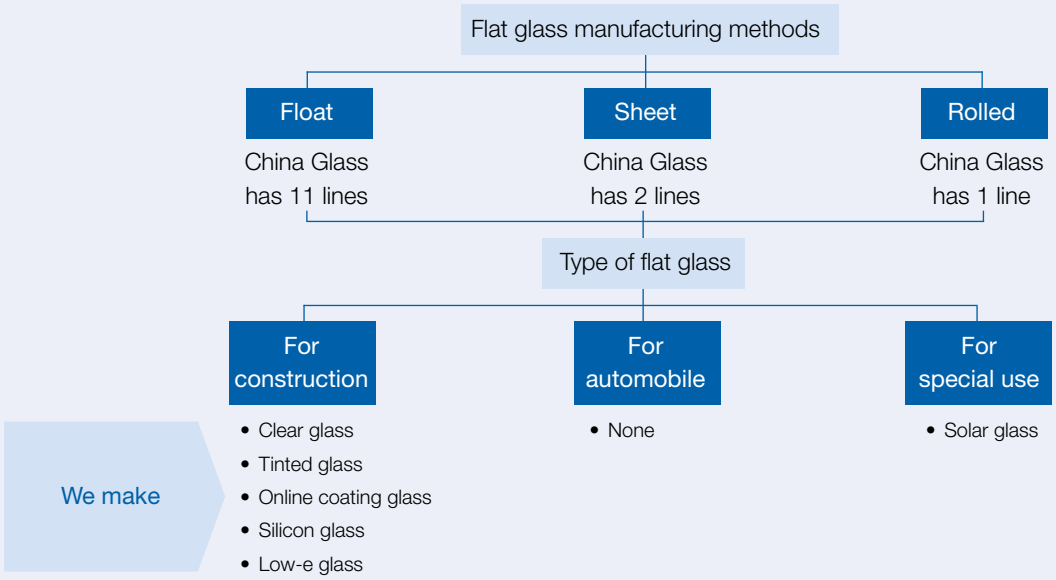
Source: Authors compilation from China Glass filings.

Exhibit 6A: China Glass post-acquisition manufacturing capacity



Note:
Total of 14 lines with production capacity of approximately 4,780 tons per day, plus two additional lines at Xianyang and Taicang, which are under construction, with a planned production capacity of approximately 450 tons per day and approximately 330 tons per day, respectively.

Exhibit 6B: China Glass post-acquisition product portfolio



Source: Company documents.

Exhibit 7A: Income statement, 2004-2007

Resilience – Profitable in an industry downturn
Summary Income Statement

	Year ended 31-Dec-04	Year ended 31-Dec-05	Year ended 31-Dec-06	3 months ended 31-Mar-06	3 months ended 31-Mar-07	
1USD = 7.66RMB	(RMB'000)	(RMB'000)	(RMB'000)	(RMB'000)	(RMB'000)	(USD'000)
Turnover	429,738	386,494	573,136	106,760	308,624	40,290
Gross profit	126,269	61,575	55,307	(12,017)	40,181	5,246
EBITDA	121,516	54,557	49,464	(11,290)	35,543	4,640
Interest expense	(5,524)	(7,739)	(15,538)	(3,427)	(11,709)	(1,529)
Net profit before MI	76,709	16,102	14,605	(21,984)	32,168	4,199
Net profit after MI	64,816	16,103	5,623	(21,515)	43,493	5,678

Exhibit 7B: Balance sheet information, 2004-2007

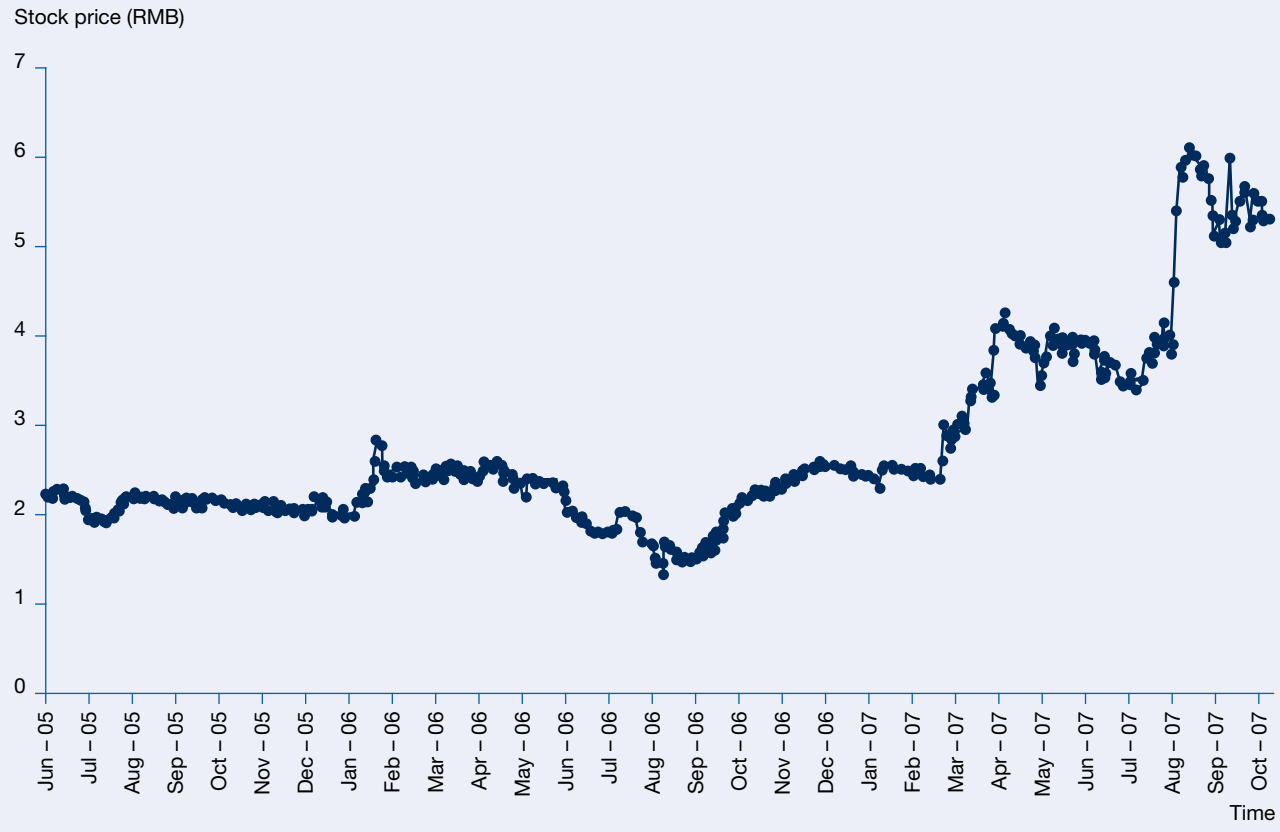
Summary Balance Sheet

	Year ended 31-Dec-04	Year ended 31-Dec-05	Year ended 31-Dec-06	3 months ended 31-Mar-07	
1USD = 7.66RMB	(RMB'000)	(RMB'000)	(RMB'000)	(RMB'000)	(USD'000)
Cash and cash equivalents	106,453	113,585	67,275	288,975	37,725
Trade and other receivables	16,547	26,368	214,217	491,924	64,220
Inventories	42,945	57,186	91,869	369,505	48,238
Property, plant and equipment	256,793	494,680	843,687	1,861,582	243,026
Total assets	436,851	764,272	1,361,234	3,524,671	460,140
Total debt	166,000	152,189	455,367	1,046,572	136,628
Trade and other payables	120,392	164,236	330,915	1,298,484	169,515
Total liabilities	288,268	366,209	838,510	2,542,592	331,931
Total net worth minus goodwill	148,583	383,950	508,611	967,966	126,366
Tangible net worth	148,583	370,561	384,203	450,552	58,819
Total liabilities/ Total net worth less goodwill	1.94	0.95	1.65	2.63	–
Total debt/EBITDA	1.37	2.79	9.21	7.36	–
Net adjusted total debt/EBITDA	0.49	0.71	7.85	5.33	–
Quick ratio	0.73	0.44	0.47	0.36	–

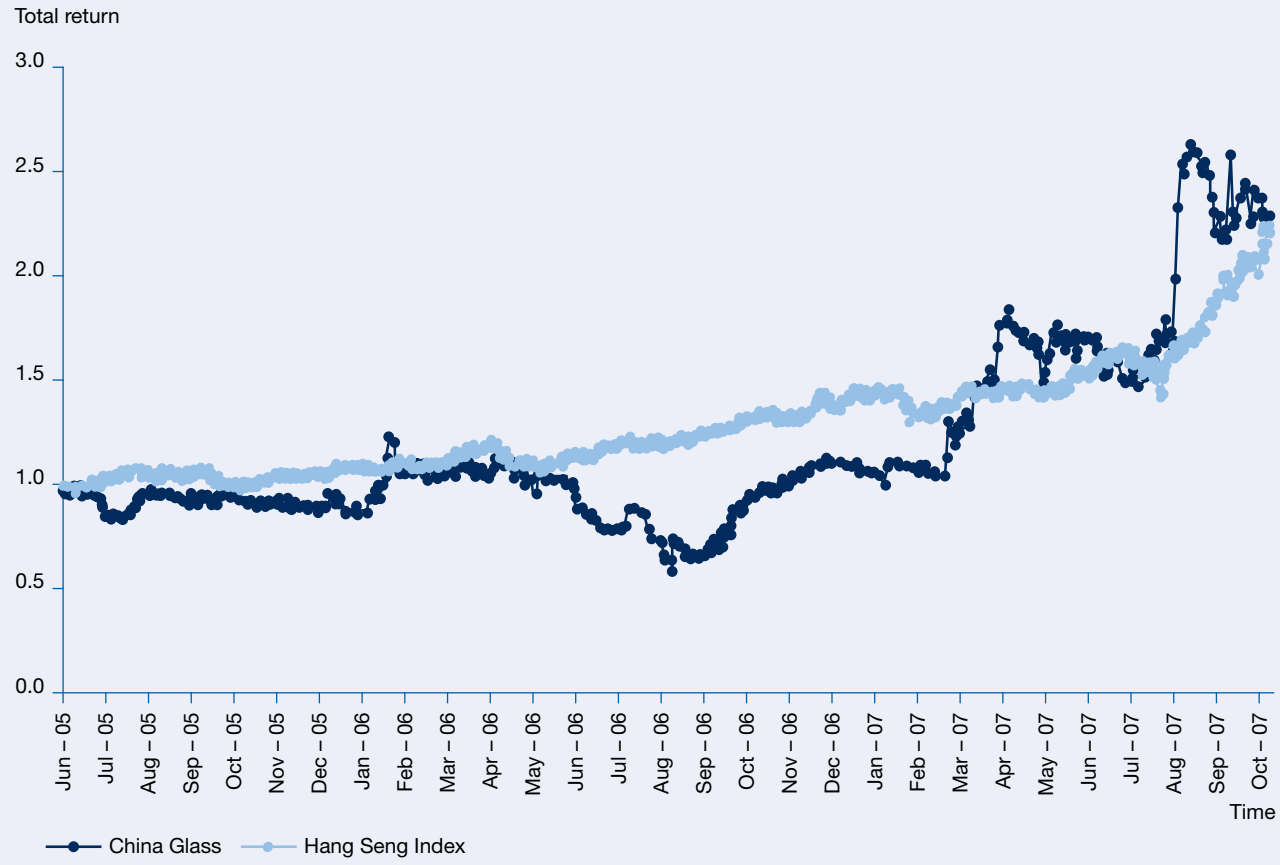
Source: Company documents.

Exhibit 8: China Glass stock price performance

China Glass stock price



China Glass share price performance (indexed Jun-05 = 1.0)



Source: Return data obtained from Yahoo finance, October 2007.

3i Group plc and Little Sheep*

LILY FANG
INSEAD

ROGER LEEDS
School of Advanced International Studies, Johns Hopkins University

"Many people grow a company like raising a pig. The pig gets fat, you kill it and make money. I grow my company like raising a son. The average life of a restaurant is less than three years in China. I want Little Sheep to last a century."
– Zhang Gang, Founder, Little Sheep Catering Chain Co.

"Helping a great business to realize its potential takes a lot more than just capital. It is ultimately about the people, thus your relationship with the management team and the sort of support you can provide, such as introductions to key industry expertise and relevant operational best practice, is very important." – Anna Cheung, 3i Partner, China

EXECUTIVE SUMMARY

In 2004, a large, well-established global private equity firm invested in a rapidly growing Chinese restaurant chain that originated in Inner Mongolia, one of the country's most remote regions. This case describes how and why an unlikely yet productive relationship was forged between these two firms, and the result of their collaboration. 3i, a highly respected global private equity firm with a 60-year track record, first established an Asian presence in Hong Kong in 2001. Three years later, a rapidly growing restaurant chain called "Little Sheep" came to the firm's attention. Due to its meteoric growth and national brand name recognition, Little Sheep was very attractive to some prestigious international investors, who made offers of financing. The founder, however, favoured 3i over other prospective investors due to a strong belief that, in addition to its financing capability, the firm had the expertise and commitment to add value on a number of fronts that would strengthen the overall competitiveness and profitability of his growing company.

This story of 3i's value-creating contribution to Little Sheep is consistent with much of the private equity reality in China today. As one of the most sought-after destinations for capital in the world, there is no scarcity of domestic or foreign investment capital for high-growth private companies, especially those run by the new generation of talented entrepreneurs. As this case demonstrates, the truly scarce resource for many private firms striving to grow their businesses in an increasingly competitive market is industry and management expertise that will help entrepreneurs make the transition to professional business practices, in areas such as marketing strategy, operational efficiency and corporate governance standards. The relationship that evolved between 3i and Little Sheep is emblematic of value created by an experienced private equity investor with deep industry expertise and a Chinese entrepreneur who was able to first recognize and then capitalize on the value-enhancement services offered by an investor whose interests were closely aligned with his own.

3i GROUP PLC

3i Group plc is one of the oldest private equity firms in the world, with a track record dating back to 1945 when the British government and a consortium of banks founded two organizations – the Industrial and Commercial Finance Corporation (ICFC) and the Finance Corporation for Industry (FCI) – to bridge the financing gap afflicting small and medium-sized enterprises (SMEs) in the aftermath of the Second World War.[1] In 1975, these two corporations merged, and in 1983 the combined entity was re-named 3i – "investors in industry". In 1994, 3i was listed on the London Stock Exchange, becoming the first large private equity fund to go public and have access to permanent capital. 3i invests in a wide variety of businesses through its five lines: buyouts, growth capital, venture capital, infrastructure and quoted private equity.[2] (See **Exhibit 1** for a summary of 3i's business lines for fiscal year 2007.)

Expanding its geographic footprint beyond the UK and Europe, 3i today has offices in 14 countries across Europe, Asia and the US, and has made investments in more than 30 countries. The firm opened its first Asia office in Singapore in 1997, followed by a second office in Hong Kong four years later, and offices in Shanghai, Mumbai and Beijing subsequently. During fiscal year 2006, 16% of the group's new investments were in Asia. Alongside the geographic shift, 3i's investment strategy has also evolved, with an emphasis on making fewer, larger, and more sector-focused investments. In Asia, the group's average investment size has been about $40-50 million, and sectors in focus included consumer-related goods and services, healthcare, and energy.

These changes in investment strategy were consistent with a decision to become more actively involved in its portfolio companies, returning to the firm's original modus operandi as an "investor in industry". To better serve its portfolio companies, 3i developed two unique programmes: People Programmes and Business Development Practice. *People Programmes* is a highly sophisticated approach to cultivating relationships internationally with seasoned

* The authors express their appreciation for the research and editing support provided by Brian DeLacey.

[1] The perceived funding gap – the "Macmillan gap" – was scrutinized back in 1929 in a report by a committee under the chairmanship of Lord Macmillan. The founding of ICFC, predecessor of 3i, was closely linked to one suggestion in the Macmillan Report.
[2] 3i's growth capital and venture capital investments are made from its balance sheet, while the group invests in buyouts through its €5.0bn Eurofund V. During 2007, both the infrastructure and quoted private equity business lines raised new funds that are listed on the London Stock Exchange.

executives and industry experts whom 3i regularly calls upon to assist the deal team at various stages of the investment process, from due diligence to post-investment operational support. While many private equity groups rely upon industry experts, 3i's *People Programmes* is unique in its scale and 20-year history of building an enviable rolodex. Chris Rowlands, 3i's managing director for Asia explained: "At 3i, this is not a nice-to-have, or an afterthought. This is at the heart of our investment model."

The second distinctive 3i programme, the *Business Development Practice*, is a dedicated resource to help 3i's portfolio companies expand their operations internationally. Initially this grew out of a demand from European firms wanting to gain entry to Asia, but the team is increasingly working with Asian firms seeking to tap into the European and US markets and Rowlands believes it "is not only a service for our portfolio companies, but we believe it directly increases our investment value as well".

INNER MONGOLIA LITTLE SHEEP CATERING CHAIN CO. LTD

Entrepreneurial beginnings

In 1999, an entrepreneur called Zhang Gang founded Little Sheep Catering Chain Co. in Inner Mongolia, one of the most remote and underdeveloped corners of the world. One of the five so-called autonomous regions in China, Inner Mongolia's economy was primarily agrarian and until the 1990s had ranked among the country's poorest regions. But this began to change dramatically with the economic reform programmes initiated by Deng Xiao Ping in the 1980s. The combination of a reform-minded regional government and rich natural resources provided strong impetus for Inner Mongolia's economic growth. By 2006, Inner Mongolia had been transformed into one of the country's wealthiest regions in terms of GDP per capita.[3]

Although Zhang (ethnic Han Chinese) had no formal business education, he was an opportunistic and intuitive businessman long before he founded Little Sheep. A short stint as a factory worker in Baotou Steel Factory at an early age led Zhang to conclude that a career as a worker in a state-owned factory would be "very repressive". He then ventured into clothes retailing while still a teenager and, by the early 1990s, had accumulated enough capital to enter the cell phone business, eventually rising to become the sole distributor of cell phone equipment in Inner Mongolia.

Zhang initially thought about entering the food business as a hobby. He focused on a popular dish in Northern China called "hot pot" – a pot of boiling soup that sits atop a small, table-top stove to which diners add thinly sliced meat and vegetables. Traditionally, the cooked food is then dipped in flavoured sauces. Zhang wanted to improve the soup base so that there would be no need to dip the cooked food in sauces – he wanted to create a healthier and more naturally flavoured hot pot. After many trials and tastings, he finally settled on a unique recipe containing over 60 spices and herbs. Only then did he begin thinking about it as a business. "It made sense – I always wanted to have a basic business, selling something simple that people wanted," he recalled.

Zhang named his venture Little Sheep because locally raised lamb is a staple in the Mongolian diet, and thinly sliced lamb would be the specialty in his new restaurant. He opened the first Little Sheep restaurant in Baotou, a large city in Inner Mongolia on 8 August 1999, and it was an instant success. By the second day, long lines of customers queued up outside the restaurant, an unprecedented phenomenon in a city where people were unaccustomed to waiting in line for supper. Based on this early success, Zhang managed to open two additional restaurants in Baotou within two months, with an equally enthusiastic customer response.

The trademark battle

As Zhang witnessed the surprising popularity of Little Sheep, his business intuition immediately took over. Once word spread about the phenomenal early success of the restaurants, he knew others would try to replicate his business model and even use the Little Sheep name, undermining the brand value. As early as October 1999, just as he was opening his second and third restaurants, Zhang submitted his first application for a trademark to the National Trademark Office, the official government agency in charge of intellectual property matters. This proved to be the start of a battle that would drag on for nearly seven years, until Little Sheep was finally awarded trademark protection in June 2006. Ironically, it took Little Sheep longer to be granted trademark protection in China than in several overseas markets. Reflecting on this drawn-out experience with the government authorities, Zhang lamented that this was his "single biggest headache" during the entire history of the firm. Not only would this experience have an unexpected impact on Little Sheep's growth strategy, it also would sow the seeds in Zhang's mind to bring Little Sheep to the public market.

Rapid growth and strategic re-orientation

The extraordinary success of the first three restaurants spurred Zhang to expand with lightening speed throughout the country. By the end of 2002, just over three years after opening the doors to his first restaurant in Baotou, the company had established a nationwide chain of more than 500 restaurants. Ironically, the lack of trademark protection was as much a driver of rapid expansion as the founder's ambition and entrepreneurial talent. "I didn't have the luxury to wait. I had to move fast to grab market. Otherwise, anyone could start a Little Sheep and we had no legal recourse to fight back," Zhang explained.

But this success came at a high cost and by the end of 2002 the company was suffering from serious growing pains. While the rapid expansion had been primarily driven

[3] In 2006, Inner Mogolia's GDP per capital ranked number 10 among Chinese regions, behind only nine wealthy coastal provinces. GDP per capital ranking data from wikipedia.com., November 2007.

by an aggressive franchise strategy, the company's thin management ranks resulted in very weak oversight of the franchisees. The problems were aggravated when media reports began to appear claiming substandard quality and service in certain Little Sheep franchise stores, inevitably damaging the brand.

At the end of 2002, Zhang faced a critical decision: should the company curtail growth and scale back the franchises until his management team could be strengthened, even though this would result in the immediate loss of substantial franchise fees? Moreover, he would risk alienating a growing roster of franchise applicants who were waiting to capitalize on the brand and open Little Sheep restaurants. Resisting the temptation to maximize short-term profit, Zhang decided to temporarily halt the awarding of new franchises in the following year. In addition, he initiated efforts to more closely monitor the performance of the existing franchises, and designated one of his long-time lieutenants, Zhang Zhan Hai, to be in charge of the task.

3i'S INVESTMENT IN LITTLE SHEEP

Management's goal

Gradually, Zhang's decision to scale back the expansion began to pay off. In 2004 the company strengthened its management ranks significantly by hiring as senior vice president of finance, industry veteran Lu Wenbing, former vice president of Meng Niu (Mongolian Cow), a well-known Inner Mongolia-based dairy company. Lu brought much needed financial discipline and internal control to the company and by 2005 Little Sheep's performance had clearly rebounded as the company collected a number of prestigious regional and national business awards, including the Little Sheep brand being ranked 95th by the World Brand Lab among "The 500 Most Valuable Chinese Brands". According to Ministry of Commerce statistics, the company had the second largest market share among China's restaurants chains, behind only the fast-food giant KFC. (See **Exhibit 2** for a major-events time line in Little Sheep's corporate history up the 3i investment and **Exhibit 3** for the company's footprint in China at the end of 2005, just before the 3i investment.)

Notwithstanding this renewed success, Zhang recognized that sustaining the company's growth would require not only financial resources but, more importantly, additional industry expertise. Like many Chinese entrepreneurs, Zhang came to believe that the ultimate validation for Little Sheep's success would be a public listing, preferably on an overseas exchange.[4] This would give the company a diversified source of capital as well as brand recognition, and subject it to market discipline. His preference for an overseas listing was rooted in his concern about the lax listing standards on the domestic Chinese exchanges; he preferred instead an international certification. But to prepare for an IPO, he believed that the company needed to attract not only additional capital, but a partner with the capability to provide much needed industry knowledge and expertise. "What we lacked were high-level professionals from the food and beverage industry who could help take Little Sheep to the next, higher level... We needed a partner that could help us prepare for an IPO outside China", explained Zhang.

Origin of the deal

Little Sheep's extraordinary growth and brand name recognition attracted many willing investors, including such prestigious investment banks as Morgan Stanley and Goldman Sachs. At 3i, Little Sheep was spotted by an associate director, Daizong Wang, a Wharton MBA who had recently joined the group after a four-year stint with Goldman Sachs in Hong Kong. As 3i's investment strategy in Asia was becoming more sector-focused, Wang was assigned to study the food and beverage sector, which had been growing at a rate twice as fast as China's GDP for over 15 years. As the Chinese economy began to shift towards more consumption-led growth, Wang believed that consumer-related sectors such as restaurants would offer tremendous upside. (See **Exhibit 4** for some growth statistics of the Chinese restaurant sector.)

Wang also noticed that even though the sector was experiencing rapid growth, prior to 2005 there had been no private equity investments due to the lack of scale in typical restaurant businesses. Unfazed, he began to analyse the market share rankings of restaurant chains in China to screen for investment targets. Little Sheep ranked second, occupying 6.2% of the entire restaurant and catering market, behind KFC.[5] Intrigued by Little Sheep's ability to achieve scale unlike most other restaurants, Wang realized that the key was the simplicity of Little Sheep's business model: "The Chinese restaurant business is fragmented because it is difficult to standardize. In most restaurants the largest cost component is the chef, but it is difficult to achieve consistency. Little Sheep is different because customers cook their own food in the hot pot, which eliminates the need for a chef. This do-it-yourself style of dining and the ease of standardization made this business capable of scale." In fact, these characteristics made hot pot restaurants a significant sub-sector of the total restaurant industry, accounting for more than 20% of all consumer spending on restaurants, with Little Sheep the clear market leader with one third of total hot pot revenue. (See **Exhibit 5** for statistics on the hot pot sub-sector.) Based on this analysis, Daizong Wang concluded, "From the very beginning, I wanted to invest in this business."

His next step, in August 2005, was to cold call Little Sheep's senior vice president of finance, Lu Wen Bing. After making his pitch to Lu, whom Wang found "surprisingly open-minded [about private equity]", he was invited to a formal meeting in Baotou, Little Sheep's headquarters. Reflecting on the initial exchange, Wang said: "At a time when few in China understood the difference between private equity and

[4] At the time, the Chinese A-share market was also closed for new public listings.
[5] According to Euromonitor, Little Sheep has a higher, 9.9% market share among China's full-service restaurant chains, excluding fast food.

investment banking, Lu was very sophisticated and ahead of the curve." It turned out that earlier in his career, Lu had worked on the senior management team of Meng Niu when it received a widely publicized investment from Morgan Stanley and CDH, a well-known Chinese private equity fund. Based on this previous experience, he was predisposed to working with a private equity investor.

Winning the mandate

After the initial meeting in August, 3i engaged in a four-month competition with other private equity suitors, including Goldman Sachs and Morgan Stanley, before finally being awarded the Little Sheep mandate. During this period, Anna Cheung, a 3i partner based in Hong Kong, was assigned as the senior member on the team working with Wang to secure the mandate. The investment team flew to Baotou frequently, getting to know Little Sheep's senior management team, and explaining 3i's investment philosophy. At the same time, they spoke with a number of research analysts covering the Hong Kong and Chinese restaurant sector to learn more about the sector, and shared their findings with Little Sheep senior management. The team also tapped into 3i's network of industry experts – the *People Programmes* – and identified Nish Kankiwala, former president of Burger King International, as a suitable advisor for Little Sheep. As the top executive at one of the world's largest fast food restaurant chains, Kankiwala would bring a wealth of sorely needed knowledge about the franchise business. At the request of the 3i team, Kankiwala flew to Beijing and spent a number of days meeting with Little Sheep's entire senior management team, learning the ups and downs of the company's performance and discussing the relevance of his own experience to Little Sheep's future strategy. This was the first time that Little Sheep management had direct access to a world-class expert with a deep understanding of their business and they were impressed by 3i's commitment and ready access to this calibre of expertise.

But the spectre of Goldman Sachs continued to lurk in the background. Wang heard that his former Goldman colleagues were visiting Little Sheep in Baotou in late 2005, so he immediately flew there and was "prepared to sit there until we signed the term sheet". His persistence paid off and four months after Wang's August cold call, 3i signed a term sheet with Little Sheep, agreeing to a $25 million equity investment for a minority stake in the company. (Prax Capital, a private equity fund focused on Chinese investments, invested $5 million as a co-investor.) The transaction closed six months later, in June 2006, and 3i's real value-add to the company began to take shape.

POST-INVESTMENT VALUE-CREATION

Forming a strategic blueprint

During the six-month period between the signing of the mandate in late 2005 and the final closing in June 2006, 3i worked closely with Little Sheep management to clarify a number of strategic questions that the company needed to address, and an agreement was reached to engage Roland Berger, a strategic consulting company, to provide fact-based analysis as a basis for resolving some of the most pressing issues.

Based on extensive data collection and analysis, the consultants made a number of specific recommendations, such as optimal store size and location in different sub-markets,[6] and how the company should overhaul its existing franchises (as described in the next section). These findings and recommendations became the basis of a blueprint that outlined a step-by-step effort to professionalize and improve the company's operations. When the analysis and recommendations were presented to the Little Sheep board, the response was highly favourable.

Mapping strategy to operations: the 180-day plan

Aided by the strategic insights gained from the Roland Berger report, 3i's Wang drafted a "180-day plan", a detailed work plan of tasks that the company needed to address in the following six months, including specific financial, legal, operational and HR issues. (See **Exhibit 6** for an excerpt from Little Sheep's 180-day plan.) After discussing the plan with the management and obtaining their full commitment to executing it, it was then continuously tracked and updated. 3i partner Anna Cheung explained: "The 180-day plan helped to provide structure and a time frame that gave all parties involved a goal to work towards."

This detailed level of post-investment involvement is standard for all 3i investments, and it confirmed for Little Sheep management that 3i was willing and able to provide the non-financial benefits that they had been seeking from their private equity investor.

Strengthening the management team and the board

Both 3i and Little Sheep understood clearly that a critical task for the company prior to a public listing was strengthening the management team and board structure. Little Sheep's management team had a high level of integrity and drive, but lacked depth: the entire top management team consisted of founder and CEO, Zhang, a senior vice president of finance, and three regional vice presidents. (See **Exhibit 6A** for an organizational chart for Little Sheep before 3i's investment.) Even more significantly, as Wang remarked, "the company lacked systems such as centralized operation management, new store development and marketing teams, which were crucial for the company to continue to grow in a coordinated manner". Through the years, the company had been carried forward almost entirely by a small team of managers united and motivated by the founder's sheer personal strength and charm. "The founder, Mr Zhang, is an inspirational person," remarked Cheung; and as one of Zhang's lieutenants would confirm, he was "the heart and

[6] For example, based on profitability analysis, it found that the optimal store size for tier-1, tier-2, and tier-3 cites are 1200m^2, 600m^2, and 600m^2, respectively, and that the reason for most under-performing stores (profitability < 5% of sales) was due to wrong store location.

soul" of the business. But there was a pressing need to recruit additional professional managers, install management information systems and revamp the structure and responsibilities of the board.

In this regard, 3i was instrumental in helping Little Sheep gradually put a strong team and a governance system in place. Once 3i made the investment, Cheung and Wang both joined the board as non-executive directors. 3i also recruited two additional independent directors with strong industry experience: Nish Kankiwala, the former president of Burger King International who played a part in the deal initiation process, and Yuka Yeung, CEO of the KFC franchise in Hong Kong. Both individuals had extensive experience in the food industry and were exactly the type of high-level industry people that Little Sheep had been looking for.

Instead of viewing these new directors as outsiders, however, Little Sheep's top management enthusiastically welcomed them as partners capable of adding considerable value to the company. When 3i proposed four board meetings per year, Little Sheep came back and asked for more. "Little Sheep is the only company I have worked with that has asked for more board meetings… Zhang is an extraordinary entrepreneur, but he was very humble and eager to learn. This is one of the most impressive things about the company," Cheung commented.

The newly constituted board immediately began to focus on adding depth to the management team. Up to this point, Zhang had served as both the board chairman and the CEO and had tended to delegate much of routine management to members of his senior management team. One of the first 3i recommendations was to recruit a full-time CEO dedicated to overseeing day-to-day management of the business. "We practically insisted on it," recalled Wang. In addition, based on 3i's recommendation, the board agreed to create new positions for a COO and a CFO, but emblematic of China's thin supply of professional managers, it would take more than a year to recruit the right candidates. (See **Exhibit 6B** for Little Sheep's organization chart as of October 2007.)

Creating a Standards Committee

Until these three new senior executives could be recruited, an interim management solution was needed. 3i proposed – and the board agreed – to create a Standards Committee consisting of Little Sheep's existing management team, plus Wang. The committee's purpose was to serve as interim CEO, focusing especially on enhancing the communication and coordination among the three regional operations until a proper headquarters could be set up. For the first three months between June and September 2006, the committee met bi-weekly to discuss detailed operational matters and make decisions to be carried out by the three regional VPs. Gradually, as internal communication improved and key headquarter functions were established, the Standard Committee evolved to become a series of monthly meetings focused more on long-term strategic issues, such as new-store developments, marketing and budgeting. Finally, in November 2007, with the establishment of Little Sheep's new national operation headquarters in Shanghai, the committee was formally dissolved.

Creating and executing a new franchise strategy

Although Little Sheep had taken the initiative to halt the awarding of new franchises in 2003, the existing sprawling network of over 500 franchises was not systematically addressed prior to 3i's involvement. Symptomatic of the problem was the fact that management had actually lost count of the exact number of stores in the Little Sheep network. Cleaning up the existing franchise system and designing a new franchise strategy thus became a top priority for the newly constituted board. Based on the insights from the Roland Berger report, the board came to the conclusion that the new strategy should focus on quality rather than quantity, and that the franchise system should become more centrally managed. Not only was this consistent with protecting and strengthening the Little Sheep brand, it was also made feasible by the strengthened management and headquarters capabilities. The following three-phased overhaul of the franchise system was agreed on and carried out:

Phase 1: Cleaning up the existing franchise system

First, a systematic effort was taken to visit and catalogue every franchise in the country. These visits generated store-by-store information that was fed into a database created to track critical performance indicators, and served as a basis for making decisions about the future status of each franchise. More than 200 franchises that had clearly violated the Franchise Agreement or did not meet Little Sheep's quality standards were closed. Others that were performing reasonably well had their franchise agreement renewed, and the best performing stores were bought back by Little Sheep to become directly owned as part of the new, more centralized strategy. This task was complete by the end of 2006.

Phase 2: Enhancing training and support to remaining franchise stores

Phase 2 involved stepping up the training for all franchise personnel through an elaborate new programme consisting of various stages of training at headquarters, on-site and during regular national and regional franchisee meetings. In addition, headquarters staff continued to provide on-site training during their regular store visits.

Phase 3: Developing new franchise stores

The final phase in the new franchise strategy was to proactively develop new stores and grow the franchise fee base. In contrast to the traditional, passive expansion method of responding when potential franchisees called, Little Sheep's new, active approach began with research into the local business environment, which then led to a choice of locations. The company then actively sought out restaurant operators with good reputations to run the franchise stores.

In little more than a year this new proactive strategy transformed the profile of Little Sheep's franchise system. The company moved from having 40 directly owned stores versus over 500 franchises before the 3i investment to a more balanced mix of 101 to 260 by late 2007. Even with a dramatically decreased total store count, these fundamental changes resulted in year-on-year revenue growth of close to 40%, double the industry average of about 20%.

Shelving the international expansion plan

Prior to 3i's investment, Little Sheep had an ambitious plan for international expansion. With successful restaurants already operating in Toronto and Hong Kong, management was eager to accelerate the pace of overseas growth and establish the Little Sheep brand name globally. Each regional VP was designated to lead expansion efforts in different overseas regions – North America, North Asia and South East Asia – even though they were already stretched thin managing their domestic operations.

Little Sheep's overseas ambitions were quite common among the new generation of Chinese private enterprises. On this issue, however, 3i and Little Sheep management had different views. Even though 3i was well placed to provide introductions and on-the-ground support for an overseas expansion, it strongly recommended that Little Sheep initially focus on strengthening domestic operations rather than rushing into overseas expansion. "Given the vast and yet untapped opportunities in China's restaurant industry, it is strategically important for Little Sheep to leverage the leading market share and brand name it has already established to secure a dominant market position at home before expanding its operations overseas," Cheung explained.

Although management initially resisted this 3i recommendation, Zhang later conceded that this was a sensible approach. Looking back on the incident, one of the independent directors viewed the outcome as one more example of the company's fundamental strength: "They [Little Sheep management] are open-minded, and very willing to listen," remarked Yuka Yeung, "which is really remarkable. It is a learning company."

EARLY RESULTS

From the time of 3i's investment in mid-2006 until the end of 2007, Little Sheep opened 37 new stores and achieved year-on-year revenue growth of 40%, far in excess of the 15%-20% average growth in China's food sector. The strong revenue growth was also fueled by the evolution of Little Sheep from a pure restaurant business into a more diversified food and beverages group with two meat processing facilities, a packaged-seasoning plant, a logistics company and a number of regional subsidiary companies. The company also completed its search for new senior executive talent: Daizong Wang validated his confidence in Little Sheep by resigning from 3i in October 2007 to become Little Sheep's new CFO, and Yuka Yeung, one of the independent directors and the former CEO of KFC's Hong Kong franchise, became the new COO.

CONCLUSIONS

At first glance the pairing of 3i, a global private equity group with almost no track record in China, and a restaurant chain with origins in remote Mongolia, might seem like an odd and unlikely match. But the story of their relationship conforms to many of the fundamental characteristics of successful private equity transactions, especially in emerging markets. First, the initial driver that allowed 3i to win the mandate after an intense contest with better-known competitors was chemistry, or the ability to make the founder comfortable with its industry expertise, commitment to the company and approach to post-investment value-creation. Money was secondary. Second, Little Sheep's founder had the foresight and self-confidence to recognize the value of accepting an active investor into his company. Even though he had never heard of 3i before meeting Daizong Wang, he and his senior management team exhibited an openness and eagerness to learn from outsiders, which is not always the case, especially with closely held family-run firms in emerging market countries. And third, this is a textbook case of the positive results that stem from closely aligned interests between a private equity investor and the management of a portfolio company. From the beginning, the 3i team was exceptionally hands-on, working closely with the company's senior management team on a continuous basis to make significant changes in the company, always with an eye to building value and moving closer to the day when Little Sheep would be positioned to successfully execute an IPO. The combination of these three factors goes far to explain the ingredients required for successful private equity transactions in emerging markets, or anywhere.

Exhibit 1: Summary information on 3i's business lines

Figures in £ million

	Buyouts	Growth Capital	Venture Capital	Infrastructure	Quoted Private Equity	Total
3i's own capital	1,281	1,460	741	469	20	3,971
Third-party funds	2,129	227	15	385	0	2,756
Total	3,410	1,687	756	854	20	6,727

Source: 3i Annual Report 2007.

Exhibit 2: Major events in Little Sheep's corporate history

Date	Event
Aug-99	First Little Sheep restaurant opened
Oct-99	Second and third Little Sheep restaurants opened, making it a chain
May-01	Little Sheep set up subsidiary company in Shanghai
Jan-02	Little Sheep set up subsidiary company in Beijing
Jan-02	Little Sheep set up subsidiary company in Shenzhen
Aug-02	Little Sheep passed ISO9001 certification and China national "Green Food" certification
Jan-03	Little Sheep set up R&D and production facility for seasonings
Jan-04	Little Sheep set up subsidiary company in Hong Kong
May-04	Little Sheep opened its first restaurant in Hong Kong
Nov-04	Little Sheep became the only restaurant business to enter the "China Top 500 Businesses" list, ranking #451
Nov-04	Little Sheep obtained the "Prestigious Brand" designation in China
May-05	Little Sheep entered the "Inner Mongolia Top 50 Private Businesses", ranking #2
Aug-05	Little Sheep's brand was evaluated at 5.5 billion RMB, and entered "China Top 500 Most Valuable Brands" list, ranking #95
Aug-05	Little Sheep entered "China Top 500 Service Businesses" list, ranking #160, (#1 among food companies)
Sep-05	Little Sheep obtained the "China Top 100 Food Businesses" title for the third time, ranking #2
Oct-05	Little Sheep opened its first overseas direct-ownership restaurant in Toronto, Canada
Dec-05	Little Sheep entered the "China Top 500 Quality" list and "China Food and Beverages Top 10 Quality" list
May-06	Little Sheep was named one of "Inner Mongolia's 50 Most Respected Businesses"
Jun-06	Little Sheep's trademark was formally awarded

Source: Compiled from company documents.

Exhibit 3: Little Sheep's footprint in China (as of the end of 2005)

In addition, Little Sheep had about 550 affiliate stores in operation by the year end of 2005, mainly in the Northern and Northwest China.

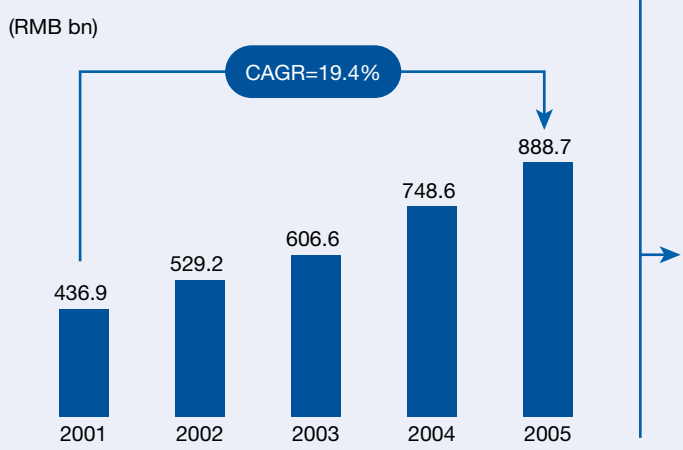
Provinces with more than 20 stores	
Hebei	74
Henan	61
Xinjiang	53
Inner Mongolia	52
Shangdong	42
Gansu	41
Guangdong	33
Shanxi	33
Beijing	22

Source: Company documents.

Exhibit 4: Growth statistics for the Chinese restaurant industry

The restaurant business in China is large and has enjoyed strong growth over the past 5 years

Revenue of China's restaurant industry (2001–2005)



Driving forces

- Economy grows 8% on average
- Fast growth of disposable income in China
- Urbanization process increases the dining out choices as restaurants become more and more economically viable
- Spending in restaurants by urban citizens grew 20% p.a. over the past 5 years

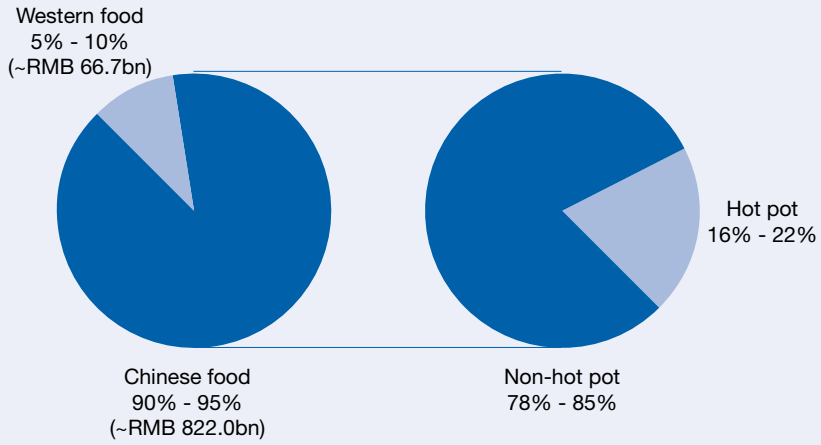
Source: Company documents.

Exhibit 5: Hot pot restaurant as a sub-sector of the dining industry

Hot pot's market share of the restaurant industry is estimated to be 15% to 20% on a growing basis

Total restaurant industry in 2005

100%=888.7 (RMB bn)



Volume of Chinese food in restaurants in 2005

100%=822.0 (RMB bn)

Comments

- Calculations based on data from China Restaurants in Chain Statistics Yearbook
- Hot pot market share shows an upward trend
  – 14.7% in 2003
  – 21.2% in 2004
- A sample telephone survey conducted by Roland Berger staff showed on average hot pot dining represents 15-20% of overall restaurant spending

Source: Company documents.

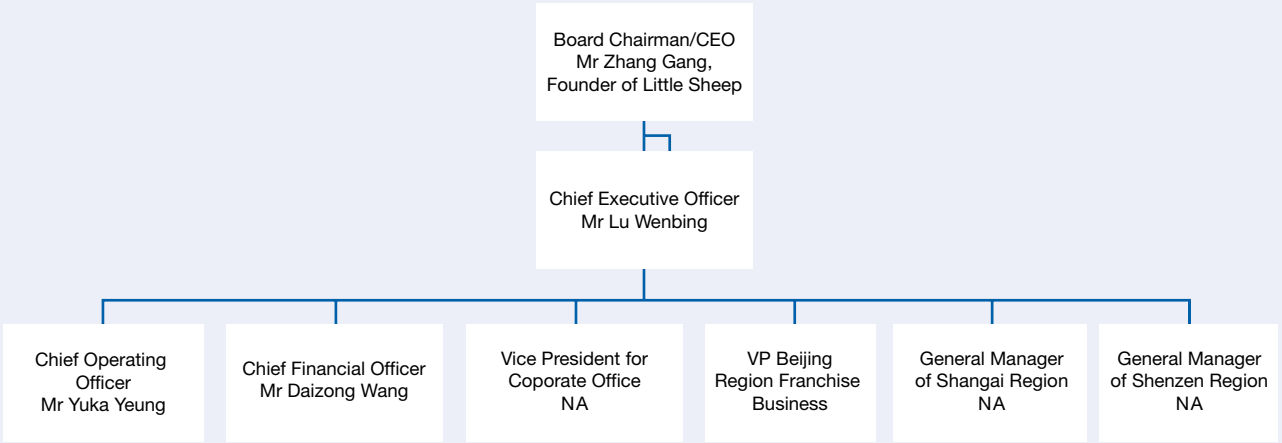
Exhibit 6: An excerpt from the 180-day plan

	Issues	Timing	Action / Output
I.	**Legal**		
…			
g.	Lease agreement	Within 6 months	– Renew lease agreements that have expired or are to expire soon by 31 July 2006 – Revise certain lease agreements (identified in legal due diligence) by 31 July 2006 – …
…			
i.	Other permits and certificates	Within 12 months	– Obtain necessary certificates or evidence for compliance with fire safety, environmental protection and sewage fees within 12 months
II.	**Financial**		
a.	Internal system	Within 3 months – report and recommendations; Within 12 months – adoption of recommendations	– … – Engage a leading accountant to examine systems, processes, controls, information capture to ensure robust, speedy and accurate information flow – Report outlining adequacy of existing systems and recommendations for improvements to be presented at first board meeting post-completion. Satisfactory system in place in 12 months – …
…			
III.	**Business and Operations**		
…			
c.	New site selection	By 31 September 2006	– Standardize and formalize location assessment process – Set up a dedicated team responsible for new site selection for the whole group – Establish a set of criteria and parameters such as those in the Roland Berger report – …
…			
e.	Store-level operational improvement	Assign responsibilities and agree on action plan within 3 months	– Refine operations manual – Step up staff trainings and communications – Enhance internal audit and increase frequency of store checks – Implement KPI benchmark at city/provincial, regional and national levels
…			–

Source: Company documents.

Exhibit 6A: Little Sheep's management team before 3i investment

Exhibit 6B: Little Sheep's management team after 3i investment



Indian private equity cases: introduction*

LILY FANG
INSEAD

ROGER LEEDS
School of Advanced International Studies, Johns Hopkins University

INTRODUCTION

The two India cases, *ICICI Venture and Subhiksha* and *Warburg Pincus and Bharti Tele-Ventures*, provide insights into why India has attracted more private equity investment recently than any other emerging market country. Total investments increased almost 700% between 2004 and 2006, from $1.1 billion to $7.46 billion, and 2007 is expected to be another record-breaking year. This meteoric growth has been fostered by a combination of country-specific factors that distinguish India's investment environment from other emerging markets. These include:

Sustained rapid economic growth: Second only to the unprecedented performance of China, India has established a track record of rapid, sustainable economic growth, averaging about 7%-8% annually since 2000.

Burgeoning domestic consumer market: Although the current per capita income level of about $720 ranks India among "low income" countries, the middle class is projected to increase tenfold by 2025, from about 50 million to more than 500 million consumers.[1]

Well-established public equity market: Arguably, no emerging market has a deeper and broader public securities market than India, a vitally important factor for private equity investors. The Mumbai Stock Exchange dates back to 1875, has more than 6,000 listed companies and reasonable levels of liquidity and trading volume.

Human capital and competitiveness in high-growth sectors: India has one of the best higher education systems among emerging market countries. This explains the country's dominant lead and world-class competitiveness in a number of growth sectors, such as information technology, software development, healthcare, pharmaceuticals and automobile components. Further buttressing this competitive advantage is the widespread knowledge of English.

Stable democratic government and credible legal framework: India has one of the oldest and most stable democracies among emerging markets economies. In addition, its common-law legal origin has provided the foundation for a well-established, credible legal system.

Within the context of these favourable factors, the cases focus on private equity transactions in two high-growth, but unsettled sectors of the Indian economy: retail (*ICICI Venture and Subhiksha*), and mobile telecom (*Warburg Pincus and Bharti Tele-Ventures*). As both cases demonstrate, the robust sector-specific growth appeared to provide attractive opportunities for astute private equity investors. But there also was enormous uncertainty because both the retail and the telecom sectors were beset by high levels of inefficiency, fragmentation and burdensome, over-protective government regulation that undermined performance and profitability. Thus, at the time both investments were made, the opportunities were attractive, but the risks were high. As noted by one of the Warburg Pincus managing directors who was involved in the Bharti investment, due to the uncertainties about the pace and direction of change in India, this was a time of "maximum risk". The cases highlight how some of these risks were mitigated to generate favourable results for both the investors and their portfolio companies.

Like most private equity transactions in India, as well as other emerging markets, it is noteworthy that these cases do not fit the profile of US and European buyouts – both involved minority investments rather than control, leverage was not a factor, and although major financial and operational restructuring was extremely important, neither transaction involved disruptive layoffs, management changes or other features that have been targeted by critics of Western buyouts. On the contrary, the cases illustrate that for economies like India that are in the midst of major structural changes, there are ample opportunities for more traditional "growth capital" investments in companies that are expanding rapidly, especially in sectors like retail and telecoms that are undergoing consolidation. The management of both Subhiksha and Bharti Tele-Ventures readily accepted the active participation by the private equity investors in key decisions affecting value-creation and long-term performance.

* The authors wish to acknowledge their appreciation for the research and editing support provided by David Kiron.

[1] McKinsey Global Institute, "The 'Bird of Gold:' The Rise of India's Consumer Market," May 2007, p.8. This projection is based on the assumption that the current economic growth rate is sustained.

EXECUTIVE SUMMARY: WARBURG PINCUS AND BHARTI TELE-VENTURES

Between 1999 and 2001, Warburg Pincus, one of the oldest and most respected private equity groups in the world, made a series of investments totalling nearly $300 million in Bharti Tele-Ventures, a relatively small Indian telecoms company. At the time, private equity was virtually unknown to most entrepreneurs in India; and Bharti Tele-Ventures' top management had never heard of Warburg Pincus before their first meeting in 1999. Moreover, the industry-specific risks could hardly have been more daunting due to the prolonged regulatory uncertainty in the telecoms sector and the persistent inefficiencies that had resulted from fragmentation and a lack of competition. These factors served as major deterrents to investors, who were waiting for visible signs that the government was willing to address these problems. This case describes why Warburg Pincus was willing to reject conventional wisdom under such circumstances, and what the firm did during the post-investment phase, working effectively with Bharti's management to enhance value, and hence its own financial reward.

The outsized risks were significantly mitigated by Warburg's confidence in Bharti's management team, and their careful calculation that the inefficiencies inherent in the India's telecoms sector were unsustainable. Change, they concluded, was highly likely to occur sooner or later, and therefore the challenge was to identify a telecoms company that was capable of capitalizing on the opportunity when the sector transformation began to occur. They found their match in Bharti Tele-Ventures, a young, mid-sized local company founded and led by an extraordinary entrepreneur, Sunil Mittal. After Warburg Pincus' initial investment, a close and productive relationship ensued that successfully transformed Bharti Tele-Ventures from a regional telecoms provider to a company with a pan-Indian service capacity and ultimately the country's predominant leader in the mobile sector. By the time Warburg Pincus fully exited in 2005, their original $290 million investment had generated proceeds for the firm of $1.8 billion.

EXECUTIVE SUMMARY: ICICI AND SUBHIKSHA

The retail market in India, as noted above, is poised to become one of the largest in the world, with a projected half billion middle-class consumers by 2025. However, much like the Indian telecoms sector described in the Bharti case, the retail market is extremely fragmented and under-developed, dominated by more than 15 million tiny "mom-and-pop" shops called "Kiranas" that sell groceries and household products at government-controlled "maximum retail price"; organized retail accounts for only 3% of the total market. Modernization of the sector is further impeded by protective government regulations that insulate the local market from foreign investment. But, as the case demonstrates, it is precisely these seemingly high hurdles that create enormous opportunities for talented Indian entrepreneurs and astute private equity investors.

This case describes a series of four investments totalling $18 million between 2000 and 2006 made by ICICI Venture, one of India's largest and most successful domestic private equity groups, in Subhiksha, a leading Indian retailer in the discount food and groceries business. During ICICI's seven-year relationship with the company, it has not only been a source of capital, but also a broad range of value-added services that have contributed to transforming Subhiksha from a mid-sized regional retail chain into a pan-Indian market leader with about 1,000 stores. Under the leadership of the Indian entrepreneur R. Subramanian and with the ongoing support of ICICI Venture, the company's operating strategy was revamped to achieve rapid expansion across the country; its board was restructured and upgraded; more professional management information systems were designed and implemented; and a number of high-level professionals were recruited to strengthen the senior management team. The case illustrates that, as with all successful venture capital and middle market private equity investments, one key success factor is the ability to first recognize genuine entrepreneurial talent in a high-growth sector, and then forge a trusting relationship that capitalizes on the strengths and expertise of both investor and entrepreneur.

ICICI Venture and Subhiksha*

LILY FANG
INSEAD

ROGER LEEDS
School of Advanced International Studies, Johns Hopkins University

"We genuinely believe that by enhancing our efficiency, we are helping the consumers to save more. We are also happy that we are introducing a model that is Indian, capable of supporting the middle class of India."

R. Subramanian, Founder of Subhiksha

"RS is a brilliant guy. He is a maverick and can think out of the box. We believed in his ability to deliver on the small-format organized retailing model, and create value for the customers, employees, and investors."

Bala Deshpande, Director of Investments, ICICI Venture

EXECUTIVE SUMMARY

India's rapid economic growth in the last decade has lifted millions of people out of poverty and stimulated the expansion of a middle class with increasing amounts of disposable income. India's consumer market, already the twelfth largest in the world, is forecast to rise to fifth place by 2025 and the middle class is expected to soar from about 50 million in 2006 to more than half a billion in that time. However, the Indian retail market is still extremely fragmented and under-developed, with large chain stores accounting for only 3% of the total retail market. With foreign investments continuing to be severely restricted by government regulation, an enormous opportunity exists for talented Indian entrepreneurs and investors.

This case describes the investment made by one of India's largest and most successful domestic private equity groups, ICICI Venture, in Subhiksha, one of India's leading retailers in the discount food and groceries business. During its seven-year relationship with the company, ICICI Venture has provided not only capital, but much needed non-financial value-added such as strategic advice and management team-building that contributed to transforming Subhiksha into a market leader. The case illustrates that, as with all successful venture capital and middle market private equity investments, one key success factor is the ability to first recognize genuine entrepreneurial talent, and then forge a relationship that capitalizes on the strengths and expertise of both investor and entrepreneur.

PRIVATE EQUITY IN INDIA AND ICICI VENTURE

India is rapidly becoming a leading emerging markets destination for private equity, with total investments increasing almost 700% between 2004 and 2006, from $1.1 billion to $7.46 billion.[1] This growth has been fostered by a number of factors, including an economy that has been growing at an average annual rate of 6% since 1980 (see **Exhibit 1A** for India's GDP growth between 1980 and 2006), an established legal system, widespread use of English, a deep pool of expatriates experienced in Western businesses, a world-class higher education system especially in engineering, health sciences and technology, and one of the oldest, most stable democratic governments in the region. Moreover, with more than one billion inhabitants and a rapidly growing middle class of consumers, the domestic Indian market is especially appealing.

As these factors have attracted a surge of private equity activity in the country, not surprisingly competition for deals has intensified apace. (See **Exhibit 1B** for private equity investments in Indian companies from 1990 to 2006.) But ICICI Venture is endowed with a number of advantages over its foreign competitors. First, it enjoys very strong local brand recognition. Founded in 1987, ICICI Venture is one of the oldest private equity groups in India and benefits from being a wholly-owned subsidiary of ICICI Bank – India's largest private sector financial services group. Second, like other local players, it benefits from the protective Indian regulatory environment that restricts foreign investment in many sectors, including retail. Finally, ICICI Venture's team is entirely Indian, resulting in an important cultural and linguistic fit with local entrepreneurs and regulators compared with foreign funds. Bala Deshpande, director of Investments at ICICI Venture, explained its importance: "It is not about being Indian per se, but about knowing the unique challenges of doing business in India."

These internal and external factors helped make ICICI Venture one of the largest and most successful private equity firms in India with assets under management in excess of $2 billion. While ICICI Venture's limited partners are global, its current investment portfolio consists entirely of Indian companies and is strategically well positioned to continue capitalizing on the Indian growth story. ICICI Venture's large sector exposures include retail, domestic services, healthcare, energy, infrastructure and real estate. The group also claims a number of "firsts" in the Indian private equity industry, including India's first leveraged buyout (Infomedia), the first real estate investment (Cyber Gateway), the first mezzanine financing for an acquisition (Arch Pharmalabs) and the first 'royalty-based' structured deal in Pharma Research & Development (Dr Reddy's).[2]

As the private equity market in India has taken off in recent years, ICICI Venture's investment strategy has become increasingly sector-focused, which has resulted in the largest exposure of any private equity group to the Indian retail

* The authors express their appreciation for the research and editing support provided by David Kiron.

[1] Data in this paragraph is cited in C. P. Chandrasekhar Jayati Ghosh, "Private equity and India's FDI boom", Business Line, 1 May 2007.
[2] ICICI Venture portfolio information is obtained from the company's website; http://www.icicventure.com

sector. For example, nearly all of the well-known Indian retail groups, including the Big Bazaar Group, Pantaloon Retail, and Shoppers' Stop, have been backed by ICICI Venture. Not coincidentally, this sector exposure reflects the group's strategy to capitalize on the domestic regulatory environment that until recently has heavily protected the rapidly growing retail sector against foreign investment.

INDIA'S RETAIL SECTOR

India's retail sector is vast yet inefficient and underdeveloped. Retail currently accounts for about 10% of India's GDP, making it a $250 billion industry and India the world's twelfth largest retail market. Yet, in 2007, only 3% of this market was comprised of organized retail (chain stores).[3] The remaining 97% consists of more than 15 million tiny "mom-and-pop" shops (called "Kiranas"), with an average space of 100 square feet, selling groceries and household products at what is known as the "maximum retail price".[4]

But the sector's massive inefficiency and under-development is poised for dramatic change. According to a recent study,[5] India's aggregate consumption is projected to quadruple in the next 20 years, making the country the fifth largest retail market in the world. Moreover, the middle class will swell from the current 50 million to almost 600 million by 2025, creating exceptional opportunities for astute retailers who are able to capture part of this huge market.

Despite this enormous potential, however, the Indian retail sector is still fraught with regulatory and political risk. Until recently, foreign direct investment was strictly limited in India's retail sector. While new regulations in 2006 permitted majority foreign ownership (up to 51%) in retail businesses for the first time, such investments were still limited to single-brand stores. In addition, even domestic players cannot escape the political pressure from the 15 million strong Kirana operators who comprise the second largest employment sector in India, just behind agriculture. Recently, for example, when large Indian business groups such as Reliance and Birla entered the retail market, they were subjected to frequent store shut-downs caused by (sometimes violent) protests.

Nevertheless, the overall outlook for Indian retail is bright. "Our view is that India's retail sector sooner or later will follow the trend in China. The shift towards organized retail is inevitable," said Deshpande, who has been responsible for most of the group's investment in the sector. This view seems to have been borne out by the huge amount of interest shown by established Indian business groups as well as foreign retail operators.[6]

SUBHIKSHA – A TRULY INDIAN RETAIL MODEL

Indian entrepreneur R. Subramanian (RS) founded Subhiksha Trading Services Private Limited (henceforth Subhiksha, pronounced su`biksha) in 1997 in his hometown of Chennai, a city of 8 million inhabitants on the east coast of India. The energetic, fast-talking RS, as he is known, has an engineering degree from the renowned Indian Institute of Technology, Madras, and he graduated at the top of his class from the Indian Institute of Management, Ahmedabad in the 1980s. Preferring to "do something in front of my own people", RS decided to stay in India at a time when many fellow graduates were choosing to go abroad. He quickly became a successful entrepreneur, founding two ventures that developed pioneering financial instruments for the Indian marketplace.[7] In 1997, RS launched his third venture, Subhiksha, even though he had no experience in the retail sector.

The carefully chosen brand name "Subhiksha" means "giver of good things in life" in Sanskrit and was an apt name for the company's philosophy. Subhiksha's business model was to sell everyday necessities and staples, such as food, groceries, and commonly used pharmaceuticals at a substantial 8%-10% discount to the "maximum retail" price charged at Kirana stores. For the average Indian middle-class family that spent about 50% of its total budget on groceries, a saving of this magnitude was significant. The uniqueness in Subhiksha's business model is its hybrid feature adapted to the changing Indian retail market: while its heavily promoted discounts resembled Wal-Mart's "everyday low prices", its store format was closer to 7-eleven's convenience-store model. Subhiksha's stores are small, ranging from 1,000 to 2,000 square feet in floor space, and are located in the heart of residential catchments with a 1-2km radius.

This distinctive retail model was the outcome of a three-month study of Subhiksha's target customers that consisted of the burgeoning Indian middle class. As Deshpande explained:

"First, the middle class shopper doesn't have a car to do destination shopping. Second, Indians are obsessed with the freshness of their food and prefer frequent shopping. (It helps that 85% of the women don't work.) Third, frequent purchases in small amounts also helps households better manage cash flow… In my view, Subhiksha's model, which combines the front-end friendliness and familiarity of a Kirana, and a back-end efficiency of a large discount chain, makes a lot of sense and is a meaningful way to address the Indian retail market."

But not everyone was convinced that the model would be successful. "I was questioned so many times about this

[3] Statistics on India retail sector are compiled from "Gently does it – Indian retailing", The Economist, 11 August 2007; "Setting up shop in India – Retailing", The Economist, 4 November 2006; and "Coming to market – Retailing in India", The Economist, 15 April 2006.
[4] In India, producers set the maximum retail price for goods. Kiranas seldom deviates from this price, effectively reducing competition and differentiation.
[5] "The Bird of Gold: The Rise of India's Consumer Market", McKinsey Global Institute, May 2007.
[6] Reliance Group has launched Reliance Fresh, a chain of grocers. The Tata Group and the Bharti Group have formed joint ventures with Australia's Woolworths group and the US giant Wal-Mart respectively to enter into retail business.
[7] RS' first company did asset securitization in India in 1992, and his second company offered financing for small investors to make IPO investments in the booming Indian stock market in 1994.

investment," recalled Deshpande. Critics of the Subhiksha model believed that 'organized retail' meant a big-box format. They argued that the only reason Kiranas could survive in the low-margin food and grocery business was that they had no overheads. A chain of small stores would not achieve scale efficiency, but its overheads would eliminate all of the margin.

RS however was able to counter conventional wisdom by developing a set of unique, innovative practices in his stores that made a small-format grocery chain profitable in India. For example:

- Careful selection of store location to save on rent:
  Subhiksha's stores were located in residential areas where rentals were typically 30%-50% lower than "high streets". Traffic into the stores was not affected by the back-street locations because most of Subhiksha's business was derived from local residents, who were well aware of the store's presence.

- SKU control:
  Subhiksha stocked only the 70%-80% most frequently used household items, and for each category only the top one or two brands were stocked. This practice ensured high inventory turnover and efficient shelf-space management. For select product categories, Subhiksha was developing private label items to increase customer choice.

- Eliminating the middlemen:
  Subhiksha purchased in large volumes directly from wholesalers and received quantity discounts.

- Just-in-time inventory management:
  Subhiksha stores carried very small inventories. The bulk of the inventory was stored in a central depot, serving all stores in a city. Using computerized just-in-time inventory management, at the end of each day each store uploaded re-stocking requests to the central depot; the data was processed overnight and the exact amount of inventory was delivered the next morning before the store opened.

- Value-adding services but bare-bones operations:
  To increase customer loyalty, Subhiksha offered a loyalty programme and home delivery service (via bicycle). Due to low labour costs and store proximity to customer residences, each store was able to offer delivery service for next to nothing.

ICICI VENTURE'S INVESTMENT IN SUBHISHA

Between 1997 and 2000, RS built a chain of 50 stores across Chennai and he was beginning to plan a more aggressive growth strategy that was contingent on raising outside capital. Familiar with the ICICI brand name, RS contacted ICICI Venture to explore his financing options. Among many investments it made during the technology bubble, ICICI Venture invested 150m Rupees (Rs) (about US$3.4 million)[8] in Subhiksha in June 2000 for 15% of the company. (See **Exhibit 2** for a time line of ICICI Venture's investments in Subhiksha.)

But shortly after this initial investment ICICI Venture began to undergo a series of changes, in part caused by the bursting of the technology bubble and the deteriorating performance of its investment portfolio. One major change was the hiring of Deshpande, who had more than 10 years of operational experience in a number of multinational retail operations, including Best Foods and Cadbury. Her first task was to pare down her inherited portfolio of 39 companies by 50%. The portfolio review resulted in the retention of 18 companies, eight of which were in the retail sector,[9] including Subhiksha.[10] Deshpande was attracted to Subhiksha because it targeted the rapidly expanding middle class, where food and groceries comprised more than 50% of their total spending. But, according to her, that wasn't the most compelling reason to retain Subhiksha in the portfolio. That reason was "clearly the founder. RS is a maverick, a truly talented entrepreneur", she said.

From its first $3 million commitment in 2000, ICICI Venture eventually invested a total of $20 million in Subhiksha in four rounds over seven years, and was the company's only external source of equity. During this long period, the relationship between ICICI Venture and Subhiksha deepened as they worked closely to enhance performance and expand the company's geographic footprint.

2000 – 2002: THE EARLY YEARS

Initially the relationship between Deshpande and RS was formal and somewhat distant. RS referred to the period as one in which "neither side made many demands on the other… We moved on with our own business. They were trying to understand what we were doing and also fix their own portfolio problems. But it was a period in which a lot of comfort and trust was built."

Although ICICI Venture may have appeared relatively passive on the surface, it was not entirely *laissez faire*. Deshpande explained her approach: "The first question is whether you trust the entrepreneur. In RS's case, the answer was yes… But as with all brilliant people, RS has his quirks and our approach had to be flexible. You need to maintain the oversight, but also give the entrepreneur space. You don't want to push him to do things that he does not like to do."

Aside from capital, there was an additional, tangible benefit ICICI Venture brought to Subhiksha during this early stage. "Their investment gave us a lot of credibility, which was what we wanted. After all, we were an unknown quantity with a new format. With their investment, we could attract good employees and negotiate with better suppliers better, etc," explained RS.

[8] All US Dollar amounts are approximate, converted from average exchange rate during the month of the investment.
[9] The other retail businesses Deshpande kept included Shoppers' Stop; the Future Group, which operates the department store chain Pantaloon; and Big Bazaar. Today, they are all leading retail groups in different segments of the Indian market.
[10] ICIC Venture closed out or exited the rest of the investments.

2003 – 2005: PATIENT, SUPPORTIVE CAPITAL

August 2003 marked the beginning of a new phase in the relationship between ICICI Venture and Subhiksha. At this point, Subhiksha had 137 stores all over Tamil Nadu, the state surrounding Chennai, but uncertainty was mounting about whether the company should roll out additional stores beyond Tamil Nadu and how it could do so successfully and quickly. At the time, there was no other organized retail player in the food and grocery discount segment with a national presence, which posed a critical opportunity for Subhiksha to seize the first-mover advantage. But in the race to win, time and capital were of the essence.

Removing funding constraints

During an August 2003 board meeting, one of the members of the ICICI Venture team asked RS what constraints were impeding his expansion plans. His response was money and people, which prompted ICICI Venture to evaluate a second round of funding that would enable the company to move more aggressively to execute the firm's expansion strategy. Between 2004 and 2006, ICICI Venture invested an additional $17 million on top of the original $3.4 million invested in 2000, which increased the investor's equity stake in the company to 45%.[11] But far from writing a blank cheque, ICICI Venture invested with a number of conditions that were designed to strengthen Subhiksha's capabilities as it embarked on a major expansion, including:

Investing in IT

To support Subhiksha's national expansion and prepare the firm for its eventual listing, one ICICI Venture condition for additional financing was that the company strengthen its IT and management systems. Although RS single-handedly invented the management system and practices that defined Subhiksha, he initially resisted the need for an elaborate IT system. "Here is a brilliant guy who has everything in his head. RS has no reason to put this on paper or in some software programme," explained Deshpande. "But we wanted a back-up. A situation where all of the company's information is in just one head is very risky for us as investors." Finally RS was convinced and in 2006 the core IT upgrade was completed using state-of-the-art software.

Build a management team

Before 2004, like many entrepreneurs, RS was a hands-on leader who retained personal responsibility for overseeing all functional areas of Subhiksha management. ICICI Venture recognized that a pan-India growth plan required a deeper management team and a less centralized approach with a greater amount of delegation of responsibilities. Thus another condition for ICICI Venture's additional investment was an agreement that RS would recruit a new Chief Financial Officer (CFO), a Chief Technology Officer (CTO), a logistics/back-end head, and a number of business unit heads for each regional market.

Developing a robust board structure

Even RS acknowledged that before 2004, Subhiksha's board consisted of "my right hand and my left hand". ICICI Venture not only urged him to have an independent board, but also one that truly reflected the pan-Indian goals of the company. Leveraging its wide business network, ICICI Venture helped attract a truly pan-India board, with independent directors, industry experts and academics from across India and the United States. (See **Exhibit 3** for Subhiksha's board composition and brief biographies of board members.) "I never knew any of these people before at all. ICICI Venture brought these connections to us. This greatly enhanced our credibility in the eyes of future investors," remarked RS.

Enabling a pan-India vision and being patient and supportive

RS's initial expansion plan was to focus on the south-west of India, the country's wealthiest region. ICICI Venture made it clear, however, that it would support Subhiksha's growth strategy only if RS pursued a pan-India vision that would transform Subhiksha into the country's dominant food and grocery discounter. Deshpande argued that a south-western company would be far less attractive to investors when and if Subhiksha underwent an IPO. RS was soon persuaded and in late 2003, ICICI Venture made a second round investment worth $3.5 million, and Subhiksha began to expand across India.

But execution often deviates from original plans. Although RS's initial pan-India rollout strategy was to sequentially enter each geographic market, he began to reconsider after witnessing the phenomenal transformation of Bharti Telecom from a northern India mobile company to India's largest mobile provider. Bharti had adopted a "big bang" approach – the simultaneous rollout of service in numerous geographic markets. RS concluded that this more aggressive approach would be superior to his more gradual strategy because it would create simultaneous brand recognition across India.

RS worried that ICICI Venture might not agree with the shift of strategy because it would require a time-consuming reconfiguration of the company's logistics and delay the expansion. In addition, more capital would be required to fund an intensified marketing campaign. But to his surprise, ICICI Venture immediately supported the new plan, and followed up with a third round of financing of about $6.5 million in late 2004.

Reflecting on the experience, RS said: "We wanted an investor who would understand what we were trying to achieve and would not second-guess us. It was reassuring that ICICI Venture understood that we changed strategy not because we couldn't deliver on the original plan, but because the new strategy was better. [This level of trust] was why we didn't even talk to any other investors."

In summary, the period from 2003 to 2005 marked the second stage in the ICICI Venture-Subhiksha relationship. In RS's own words, during this period, ICICI Venture provided the much-needed "patient, supportive capital", as well as management support, and valuable suggestions for the company's strategic direction.

[11] This was later reduced to 30% due to additional financing.

2005 – 2007: MODERATOR, PROTECTOR AND TRUSTED PARTNER

Since 2005, Subhiksha's expansion has uncovered many unexpected new opportunities and threats, but the company continues to benefit from the mutual trust that has developed between RS and ICICI Venture. According to Deshpande, her ongoing relationship with RS is critical: "We talk every week, if not every day." RS echoed the importance of their interactions, describing ICICI Venture's role during this recent period as "a moderating force, a protector and an advocate for us".

A moderating force

As Subhiksha began its geographic expansion, RS also began to think about opportunities to extend the Subhiksha discount model into other areas of the retail sector, such as cell phone equipment and white goods. While each idea represented an exciting opportunity to RS' entrepreneurial instincts, as an investor, Deshpande had a slightly different perspective: "We need to have disciplined growth. What would create value? The market does not care whether Subhiksha is also in the XYZ business, but it does care about Subhiksha being the top retailer in the food and grocery sector." RS and Deshpande would frequently debate each expansion idea, sometimes heatedly, and expansion into new areas would only proceed if a consensus was reached. For example, while cell phone equipment was successfully added to Subhiksha's retail mix, plans to expand into white goods were put off. RS acknowledged that ICICI Venture was "a sounding board and a moderating force in our growth plan".

A protector

By 2006, organized retail finally began to take shape in India, given the success of groups such as Pantaloon, Shoppers' Stop, and also Subhiksha. Retail, and in particular the food and grocery sector, finally caught the attention of India's largest business groups, and many of them vied to enter the sector and capitalize on the emergence of the Indian middle class. In 2006, in the midst of Subhiksha's national expansion, one of the largest listed Indian companies became extremely interested in acquiring Subhiksha as a way of entry. But RS refused the offer, unwilling to give up the company's independence, especially on the recognition that Subhiksha was in a strong and competitive position and a market leader in the industry. Frustrated, the interested acquirer began using questionable tactics. "They were not only going after our staff, but also making all sorts of completely false statements in the media that were detrimental to us such as that we were in financial distress, etc. They were really a bully," recalled RS.

RS knew that the only way to fend off the approach was to become a publicly listed company where ownership structure changes would require general shareholder approval. But Subhiksha was not yet ready for a listing as the company was in the midst of its expansion. Almost out of desperation, RS thought of a highly unusual solution: a reverse merger whereby Subhiksha would acquire a larger, listed company. This would legally transform Subhiksha into a public company, which would help it remain independent.

From ICICI Venture's perspective, however, this was far from an ideal approach. Deshpande explained: "It would work technically, but we opposed it because we felt that the structure would be too complicated and would obscure the market's valuation of Subhiksha … We have always had the vision that RS is standing on a very big opportunity – he should pursue a proper public listing rather than going through the back door … His equity is very precious and he should not give it away like that … We finally convinced RS that doing the reverse merger was not the right approach."

To protect Subhiksha from the damaging publicity created by the rejected acquirer and help restore RS' focus on the ultimate goal of a successful IPO, ICICI Venture stepped in again. Another round of funding amounting to nearly $7 million was provided to remove any remaining financial constraints in Subhiksha's path of organic growth; ICICI Venture also mobilized its own public relations arm to provide guidance and protection to Subhiksha both publicly in the media and privately through conversations with the aggressive company trying to acquire Subhiksha.

CONCLUSION

As of this writing, ICICI Venture has invested slightly over $20 million in Subhiksha, currently representing 30% of the company's equity.[12] With ICICI Venture's ongoing assistance, Subhiksha is preparing for a listing on the Mumbai Stock Exchange. Both sides have a clear understanding that ICICI Venture will exit its investment soon after the company becomes listed. RS explained: "We want to make sure that our shares end up in the right hands. We are working very closely with ICICI Venture to make sure that this will be the case.

ICICI Venture's seven-year involvement with Subhiksha through four rounds of financing has been a pivotal contribution to the company's rapid growth, increasing the company's competitiveness and profitability. Although the investor and entrepreneur had their differences along the way, Subhiksha has been transformed from a small, regionally focused retailer into a nationwide market leader in one of India's most rapidly growing sectors. Throughout this investment period – unusually long by Western private equity standards – the interests and attention of investor and entrepreneur were continuously aligned and focused on clearly defined operational and financial objectives. As the company moves closer to an IPO, and ICICI Venture's successful exit comes within view, both sides can reflect on the ingredients that led to such a strong, constructive relationship. As RS concluded, "The kind of network and resources they brought to us has been very important in our growth."

[12] ICICI Venture's investment initially represented 45% of Subhiksha's equity stake, but it was subsequently diluted to 30% as additional investments were made by RS.

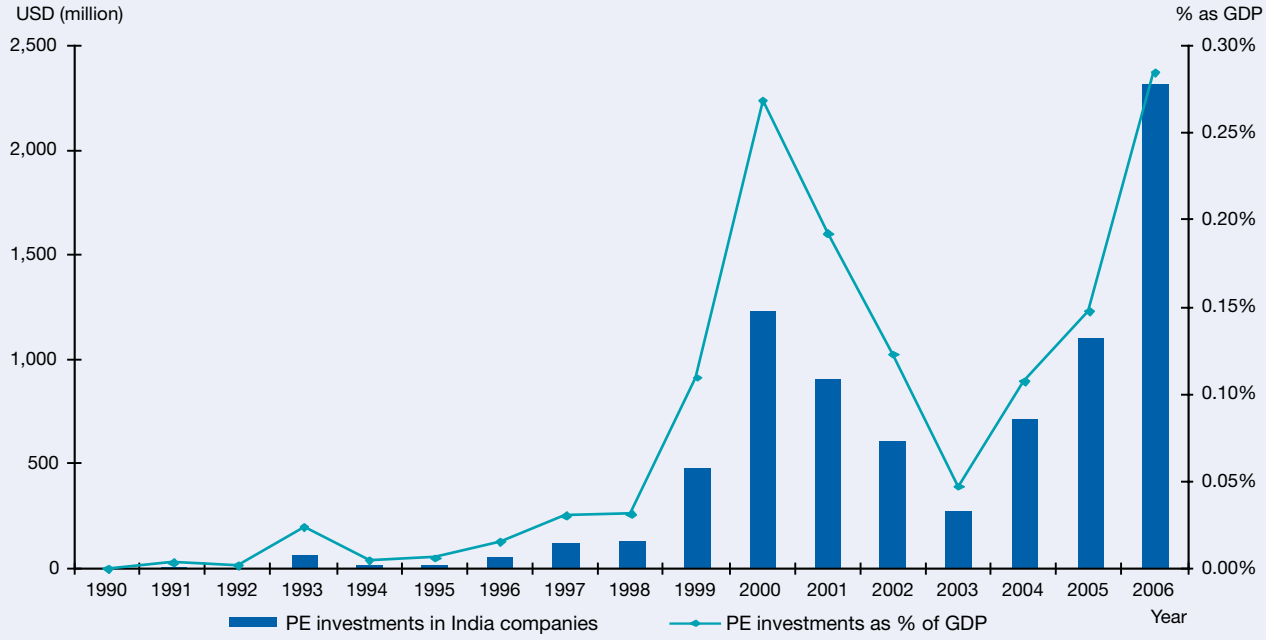
Exhibit 1A: India real GDP growth, 1980-2006

India GDP and GDP growth rate, 1980-2006

Source: GDP data from EconStats.com.

Exhibit 1B: Private equity investments in Indian companies

PE investments in Indian companies 1990-2006



Data Source: Private equity investment data from SDC Platinum VentureXpert. GDP data from EconStats.com.

Exhibit 2: Time line of ICICI Venture's investments in Subhiksha

Time	Investment amount (USD)
Jun-00	3.4 million
Late 2003	3.5 million
Dec-04	6.5 million
Nov-06	7 million

Source: Authors compilation from interview notes and company documents.

Exhibit 3: Subhiksha's board composition and brief biographies

Board Chairman: S B Mathur, age 52, an Indian national, is the Chairman and an independent director of our company. He is a fellow of the Institute of Chartered Accountants of India and the Institute of Cost Accountants of India. He has worked with the Life Insurance Corporation of India from 1967 to 2004, when he retired as its chairman. During his tenure at the Life Insurance Corporation of India, he has held several positions, including those of the senior divisional manager, Gwalior division, chief of corporate planning, general manager of LIC (International) EC, zonal manager for the western zone and the executive director.

Managing Director: R Subramanian, age 41, an Indian national, is the Managing Director of our company. Subramanian is a founder director of our company. He holds a master's in Engineering from the Indian Institute of Technology, Madras and a Post Graduate Diploma in Business Administration from the Indian Institute of Management, Ahmedabad. He was a gold medalist at the Indian Institute of Management, Ahmedabad.

Director: Bala Deshpande, age 41, an Indian national, has been nominated to our board by ICICI Venture Funds Management Company Limited. She holds a Master's in Economics from Bombay University and a Master's in Management Studies from the Jamnalal Bajaj Institute of Management Studies. Bala Deshpande has over 17 years of work experience, including seven years in the private equity field. Prior to ICICI Venture Funds Management Company Limited, she has had multi-industry exposure and has worked with leading multinational companies, including Best Foods, Cadburys and ICI. She was part of the strategic planning team at Best Foods and was nominated for the Women Leadership Forum held at Best Foods, New York. Apart from the company, Deshpande is on the board of directors of several companies, including Air Deccan Limited, Nagarjuna Constructions, Welspun, TechProcess Solutions and Naukri.com. She currently focuses on sectors such as retail, media, IT, ITES, telecoms and construction as well as some manufacturing-related industries.

Director: Renuka Ramnath, age 45, an Indian national, has been nominated to our Board by ICICI Venture Funds Management Company Limited. She holds a bachelor's in Engineering and a Master's in Business Administration (Finance) from Bombay University. She is the managing director and chief executive officer of ICICI Venture Funds Management Company Limited, a wholly-owned subsidiary of ICICI Bank Limited. Renuka Ramnath has over 21 years of work experience with the ICICI Bank Group. She has worked with the merchant banking division of the group and headed the corporate finance and equities businesses at ICICI Securities Limited. She moved back to ICICI in 1997 to set up the structured finance business. She has also been involved in setting up the e-commerce initiatives for the ICICI Bank Group. Ramnath has featured in the Top 25 Most Powerful Women in Indian Business list published by Business Today and in the list of India's Most Powerful CEOs published by the Economic Times.

Director: Rama Bijapurkar, age 50, an Indian national, is an independent director of the company. Bijapurkar holds a Post Graduate Diploma in Business Administration from the Indian Institute of Management, Ahmedabad. Presently, she teaches as a visiting professor and serves on the board of governors of the Indian Institute of Management, Ahmedabad. She also has a market strategy consulting practice and works with Indian and global companies to develop their business-market strategies. She serves as an independent director on the boards of several Indian companies. Bijapurkar has over 30 years of work experience, including at McKinsey & Company, MARG (now AC Nielsen India). She has been a full-time consultant with Hindustan Lever Limited. She has publications on market and consumer-related issues both within and outside India and writes columns for the Economic Times and Business World.

Director: Kannan Srinivasan, is an independent director of the company. Srinivasan is HJ Heinz II Professor of Management, Marketing and Information Systems at Carnegie Mellon University. He earned his undergraduate degree in Engineering (1978) and Post-Graduate Diploma in Management (1980) from India. Prior to earning his PhD (1986) at the University of California at Los Angeles, Srinivasan worked as a product manager at Procter & Gamble (India). He has published over 50 papers in leading business and statistics academic journals and shoulders editorial responsibilities of several top-tier journals. Srinivasan has been nominated several times for the Leland Bach Teaching Award. He has also taught at the graduate schools of business at The University of Chicago and Stanford University. He has worked on numerous consulting projects and executive teaching engagements with firms such as General Motors, Asea-Brown Boveri, Kodak, Chrysler, Fujitsu, IBM, Calgon Carbon, CIBA Vision, Kraft Foods, IKEA, Management Science Associates, McKinsey &Co., Pricewaterhouse Coopers, United Technologies and Wipro. Recently, he has worked with multinationals in the US to develop their India strategy. He is also the director of the Center for E-Business Innovation (eBI) at Carnegie Mellon University.

Source: Company documents.

Warburg Pincus and Bharti Tele-Ventures*

LILY FANG
INSEAD

ROGER LEEDS
School of Advanced International Studies, Johns Hopkins University

"If you can add value, they will listen to you. Whether you have a 10% or 30% stake is not the issue. At Warburg Pincus, we don't invest in a company unless the entrepreneur has a predisposition to openly work with us."
Dalip Pathak, Managing Director, Warburg Pincus

EXECUTIVE SUMMARY
Between 1999 and 2001, Warburg Pincus, one of the oldest and most respected private equity groups in the world, invested about $290 million[1] in Bharti Tele-Ventures, at the time a relatively small, little known telecoms company in India. Remarkably, this investment was made at a time of "maximum risk", when prolonged regulatory uncertainty in the Indian telecoms sector had undermined foreign investment interest. This case describes why Warburg Pincus was willing to take the risk, and what it did post-investment to work effectively with Bharti's management to enhance value, and hence its own financial reward.

The outsized risk that Warburg Pincus took was significantly mitigated by the investment team's confidence in Bharti's management team, and their calculation that India's telecoms sector was overdue for a change. Post-investment, Warburg Pincus worked closely with Indian entrepreneur and Bharti founder Sunil Mittal to make significant adjustments to the company's strategy in order to optimize competitiveness in a rapidly changing marketplace. The Warburg Pincus team, for example, supported management's shift from a regional to a pan-Indian vision, and was instrumental in providing a portion of the capital to execute an aggressive acquisition strategy needed to realize its vision. Warburg Pincus also played a role in helping the company broaden the board and strengthen corporate governance practices in preparation for its highly successful IPO.

Between 2004 and 2005, Warburg Pincus exited its Bharti stake, generating proceeds of $1.83 billion on its original $290 million investment. This case illustrates that this financial gain was largely a function of the careful execution the Warburg Pincus team exhibited at every stage of the investment, from deal origination and due diligence, to post-investment collaboration with the management and ultimately the exit.

WARBURG PINCUS AND PRIVATE EQUITY IN INDIA
Warburg Pincus was created in 1966 by the acquisition of E M Warburg & Co, a New York investment banking firm, by Lionel I Pincus & Co., a small venture capital group led by its eponymous founder. In 1971, Warburg Pincus had initial capital of $41 million and started buying businesses to be sold later for a profit. One of the longest-standing private equity groups in the US and widely regarded as one of the leading global private equity groups, by 2007, Warburg Pincus had more than $26 billion invested in more than 100 companies throughout US, Europe and Asia.[2]

Warburg Pincus entered Asia in 1994, making it one of the first private equity groups in the region. In 1995 the investment team in the recently established Hong Kong office, led by Charles R "Chip" Kaye (now co-president of Warburg Pincus Group), started looking at its first investment opportunities in India.

Managing director Dalip Pathak, one of the firm's original team members, recalled why India was a priority for the firm from the very beginning: "There were many factors that made us focus on India, including its large market and high quality of human capital. Furthermore, there was an aberration in the economy which presented a unique situation... real interest rates in India were unsustainably high. We were convinced interest rates would come down, sooner or later, and when this happened the stock markets would take off, providing a windfall to well-positioned investors and a cheaper source of capital to Indian companies to fuel growth. We were convinced the country was moving in the right direction – we wanted to position ourselves to benefit from the changes."

The early India investments made by Warburg Pincus were relatively small (sub-$30 million) and opportunistic, in sectors ranging from pharmaceuticals to media.[3] But this changed in 1999 with Bharti Tele-Ventures, a young, mid-sized local telecommunications company. Between 1999 and 2001, Warburg Pincus invested $290 million in Bharti in four instalments, a remarkable sum that even now ranks as one of the group's largest investments in one company outside the US. The investment size is even more noteworthy considering the state of the domestic economy and foreign

* The authors express their appreciation for the research and editing support provided by David Kiron.

[1] All sums quoted in US dollars are approximate due to exchange rate variations.
[2] Fund history and capital information from Warburg Pincus' website, http://www.warburgpincus.com/.
[3] Warburg Pincus' first acquisition was a stake in Nicholas Piramal, an Indian pharmaceutical company. Other investments included Rediff Communication, India's largest consumer web portal; Gujarat Ambuja Cement; and Sintex Industries, a maker of plastic goods.

investment into India at the time. Despite having grown at an annual rate of 5% between 1980 and 1999, India's economy at the turn of the millennium was still very much "closed", and attracted relatively small amounts of foreign capital. During the 1990s, total foreign direct investment (FDI) accounted for only about 1% of GDP, compared with about 5% in China.[4] Private equity investments were an even more negligible 0.2%. In fact, the founder of Bharti Tele-Ventures, Sunil Mittal, had never heard of Warburg Pincus prior to their first meeting. The $290 million Bharti eventually received from Warburg Pincus equalled about one third of all private equity investments made in India during the prior decade, which amounted to only about $900 million. (See **Exhibit 1** for information on India's GDP growth, FDI inflow and private equity investments in Indian companies.)

As the Indian economy began to accelerate in the new century, so did the pace of private equity investment. Between 2000 and 2006, India's economy expanded at an accelerated 9.4% annual rate, and, not coincidentally, the country increasingly became a favoured destination for foreign investment including private equity, which reached about $1 billion in 2005, then jumped to $7.46 billion in 2006, and is projected to pass that mark easily in 2007.[5] India's ascendancy to the very top ranks of emerging market private equity destinations can be attributed to several distinctive features including a well-established legal system, widespread use of English, a deep pool of talent experienced in Western businesses, a strong higher education system, especially in engineering, health sciences and technology, and one of the oldest, most stable democratic governments in the region. Moreover, with more than one billion inhabitants and a rapidly growing middle class of consumers, the domestic Indian market is especially appealing. Flush with cash from investors around the globe seeking attractive returns, private equity investors are beginning to pay increasing attention to the Indian growth story.

TELECOMMUNICATIONS IN INDIA

In 1992, the highly protected Indian telecoms sector comprised three state-owned companies offering fixed-line services. The National Telecom Policy of 1994 attempted to expand the provision of basic telephone service by encouraging domestic private investment and foreign direct investment. But in the early stages of liberalization, uncertainties regarding the economic viability of the telecommunications projects and a lack of regulatory clarity slowed the pace of foreign and domestic private investments in the sector. Some companies opted to focus on mobile service instead, with the expectation that many Indian customers, like those in other developing countries, would bypass the high installation fees and order backlog of fixed-line services and go directly to mobile phone use.

Unfortunately, the government's mobile licensing process was fraught with unintended consequences that further stalled the market. To prevent a monopoly, the government divided the country into 22 separate geographic markets – four "metros" comprising Delhi, Mumbai, Kolkata and Chennai, and 18 "circles" roughly corresponding to the provinces. The circles were categorized as A, B and C according to potential profitability, with A being the most lucrative and C the least. Before 2000, no single firm was permitted to own more than three category A and B licences, and only two licences were granted for each of the 22 markets. Thus, no single mobile operator could develop the scale required to be cost-efficient.

This licensing policy resulted in an inefficient, highly fragmented industry with a patchwork of 44 separate cellular networks covering the country. The lack of a pan-Indian network and the layers of inter-circle tariffs led to extremely expensive domestic long-distance calls.

In addition, two other pricing hurdles prevented the mobile market from taking off. First, average daily usage was very low because airtime was charged to both the caller and the receiver, resulting in cell phones being used primarily as pagers. Second, despite low usage rates, mobile companies had to pay the government a monthly fixed licence fee per use, regardless of how much revenue was generated per user. By 2000, India's highly underdeveloped telecoms market had only 1.7 million mobile subscribers among its one billion population, compared with 43 million in China.[6] As Warburg Pincus' Dalip Pathak explained: "At the time we were contemplating our investment in Bharti, there was huge regulatory uncertainty in the telecoms sector. Investor interest was just not there."

BHARTI TELE-VENTURES

Bharti Tele-Ventures was founded by Sunil Mittal, a self-made entrepreneur whose previous ventures included bicycle parts manufacturing, portable generators and pharmaceuticals. In 1985, he took advantage of liberalization in the telecoms equipment sector and became the first manufacturer of push-button phones through a joint venture with Siemens, the German electronic engineering and electronics giant. A few years later, in 1992, when liberalization took place in the mobile sector and the first round of licences[7] was auctioned, Mittal partnered with several foreign companies[8] to make a joint bid for one of the licences. He spent Rs 10 million (about $275,000) and took a three-month sabbatical in London to prepare for his bidding presentation. An unknown quantity at the time, Mittal's well-prepared presentation was favourably received by the government and his bidding consortium emerged as the winner of the hotly contested process for one of two prized licences for Delhi. Mittal

[4] The percentage figure is inferred from China's GDP numbers from EconStats.com, and inward FDI numbers from "China's FDI and non-FDI Economies and the Sustainability of Future High Chinese Growth", John Walley, and Xian Xin, NBER Working Paper No. 12249, May 2006, pg 3.
[5] Data in this paragraph is cited in C.P. Chandrasekhar Jayati Ghosh, "Private equity and India's FDI boom", Business Line, 1 May 2007.
[6] "Survey of China's Mobile Phone Market", ChineseBusinessWorld.com (CBW.com), September 2000.
[7] This round includes two licences for each of the four metros, altogether eight licences.
[8] Compagnie Generale de Eaux de France (CGE, precursor to Vivendi), Emtel (a Mauritian cellular phone operator part-owned by Millicom) and Mobile Systems International, UK.

founded two companies at this time – Bharti Tele-Ventures, the holding company for various telecoms ventures, and Bharti Cellular for the mobile business in Delhi. In September 1995, Bharti Cellular became the first company to launch cellular service in India.

During a second round of auctions in 1995, Bharti secured one additional fixed-line licence (for Madhya Pradesh, a category B circle in central India) and another cellular licence (for Himachal Pradesh, a category C circle in the sparsely populated, mountainous North). Initially this was seen as a set-up for Bharti's growth plan. However, by 1998, actual mobile usage was lagging far behind expectations, and several operators who made exorbitant bids began falling behind in their licence payments to the government, and some considered selling their licences to Bharti. "I was approached once a week by various cellular licencees wanting to sell out," said Mittal.[9] Thus, an opportunity arose for Mittal to acquire licences at bargain prices. However, he needed to arrange the financing to complete the acquisitions.

WARBURG PINCUS' INVESTMENT IN BHARTI

In 1998, Mittal began looking for a "financially savvy investor who has a lot of experience to help us benchmark performance against the best telecoms providers", recalled Akhil Gupta, CFO of Bharti and a close friend of Mittal. At precisely the same time, Warburg Pincus was looking for an Indian telecoms investment opportunity, but no one at Bharti had ever heard of the private equity firm.

The Bharti opportunity was identified by Pulak Prasad, a Warburg Pincus associate who had just joined the firm from McKinsey & Company.[10] Prasad was impressed by Gupta during a chance meeting, and he recommended a meeting with Warburg Pincus' managing director Dalip Pathak. Pathak and Prasad were granted an initial 45-minute meeting with Gupta and Mittal. At the time, few people in India understood the role of private equity, so Pathak made a presentation about Warburg Pincus and its investment philosophy. The meeting turned into a 3-hour discussion over lunch, during which Pathak became impressed by Mittal's approach to the business. "Sunil is someone who does not partake in small talk. He is very purposeful about how he spends time… I was impressed from the beginning by how he looked at the business and valuation," recalled Pathak.

The conventional metric that the industry uses to gauge mobile profitability is ARPU (average revenue per user). Bharti's top management disagreed with this valuation metric, and proposed that the true financial health of a mobile business is measured more accurately by three numbers: gross revenue, operating efficiency and capital efficiency. As long as operating and capital efficiency are stable or improving, increasing gross revenue would result in increasing profitability. (See **Exhibit 2** for details of these metrics and an example.) Although this so-called "three-line graph" approach is now widely accepted in the industry, in 1998 it was unusual. Recognizing this as a sign of Bharti management's forward thinking, Warburg Pincus became an early supporter of the company and its management.

Warburg Pincus' due diligence process started immediately after the initial meetings with Gupta. "For us, due diligence was not just about validation of facts, but getting to know our prospective partner in depth," explained Pathak. Warburg Pincus also engaged an outside consulting firm to conduct due diligence on India's telecoms industry. Based on this study, the consultants concluded Bharti's business plan was simply too aggressive and unachievable, and strongly recommended against proceeding with the investment. Warburg Pincus rejected the consultant's advice in favour of its own more positive assessment. "The market was very price-elastic," Prasad explained. "If prices dropped, we would achieve market penetration. Sunil's business model was correct. As long as we could be price-competitive and draw subscribers, our top-line would expand. Even though ARPU might be falling, our marginal costs would be falling even faster, and our profits would grow. We believed that Sunil and his team had the ability to achieve this, which was something that (the consulting firm) did not see."

In September 1999, Warburg Pincus made an initial $15 million investment in Bharti Tele-Ventures in exchange for less than 15% of the company's equity. Pathak joined Bharti's board of directors in late 1999 and was followed by Prasad in 2001. It is worth noting that at the time of Warburg Pincus' initial investment, investor interest in India's telecoms sector remained thin due to continued regularity uncertainty, and a number of frustrated international telecoms companies were retreating from India. As Pathak explained, Warburg Pincus invested at the time of maximum risk.

In November 1999, Warburg Pincus invested another $44 million, and three additional investments of $29 million, $125 million and $75 million followed in 2000 and 2001. The combined $290m investment gave Warburg Pincus a stake slightly over 20% in Bharti Tele-Ventures. (See **Exhibit 3** for the time line of Warburg Pincus' investments and exits.)

VALUE CREATION ACTIVITIES

Warburg Pincus' willingness to take the "maximum risk" was rooted in the investment team's confidence that sooner or later the industry must undergo major structural changes, and that Bharti and Sunil Mittal were endowed with all the qualities required to capitalize on the transformation, whenever it occurred. This confidence was reciprocated by Mittal, who was quick to recognize the value of a Warburg Pincus relationship that would go far beyond the capital injection itself.

[9] Quote from HBS case "Bharti Tele-Ventures", by Tarun Khanna, Krishna Palepu, and Ingrid Vargas, 12 March 2004.
[10] Prasad had subsequently become managing director at Warburg Pincus before leaving the firm to set up Nalanda Capital, an India-focused private equity group.

Based on this strong foundation of mutual trust, the investor and the management embarked on a close working relationship to position Bharti for accelerated growth and enhanced competitiveness. Among the most important tasks on the post-investment agenda were: systematically benchmarking the company's performance against its competitors; meeting the listing requirements for an eventual IPO; rationalizing the corporate structure to enhance the efficiency of management decision-making; strengthening corporate governance by changing the composition and practices of the board of directors and attracting additional investors. While differences of opinion inevitably arose during the course of this collaboration, both sides remained focused on the common goal of enhancing shareholder value, which led to an exceptionally productive relationship.

Think big – A pan-India telecoms, rather than Bell North

Before Warburg Pincus became involved, Mittal's vision was for Bharti to become the "Bell North" of India, i.e., the premier telecoms company in North India. But Warburg Pincus saw this as a sub-optimal strategy that would limit Bharti's growth to one of India's poorest regions, and actively pushed Mittal to consider implementing a more ambitious pan-India vision. As Pathak recalled: "At the time, a $200 million market capitalization was considered big. It was inconceivable for most entrepreneurs to think of a billion-dollar company. We believed that it was right for Bharti to aim high." When asked later in a *Wall Street Journal* interview about Warburg Pincus' role in Bharti's growth, Sunil Mittal said succinctly, "Warburg Pincus let us think big."[11] The pan-India vision became the blueprint of the company's expansion, and was one of the critical decisions that shaped Bharti's destiny as India's leading telecoms service provider.

Winning the race – growth by acquisition

Although both the investor and the entrepreneur shared the same vision on Bharti's future, they differed on how to achieve the goal of a pan-Indian telecoms company. Bharti's management was deeply suspicious of growth by acquisition, and wanted to follow the firm's historically successful strategy of building the businesses from the ground up. Warburg Pincus, on the other hand, was acutely aware that the race to become the first pan-India telecoms firm was time-sensitive and victory would only be achieved through acquisitions. After considerable discussion, Bharti proceeded to make a number of acquisitions designed to expand the company's geographic footprint while continuing to implement its organic growth strategy.

In 1999, Bharti completed its first deal by acquiring JT Mobile's operations in Karnataka and Andhara Pradesh, two category A circles in South India, and home to numerous information technology companies. The following year, in August 2000, Bharti acquired Skycell's mobile operation in Chennai, the capital of the southern state of Tamil Nadu, and the fourth largest cellular market in the country. With these acquisitions, Bharti more than trebled its number of subscribers in a little more than a year. A third acquisition in 2001 gave Bharti control of Spice Cell's network in Kolkata, the capital of the eastern state of West Bengal. With this acquisition, Bharti had successfully established a strong foothold in all four corners of India.

This rush to complete the acquisitions depended heavily on Bharti's access to capital. For the 2001 acquisitions, for example, the company raised an additional $200m from Warburg Pincus and an equal amount from SingTel, Singapore's world-class telecoms provider. "We basically provided Bharti with an equity line of credit," explained Prasad. "Having the money ready when I needed it was priceless," Mittal added. By the end of 2003, with 43 million mobile customers all across India and a 23.5% market share, Bharti had become the clear market leader in India's mobile telecoms sector.[12] (See **Exhibit 4A, 4B** for Bharti's mobile footprint in 2001 and 2003 respectively.)

Rationalizing the corporate structure

In 2000, the corporate structure of Bharti Tele-Ventures could best be described as disorganized and inefficient. As the holding company for the mobile businesses, Bharti Tele-Ventures comprised four companies that had been patched together with little forethought to efficiency.[13] For example, Bharti Cellular was the original mobile company that had the Delhi licence; Bharti Telnet operated a fixed-line business in Madhaya Pradesh and a mobile business in Himachal Pradesh; Bharti Mobinet operated cellular operations in Kamataka and Andhra, and Bharti Mobile operated cellular business in Chennai. This ad hoc structure had developed as a function of the sequential licensing process and acquisitions, rather than with an eye to efficient corporate decision-making. The shareholding structure in each of the four companies also was fragmented to the point of confusion. For example, Bharti Cellular, the firm's flagship Delhi operator, was only 51% held by Bharti Tele-Ventures; the remaining 49% was held by British Telecom (44%), Telecom Italia (2%), and New York Life (3%). The other three companies were held by different sets of strategic investors alongside Bharti Tele-Ventures (see **Exhibit 5A** for Bharti Tele-Ventures corporate structure in 2000).

Warburg Pincus made the case to Bharti management that this structure was problematic on at least three fronts. First, it was confusing to public investors, which would be detrimental when the time came to price the anticipated IPO. Second, the patchwork of companies and multitude of names undercut Bharti's objective of establishing uniform brand recognition. Third, having a large number of strategic investors was bound to create conflicts of interest (see next section), and at a minimum, balancing the different objectives could distract management focus from the singular objective of growing the business. With these shortcomings in mind, Warburg Pincus strongly urged Bharti to clean up the corporate structure.

[11] "Heard in Asia: Look beyond its stock price to gauge Bharti's potential", The Asian Wall Street Journal, 30 April 2002.
[12] Figure as of 30 June 2007.

By 2003 this restructuring task was largely completed, resulting in a simpler, more efficient corporate organization. Under the Bharti Tele-Ventures umbrella, only two companies remained: Bharti Cellular Ltd, which operated the cellular business in all 15 circles, and Bharti Infotel, which ran fixed-line operations and the long-distance, international and data businesses. In addition, Bharti Tele-Ventures consolidated the holdings from various strategic investors either by buying out their equity stakes or swapping the stakes in individual firms for equity in the holding company. These steps resulted in a more logical corporate and shareholding structure that was more comprehensible and appealing to prospective investors. (See **Exhibits 5A, 5B** for Bharti's structures in 2000 and 2003 respectively.)

Selecting strategic partners

Before Warburg Pincus' investments, no fewer than five international telecoms companies had direct stakes in the separate operating companies under Bharti Tele-Ventures, opening the door to the possibility of conflicts of interest. For example, one reason Bharti had been fixated on the Bell North plan rather than a pan-India strategy was to avoid competitive tensions with one of its strategic partners, which was involved in another partnership with a different telecoms firm in southern India.

With these conflicts in mind, Warburg Pincus recommended that Bharti buy back various stakes held by its strategic partners. While Bharti gradually bought back stakes from a number of old strategic investors, in August 2000, a new strategic partner, SingTel, entered with a $400m investment. As a highly regarded Asian telecoms company, SingTel was viewed as having a long-term commitment to the region and as a sensible choice as a strategic partner for Bharti.

RESULTS

During the three years following Warburg Pincus' initial 1999 investment, Bharti Tele-Venture experienced rapid growth. Cellular revenues nearly quadrupled from about $46.7 million to $162.2 million,[14] and the EBITDA-to-sales margin surged from 1.9% to 26.7%. However, due to the very large capital expenditures required for the acquisitions, the company did not return to profitability until 2003. (See **Exhibit 6** for a summary of Bharti's financial and operational performance between 1999 and 2001, just before Bharti's IPO.) With the support of Warburg Pincus, Bharti also diversified the composition of the board of directors, and adjusted its accounting practices to conform to US GAAP. (See **Exhibit 7** for Bharti's board composition.)

On 18 February 2002 Bharti Tele-Ventures successfully executed an IPO on the Mumbai Stock Exchange, issuing 185 million new shares, equivalent to 10% of the company's equity. The IPO raised $170 million,[15] giving the firm an implied market capitalization of about $1.7 billion, which ranked Bharti as one of India's largest companies. Proceeds from the IPO were used to fund Bharti's expansion in its cellular, fixed-line, and national long-distance networks. "We really needed the additional capital for investment. Both Warburg Pincus and SingTel were maxed out," recalled Prasad, referring to Warburg Pincus' nearly $300 million investment exposure and SingTel's $600 million.

Since Bharti's IPO was a primary offering of new shares, Warburg Pincus did not divest of its shares at the offering. "Sunil always knew we would exit. But we made it clear that we would not exit in a way that was destabilizing for the company," Pathak recalled. More than two years after the IPO, in August 2004, Warburg Pincus began to implement its exit strategy by gradually divesting of its entire stake in four separate stock sales that generated proceeds of $1.83 billion on the original investment of $290 million. (**Exhibit 3** contains a detailed time line of Warburg Pincus' exit.) One of Warburg Pincus' last exit tranches was executed as a block trade on the Mumbai Stock Exchange. The highly publicized $550-million trade was completed in only 28 minutes, and was seen as symbolizing the coming of age of the Indian stock market, showcasing not only the depth and liquidity of the domestic market but also India's enormous potential for private equity investors.[16]

SUMMARY AND CONCLUSIONS

Financially, Warburg Pincus' investment in Bharti Tele-Ventures was worthy of headlines. "It is such stuff as private-equity dreams are made of," opined The Economist.[17] But hyperbole aside, such observations, even with the benefit of hindsight, fail to capture two important factors. First, the incalculable risks that ordinarily accompany private equity investing are virtually ignored. Warburg Pincus committed close to $300 million, its largest investment at that time outside the US, as a minority investor in an unknown emerging market company. Moreover, the investment was made at a time of high regulatory uncertainty in a sector that was undergoing rapid changes and was highly dependent on government policy. Warburg Pincus was prepared to assume these risks because of its confidence in Bharti's management team, and its calculation that India's telecoms sector had to change sooner or later. Second, the after-the-fact headlines refer infrequently, if at all, to the private equity investor's contribution to value-creation, which are the true drivers of the attention-grabbing financial returns. Although Bharti was always Mittal's company to run, Warburg Pincus helped the entrepreneur to revise the company's strategy in order to optimize its competitiveness in a rapidly changing marketplace. Importantly, the Warburg Pincus team was the catalyst for helping management

[13] Bharti Tele-Ventures itself is held 65% by Bharti Telecom, a higher-level holding company of all Sunil Mittal's telecoms businesses (including fixed line). This super-holding structure is created partially to get around the 49% FDI rule in India.
[14] The actual figure was from Rs 2.1 billion to Rs 7.3 billion. The US Dollar figures were converted based on the average exchange rate of 1$US = 45Rs
[15] The actual proceeds were Rs 8.3 billion. The US Dollar figure was derived from the prevailing exchange rate of 1$US = 49Rs at the time of the IPO.
[16] Long after Warburg Pincus' exit, the original Warburg Pincus team members stayed involved. Dalip Pathak and Pulak Prasad remained on Bharti's board.
[17] "A New Frontier – Private Equity in India", The Economist, 10 September 2005.

shift from a regional to a pan-Indian vision, and then was instrumental in providing the capital to execute an aggressive acquisition strategy to realize the vision. Warburg Pincus also played an important role in supporting the company to restructure the board and strengthen corporate governance practices in preparation for its highly successful IPO.

When asked to characterize Warburg Pincus' role in Bharti's growth, Chip Kaye, Warburg Pincus' co-president, offered a modest explanation: "Our success comes from being associated with extremely talented entrepreneurs like Sunil Mittal. Our role was to serve as a catalyst for his success." Echoing this, Prasad added: "We should be careful not to take too much credit. As an investor, we can make an A+ team into an A++ team, but we cannot make a C team into an A+ team." The evidence in this case suggests that Warburg Pincus' financial success with Bharti was a function of sound investment judgements and careful, well-thought-out execution at each stage of the private equity investment cycle – deal origination, due diligence, post-investment collaboration with an able and willing partner, and finally, exit.

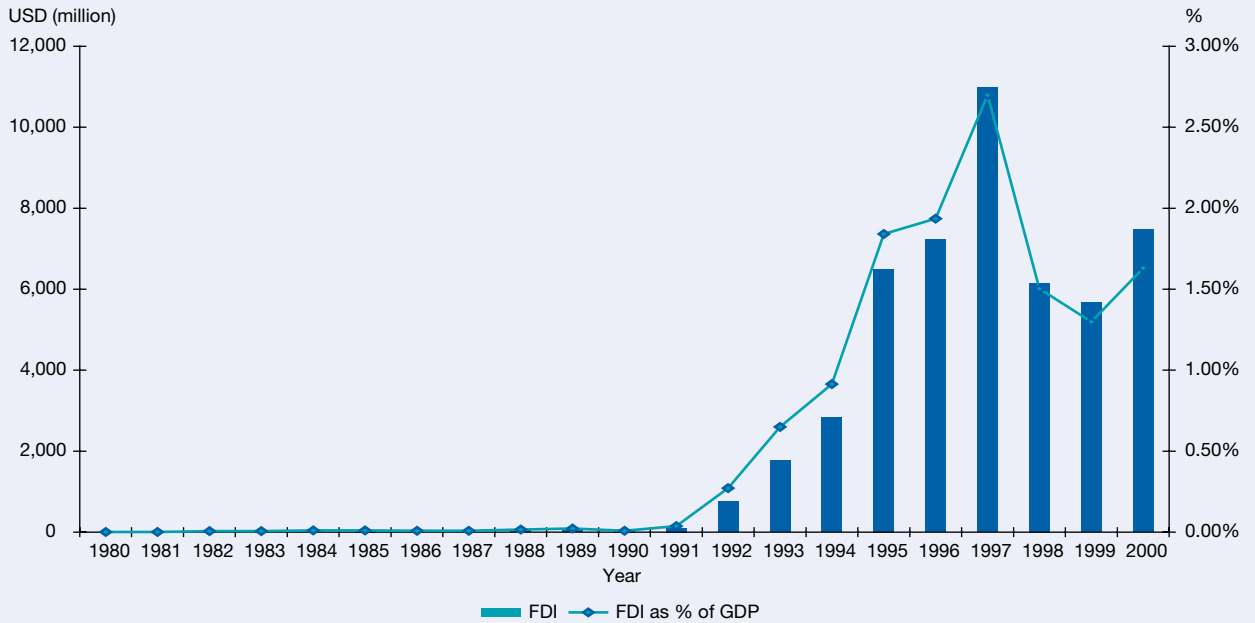
Exhibit 1A: India real GDP growth, 1980-2006

India GDP and GDP growth rate, 1980-2006

Source: GDP data from EconStats.com.

Exhibit 1B: FDI into India, 1980-2000

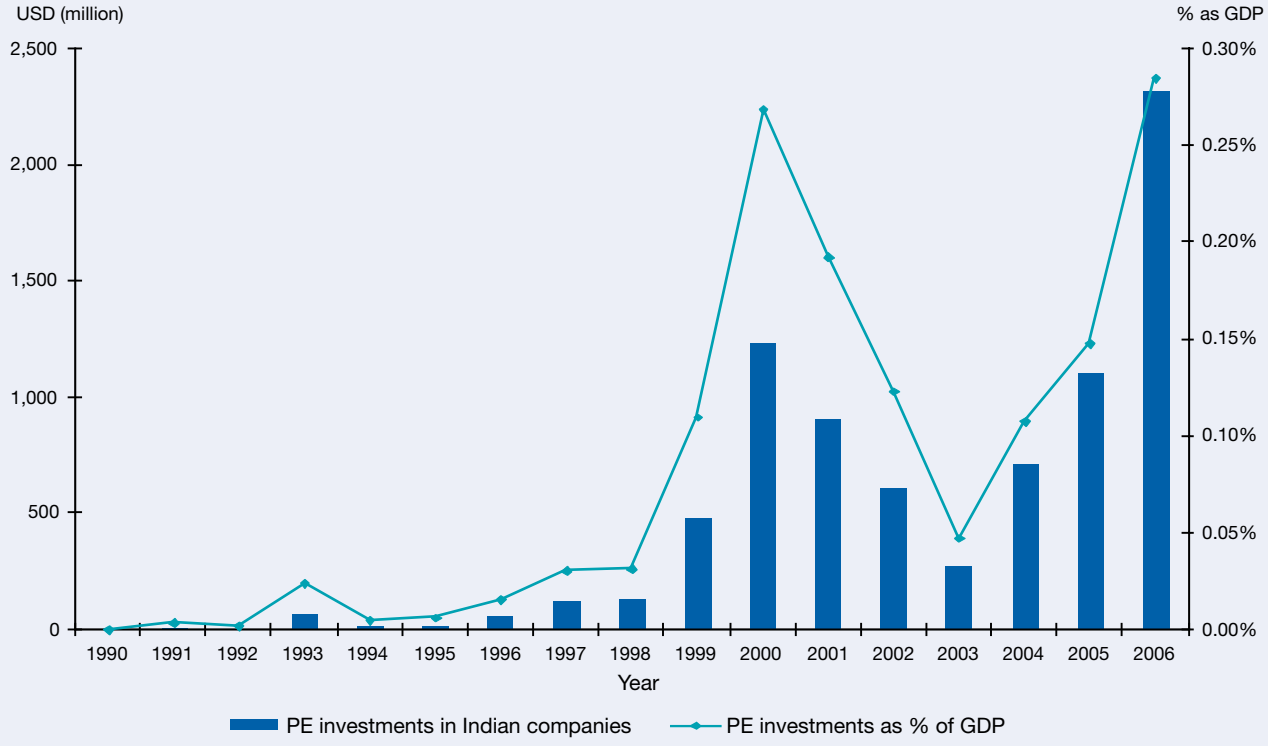
FDI into India and its percentage of Indian GDP, 1980-2000



Source: GDP data from EconStats.com; FDI data from "Globalization of Foreign Direct Investment in India: 1900s-2000", Amar KJR Nayak, Xavier Institute of Management, Bhubaneswar, Orrisa, India.

Exhibit 1C: Private equity investments in Indian companies

PE investments in Indian companies 1990-2006



Data Source: Private equity investment data from SDC Platinum VentureXpert.
GDP data from EconStats.com

Exhibit 2: Bharti's three-line graph

The company tracks its performance on a three-line graph

The parameters considered for the three-line graph are:

1. Gross Revenues – i.e., absolute turnover/sales

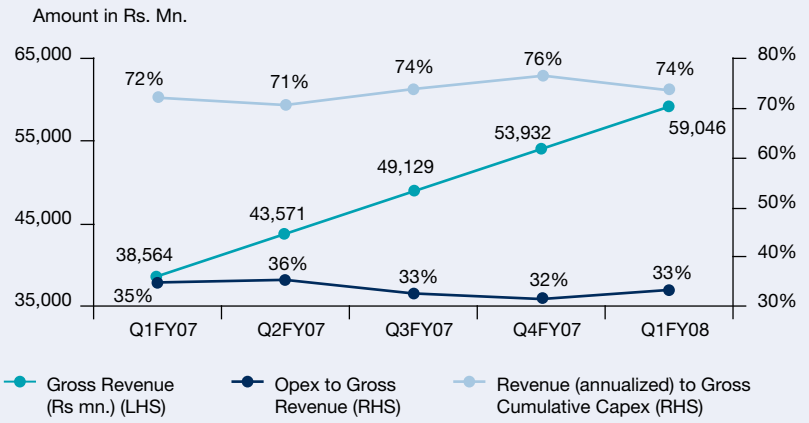
2. Opex Productivity – operating expenses divided by the gross revenues for the expected period. Operating expenses is the sum of (i) equipment costs (ii) employee costs (iii) network operations costs and (iv) selling, general and administrative costs. This ratio depicts the operational efficiencies in the company.

3. Capital Productivity – this is computed by dividing revenue for the quarter (annualized) by gross cumulative Capex (gross fixed assets, capital work in progress and intangibles) til date i.e., the physical investments made in the assets creation of the company.

This ratio depicts the productivity of assets of the company.

The company believes that as far as the absolute revenues keep increasing periodically, Opex productivity stabilizes or keeps coming down and capital productivity keeps improving, the company's overall financial health can be tracked.

Given below is the graph for the last five quarters of the company.



Source: Bharti Airtel, First Quarter Report 2008.

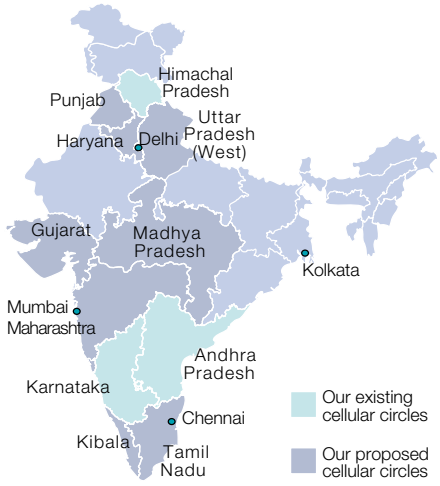
Exhibit 3: Timeline for Bharti Tele-Ventures and Warburg Pincus Investments

Date	Event	Value
1995 (July)	Bharti Televentures Ltd (BTVL) created	
1999 (13 September)	Warburg Pincus makes first investment for less than 15% of BTVL	$15 million
1999 (17 November)	Warburg Pincus makes second investment	$44 million
2000 (15 January)	Warburg Pincus makes third investment	$29 million
2001 (21 June)	Warburg Pincus makes fourth investment	$125 million
2001 (16 July)	Warburg Pincus makes fifth investment	$75 million
2002 (February)	BTVL IPO; Warburg Pincus stake diluted to 18.5%	$171.5 million
2004 (13 August)	Warburg Pincus begins to exit, sells a 3.35% equity share	$204 million[18]
2005 (2 February)	Warburg Pincus makes second exit via overnight block trade	$307 million
2005 (March)	Warburg Pincus sells 6% stake in public market, Mumbai Stock Exchange	$553 million[19]
2005 (28 October)	Warburg Pincus sells 5.65% to Vodafone, completes exit from BTVL. Cumulative proceeds exceed $1.83 billion	$766 million[20]

[18] http://www.vccircle.com/2005/11/3/the-warburg-bharti-saga-an-eventful-and-profitable-one/ accessed 14 December 2007 and company information.
[19] Jay Solomon, Laura Santini and Kate Linebaugh, "Warburg Sells 6% Stake in Bharti," Wall Street Journal, 15 March 2005, and company information.
[20] http://www.vccircle.com/2005/11/3/the-warburg-bharti-saga-an-eventful-and-profitable-one/ and company information.
Source: Warburg Pincus.

Exhibit 4A: Bharti cellular footprint in India in November 2001

We currently provide cellular services in six of the 22 licence areas in India (referrred to as circles) and intend to expand our cellular services to cover nine additional circles by the middle of this year. As of 30 November 2001, approximately 92% of India's total number of cellular subscriptions resided in our existing and proposed cellular circles. Our cellular coverage in India is depicted here:

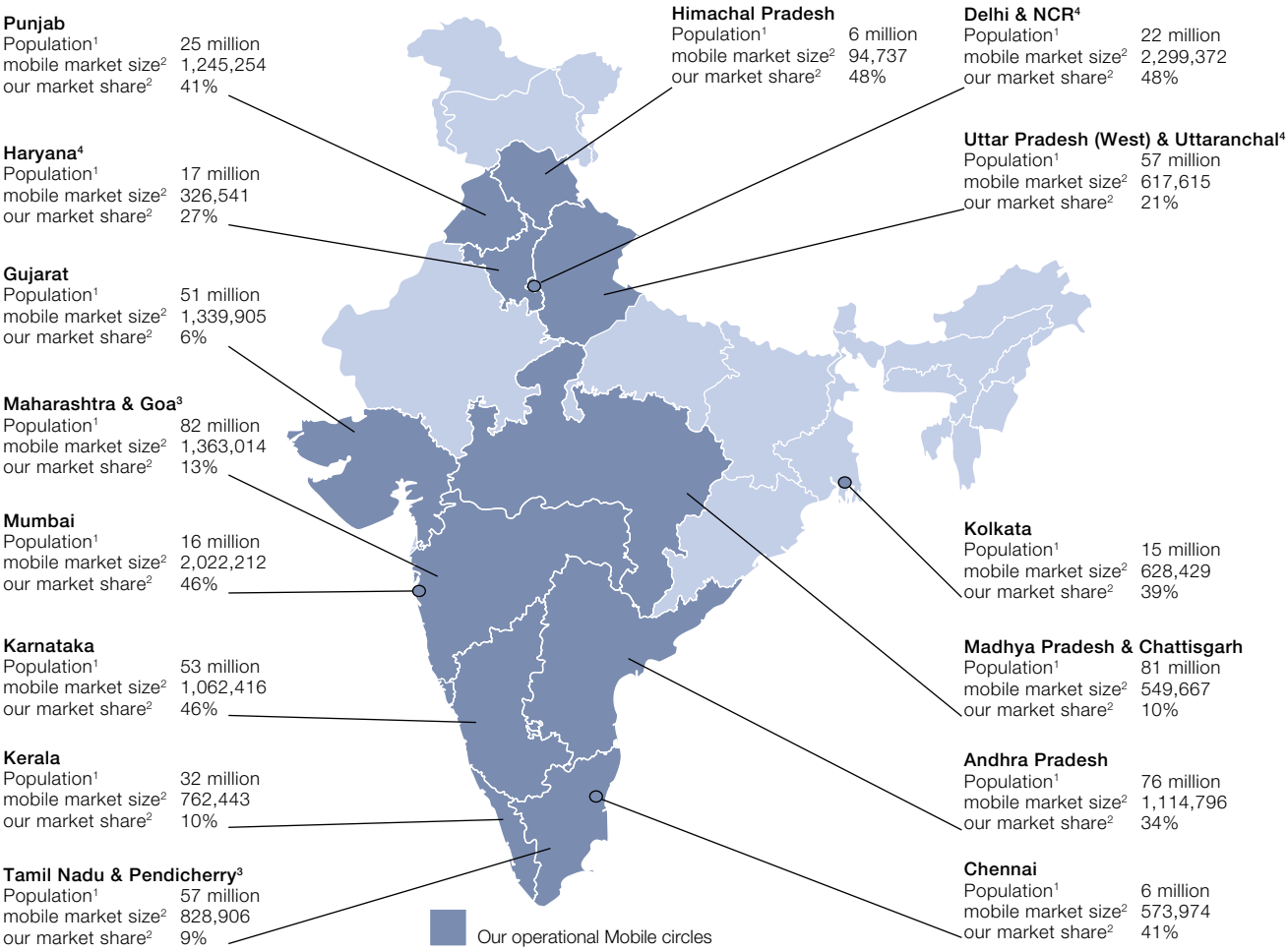


The key demographies of the present and proposed cellular circles and a comparison with leading cellular operators in India is set forth below. The information given is for the total market and is not representative of our market share or network coverage.

		Existing licence area				Existing and proposed licenced area			
	India		Bharti	Hutchison	BPL - BTAL		Bharti[1]	Hutchison[2]	BPL - BTAL[3]
		Actual	% to all India	% to all India	% to all India	Actual	% to all India	% to all India	% to all India
Number of circles	22	6	27%	18%	32%	15	68%	32%	36%
Area of the circles (in square kilometrers, in thousands)[4]	3,278	525	16%	6%	43%	1,848	56%	20%	43%
Population in licenced areas (in millions)[5]	1,027	167	16%	9%	38%	594	58%	22%	40%
Market cellular subscribers in the licenced area (in millions)[6]	5.2	2.0	38%	43%	53%	4.8	92%	61%	69%
Market DELs in the licenced area (in millions)[7]	32.4	9.6	30%	25%	51%	26.8	82%	43%	57%
Number of vehicles in the licenced areas (in millions)[8]	36,132	9,779	27%	22%	48%	29,025	80%	39%	56%

(1) Comprises our six circles where we have exisitng operations, and our nine proposed circles where we recently acquired licences and intend to provide cellular services by the middle of this year.
(2) Consists of the circles of Delhi, Mumbai, Kolkata, Chennal, Gujarat, Andhra Pradesh and Karnataka.
(3) Constitutes the proposed merged entity of BPL and Birla Tata AT&T and the circles consist of Melhi, Mumbai, Gujarat, Maharashtra, Andhra Pradesh, Tamil Nadu, Kerala and Madhya Pradesh.
(4) Area estimates are from National Census 2001.
(5) Population estimates for all the circles other than the metropolitan areas are as per National Census 2001 and are as of March 1 2001. Population estimates for the Uttar Pradesh (West) circle is 37% of the total populatin of the state of Uttar Pradesh.
(6) Based on data released by the COAI on the total number of cellular subscribers in the circles as of November 30 2001.
(7) DELs are defined as direct exchange lines representing the number of fixed-line subscribers and are based on data available from BSNL's annual report for 2000–2001 on the number of DELs in the circles as of March 31 2001.
(8) Vehicles comprise four wheelers and two wheeler non-commercial vehicles and are derived from data released by the Motor Transport Statistics of India as of March 31 1997 in its most recent report.
Source: 7 February 2002. Bharti Prospectus.

Exhibit 4B: Bharti cellular footprint in 2003



(1) Population estimates are as per National Census, 2001 and are as of 1 March 2001. The population for Uttar Pradesh (West) circle is approximately 37% of the total population for the state of Uttar Pradesh.
(2) Mobile subscriber statistics are as of 31 July 2003 and are based on data released by COAI. Mobile market size comprises the total number of mobile subscribers of all the service providers in a circle.
(3) Demographics of Maharashtra and Tamil Nadu do not include demographics of state capitals (metros) Mumbai and Chennai respectively.
(4) Demographics of Haryana do not include Faridabad & Gurgaon as they are included in Delhi & NCR. Similarly, demographics of Uttar Pradesh (West) & Uttaranchal do not include Noida & Ghaziabad as they are included in Delhi NCR.

Source: Company documents.

Exhibit 5A: Bharti's corporate structure in December 2000

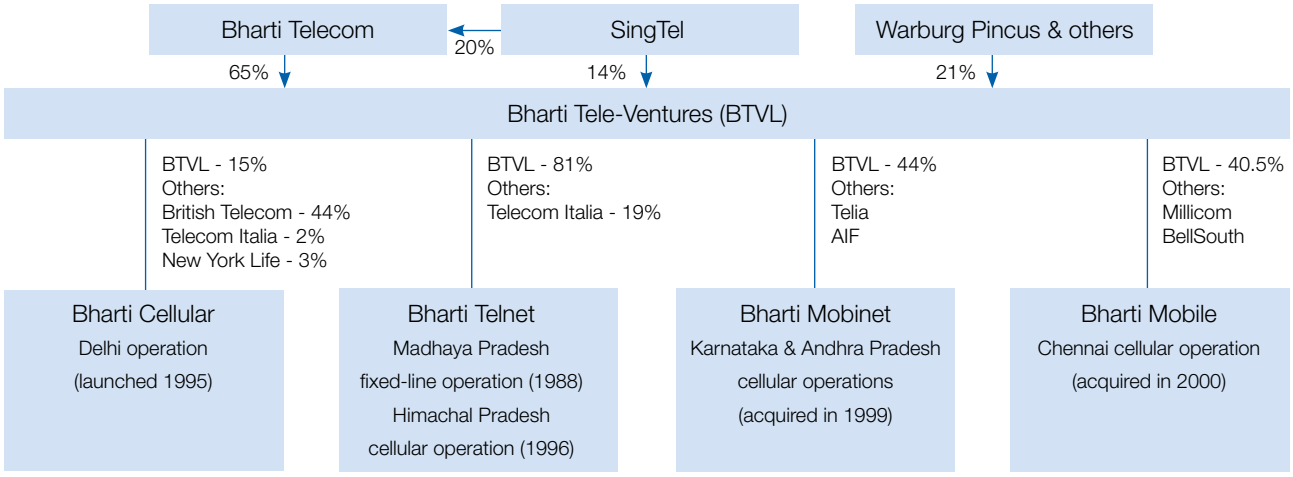
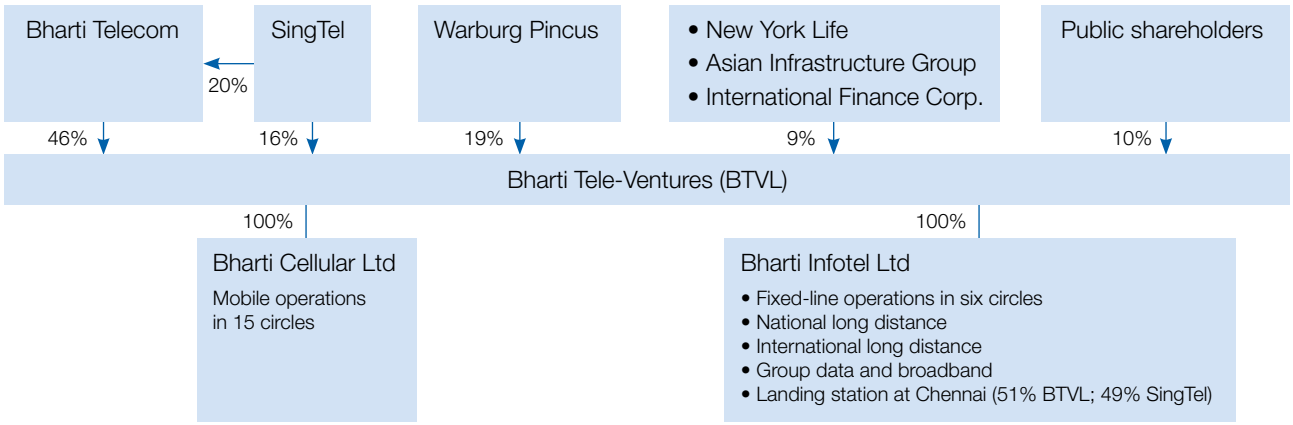


Exhibit 5B: Bharti's corporate structure in August 2003



Source: Company documents.

Exhibit 6: Summary of Bharti's financial and operational performance 1999 – 2001 (pre-IPO)

Any discrepancies in any table between totals and the sums of the amounts listed are due to rounding off.

(In millions, except ratios and per share data)	Year ended 31 March 1999	Year ended 31 March 2000	Year ended 31 March 2001	Six months ended 30 Sep 2001	Year ended 31 March 2001	Six months ended 30 Sep 2001
	(Restated)	(Restated)	(Restated)	(Unaudited)	(Restated)	(Unaudited)
Consolidated income statement data						
Revenue						
Cellular	Rs.2,195	Rs.3,837	Rs.7,370	Rs.5,302	$154	$111
Fixed-line	97	506	1,092	755	23	16
Broadband	–	–	–	171	–	4
Equipment sale	157	138	20	19	–	1
Total revenue	2,449	4,481	8,481	6,248	177	131
YoY (%)	–	83%	89%			
Performance revenue [1]	1,891	3,681	7,232	5,240	151	109
YOY (%)	–	95%	96%			
Total operating expenses excluding licence fees and pre-operating costs	1,711	2,808	5,634	3,891	118	81
Licence fees	703	817	917	681	19	14
Adjusted EBITDA	35	856	1,930	1,676	40	35
YoY (%)	–	2,346%	125%			
Earnings (loss) before taxation	(562)	(797)	(1,102)	181	(23)	4
Income-tax (expense)	105	80	46	(156)	1	(3)
Net profit (loss)	(322)	(550)	(1,208)	(158)	(25.0)	(3)
Ratios and other financial data:						
Adjusted EBTIDA margin on proforma revenue (%)(1)	1.9%	23.3%	26.7%	32.0%	26.7%	32.0%
Adjusted EBTIDA margin on total revenue (%)	1.4%	19.1%	22.8%	26.8%	22.8%	26.8%
Net profit (loss) per common share	(0.21)	(0.35)	(0.74)	(0.10)	(0.016)	(0.002)

[1] Performa revenues are calculated as service revenues less access and interconnection costs incurred for our cellular business and are unaudited. Service revenues exclude revenues from equipment sales. We believe that proforma revenues, calculated in this manner, are more representative of our revenue stream for the cellular business, as a significant part of the access and interconnection costs, which we collect from our customers for interconnecting with fixed-line network are passed on to BSNL or MTNL, in accordance with our interconnection arrangements. Until 25 January 2001, we passed on the entire charges collected from our customers, while subsequently we have been passing on 95% of call charges collected from our customers, in accordance with a notification issued by the DoT. Any change in the interconnection arrangements regarding sharing of revenues from calls will have an impact on the proforma revenues and may result in us calculating adjusted EBTIDA margins only on the basis of total revenues, which includes access charges and revenue from equipment sales, if any.

(in millions)	For the financial year ended 30 Sep 2000	For the financial year ended 31 March 2001	Six months ended 30 Sep 2001	
	(Restated)	(Restated)		(Unaudited)
Consolidated balance sheet data				
Current assets	Rs.3,945	Rs.7,967	Rs.9,289	$194
Net property, plant and equipment (incl. capital work-in-progress)	8,189	13,493	19,244	402
Goodwill	3,725	12,014	26,041	544
Total assets	16,764	35,642	63,641	1,329
Represented by				
Long-term debt, net of current portion	7,119	7,210	9,893	207
Short-term borrowings	1,229	1,007	3,130	65
Total shareholders' equity	4,222	18,955	41,540	867

(in millions)	For the financial year ended 31 March 1999	2000	2001	Six months ended 30 Sep 2001	For the financial year ended 31 March 2001	Six months ended 30 Sep 2001
Consolidated cash flow data						
Net cash provided/(used) by/in operating activites	Rs.1,059	Rs.(1,905)	Rs.1,190	Rs.(4,116)	$25	$(86)
Net cash provided/(used) by/in investing activities	(3,656)	(3,599)	(10,866)	(20,455)	(227)	(427)
Net cash provided/(used) by/in financing activities	2,594	5,528	9,860	24,823	206	518
Net increase/(decrease) in cash and cash equivalents	(4)	24	184	252	4	5

Source: 7 February 2002. Bharti Prospectus.

Exhibit 6: Summary of Bharti's financial and operational performance 1999 – 2001 (pre-IPO)

Summary operating and other data.

	As at and for the year ended 31 March 1999	As at and for the year ended 31 March 2000	As at and for the year ended 31 March 2001	As at and for the eight months ended 30 Nov 2001
Indian demographic and economic data				
Area (in square kilometres, in thousands)[1]	3,278	3,278	3,278	3,278
Population (in millions)[1]	N.A.*	N.A.*	1,027	1,027
Real GDP growth (%)[2]	6.6	6.4	6.0[4]	N.A.*
GDP per capita (in Rs.)[3]	18,078	19,748	21,648	N.A.*
Combined population of our cellular service areas[1]	N.A.*	N.A.*	154	594
Combined population of our fixed-line service areas[1]	N.A.*	N.A.*	81	232
Indian telecommunications market data				
Cellulaar subscribers (in millions)[5]	1.2	1.9	3.6	5.2
Fixed-line subscribers (in millions)[6]	21.6	26.5	21.4	N.A.
Our cellular operating data				
Number of cellular circles	2	4	5	15
Our cellular customers	121,848	282,918	595,128	1,048,000
Our total estimated market share in all our service areas[5]	55.6%	49.6%	53.1%	53.4%
Average monthly churn rate (%)[7]	3.8%	3.5%	4.7%	5.7%
Average minutes of use per customer per month[8]	91	172	217	202
Average revenue per customer per month[9]	1,330	1,335	1,249	N.A.*
Our fixed-line operating data				
Our fixed-line customers	12,223	66,661	107,086	134,958
Our total estimated market share in all our service areas[8]	1.3%	5.7%	7.8%	8.8%[12]
Average monthly churn rate (%)[7]	0.8%	1.2%	2.5%	1.9%
Average pulse per customer per month[10]	1,348	914	881	915
Average revenue per customer per month[11]	1,587	1,070	1,048	N.A.*

* N.A. Not available.

[1] Population estimates as per National Census, 2001 and are as of 1 March 2001.
[2] Economic Survey, conducted by the Government of India annually.
[3] Based on the data released by Centre for Monitoring Indian Economy or CMIE.
[4] Advance estimates, as provided in the Economic Survey 2000-01, published by the Government of India.
[5] Based on the data released by the COAI.
[6] Based on the data from the annual reports of BSNL.
[7] Average monthly churn rate for a period is the rate of customer disconnections net of reconnections. This rate is calculated by dividing deactivations less reconnections by the average number of customers during that period (the average of the number of customers on the first and last days of the respective period) divided by the number of months in that period for our customers. This information does not include churn for our customers in the Himachal Pradesh and Kolkata circles.
[8] Average minutes of usage per customer per month is calculated by:
(i) dividing the total minutes of usage for the period in our cellular networks less total roaming minutes by the number of months in that period; and
(ii) dividing the result by the average number of customers in our cellular networks at the beginning and end of the period.
This information does not include average minutes of usage per customer per month for our customers in the Kolkata circle.
[9] Average revenue per customer per month is calculated by taking the total cellular revenues reduced by access and interconnection costs and dividing it by the average number of customers during the period (calculated as the average of the sum of the customers at the beginning of the period and at the end of the period).The result so obtained is divided by the number of months in that period to arrive at the average revenue per customer per month. Average revenue per customer per month for 31 March 2001 does not include average revenue per customer per month for Chennai, as revenues for the Chennai cellular circle have not been consolidated as per IAS.
[10] Average pulse per customer per month is calculated by:
(i) dividing the total pulses of usage for the period in our fixed-line networks by the number of months in that period; and
(ii) dividing the results by the average number of customers in our fixed-line networks at the beginning and end of the period.
[11] Average revenue per customer per month is calculated by taking the total fixed-line revenues and dividing it by the average number of customers during the period (calculated as the average of the sum of the customers at the beginning of the period and at the end of the period). The result so obtained is divided by the number of months in that period to arrive at the average revenue per customer per month.

Source: 7 February 2002. Bharti Prospectus.

Exhibit 7: Bharti's board structure

Sunil Bharti Mittal, *Chairman & Managing Director.* A graduate from Punjab University, he has completed the 'Owner/President Management Programme' from Harvard Business School in 1999. The founder of the Bharti Group, he joined the board at the time of incorporation of BTVL in July 1995. He is the founder, past president and chairman of various telecoms industry associations.

Rajan Bharti Mittal, *Joint Managing Director.* A graduate from Punjab University, he has over 20 years of experience in the industry. Joined the board at the time of incorporation of BTVL in July 1995. He is the chairman of FICCI Telecom Committee as well as the PHDCCI Telecom Committee and a member of the Managing Committee of the PHDCCI.

Bashir Abdulla Currimjee, *Independent Non-Executive Director.* A graduate from Tufts University, USA. He is the Chairman of Currimjee Group, Mauritius, one of the largest commercial business groups which operate in areas such as telecommunications, energy, financial services and trading activities in Mauritius, South Africa, the Middle East, India and the Seychelles. Joined the board in February 2001.

Chua Sock Koong, *Non-Executive Director.* Nominated by SingTel. A graduate from University of Singapore, Ms Chua is a certified accountant and a chartered financial analyst. Chief Financial Officer of SingTel since April 1999. Joined the board in May 2001. Ms Chua is responsible for the overseas investments of SingTel.

Rakesh Bharti Mittal, *Non-Executive Director.* An electronics engineer from YMCA Institute of Engineering, with over 25 years of industry experience. Currently the vice chairman and managing director of Bharti Enterprises. Joined the board at the time of incorporation of BTVL in July 1995. Currently he heads the national committee on consumer affairs of CII.

Akhil Gupta, *Joint Managing Director.* A commerce graduate and chartered accountant, he has over 20 years of professional experience. Joined the board in April 1996. Mr Gupta was adjudged as the 'Chief Financial Officer for the year 2001 for Merger & Acquisitions' by the Economic Intelligence Unit, India in association with American Express.

N. Kumar, *Independent Non-Executive Director.* An engineer in Electronics and Communications, he is the vice chairman of the Sanmar Group of companies with operations in chemicals, thermoplastic resins, cement, shipping, electronics and footwear. Joined the board in November 2001.

P. M. Sinha, *Independent Non-Executive Director.* An alumnus of Massachusetts Institute of Technology's Sloan School of Management, and formerly chairman of Pepsico India Holdings and general manager of Pepsico Beverage International for South Asia. Joined the board in November 2001. He is also on the board of Lafarge India, Wipro, Azim Premji Foundation, ICICI Bank and Electrolux.

Dalip Pathak, *Independent Non-Executive Director.* Holds a Master's in Business Administration from the Wharton School, University of Pennsylvania, USA. He has been with Warburg Pincus since 1994 and is now managing director heading Singapore Operations covering South and South East Asian operations. Joined the board in September 1999.

Donald Cameron, *Independent Non-Executive Director.* A chemical engineer, he has a Master's in Economics and Administration in Petroleum Industry, from Loughborough University, UK, and over 32 years of experience in the petroleum and telecommunications industries. Joined the board in September 2001.

Lim Toon, *Non-Executive Director.* Nominated by SingTel. An engineer, he has a Post-Graduate Diploma in Business Administration from the University of Singapore. With over 30 years of experience in planning, implementation and operation of telecommunications services, he is COO of SingTel since April 1999. Joined the board in November 2000.

Pulak Chandan Prasad, *Independent Non-Executive Director.* An engineer from IIT, Delhi, he has a Post-Graduate Diploma in Management from IIM, Ahmedabad. As Managing director of Warburg Pincus, he is responsible for technology and telecoms-related investments in South East Asia, Australia and India. Joined the board in November 2001.

Sin Hang Boon, *Non-Executive Director.* Nominated by SingTel. Has a Post-Graduate Diploma in Business Administration from the University of Singapore, and has attended the Advanced Management Programme at Harvard. He has been a part of the top management of STI for 14 years, and is currently CEO. Joined the board in December 2001.

Wong Hung Khim, *Independent Non-Executive Director.* Group chairman and CEO of the DelGro group of companies, Singapore. Has headed Singapore Port Authority and was the first president and CEO of SingTel. Joined the board in November 2001. He was awarded the meritorious service medal by SingTel in 1992.

About the contributors

CO-EDITORS

Anuradha Gurung is Senior Project Manager in the Investors Industry at the World Economic Forum USA, where she is also a Global Leadership Fellow. As Senior Project Manager, Anu is responsible for initiating, developing and managing the Globalization of Alternative Investments project as well as collaborating on other Investors Industry projects that relate to Private Equity, Hedge Funds, Institutional Investors and Sovereign Wealth Funds. Prior to joining the Forum, Anu was an Investment Banker in the Mergers and Acquisitions (M&A) team at UBS Warburg LLC (now UBS Investment Bank) and in the M&A and Financial Sponsor teams at Banc of America Securities, LLC. She worked on transactions across many sectors including general industrials, healthcare, media and telecommunications, technology, real estate, and retail and consumer products. She was also a Research Analyst at Schneeweis Partners (now Alternative Investments Analytics, LLC), a research and consulting firm for hedge funds and other alternative investments. Anu was Phi Beta Kappa and graduated cum laude from Smith College, Massachusetts, USA with a BA in Economics (High Honours). She completed her Master's in Public Policy from Duke University, North Carolina, USA, where she was a James B. Duke Scholar and a Terry Sanford Scholar. Anu co-wrote the proposal for a mobile library system in rural Nepal, which was one of the top five recipients of a World Bank Development Marketplace grant in 2003.

Josh Lerner is the Jacob H. Schiff Professor of Investment Banking at Harvard Business School, Masschusetts, USA with a joint appointment in the Finance and Entrepreneurial Management units. He graduated from Yale College, Connecticut, USA with a Special Divisional Major that combined physics with the history of technology. He worked for several years on issues concerning technological innovation and public policy, at the Brookings Institution; for a public-private task force in Chicago; and on Capitol Hill. He then obtained a PhD from Harvard's Economics Department. Much of his research focuses on the structure and role of venture capital and private equity organizations. (This research is collected in two books, The Venture Capital Cycle and The Money of Invention.) He also examines technological innovation and how firms are responding to changing public policies. (The research is discussed in the book Innovation and Its Discontents.) He founded, raised funding for, and organizes two groups at the National Bureau of Economic Research (NBER): Entrepreneurship and Innovation Policy and the Economy. He is a member of a number of other NBER groups and serves as co-editor of their publication Innovation Policy and the Economy. His work has been published in a variety of top academic journals.

In the 1993-94 academic year, he introduced an elective course for second-year MBAs on private equity finance. In recent years "Venture Capital and Private Equity" has consistently been one of the largest elective courses at Harvard Business School. (The course materials are collected in Venture Capital and Private Equity: A Casebook, whose fourth edition is forthcoming.) He also teaches a doctoral course on entrepreneurship, in the Owners-Presidents-Managers Program, and organizes an annual executive course on private equity. He serves as the School's representative on Harvard University's Patent, Trademark and Copyright Committee and on the Provost's Committee on Technology Transfer.

CORE RESEARCH TEAM

Lead Academic

Josh Lerner is the Jacob H. Schiff Professor of Investment Banking at Harvard Business School, Masschusetts, USA with a joint appointment in the Finance and Entrepreneurial Management units. He graduated from Yale College, Connecticut, USA with a Special Divisional Major that combined physics with the history of technology. He worked for several years on issues concerning technological innovation and public policy, at the Brookings Institution; for a public-private task force in Chicago; and on Capitol Hill. He then obtained a PhD from Harvard's Economics Department. Much of his research focuses on the structure and role of venture capital and private equity organizations. (This research is collected in two books, The Venture Capital Cycle and The Money of Invention.) He also examines technological innovation and how firms are responding to changing public policies. (The research is discussed in the book Innovation and Its Discontents.) He founded, raised funding for, and organizes two groups at the National Bureau of Economic Research (NBER): Entrepreneurship and Innovation Policy and the Economy. He is a member of a number of other NBER groups and serves as co-editor of their publication Innovation Policy and the Economy. His work has been published in a variety of top academic journals.

In the 1993-94 academic year, he introduced an elective course for second-year MBAs on private equity finance. In recent years "Venture Capital and Private Equity" has consistently been one of the largest elective courses at Harvard Business School. (The course materials are collected in Venture Capital and Private Equity: A Casebook, whose fourth edition is forthcoming.) He also teaches a doctoral course on entrepreneurship, in the Owners-Presidents-Managers Program, and organizes an annual executive course on private equity. He serves as the School's representative on Harvard University's Patent, Trademark and Copyright Committee and on the Provost's Committee on Technology Transfer.

Ann-Kristin Achleitner is Head of the KfW Endowed Chair in Entrepreneurial Finance and Scientific Co-Director of the Center for Entrepreneurial and Financial Studies (CEFS) at Technische Universität München (TUM), one of Germany's elite universities.

Previously, she was Professor for Banking and Finance at the European Business School, Oestrich Winkel, Germany and worked as a consultant for McKinsey & Company, Inc. She earned her university and doctoral degrees in both Law and Business Administration from the University of St Gallen in Switzerland.

She is a member of the expert commission "Research and Innovation" (EFI) of the German Federal Government and a member of the Advisory Board on Small- and Medium-Sized Companies of the Federal Ministry of Economics and Technology. Recently, she was part of a distinguished team working for the Federal Ministry of Finance on expertise about the legal and tax environment of private equity, providing recommendations for the German legislator to prepare a new private equity law.

She is President of the Förderkreis Gründungs-Forschung e.V. (FGF), the largest non-profit organization in German-speaking countries supporting entrepreneurship research and academic education. Moreover, she is a member of the senate of the Fraunhofer-Gesellschaft, the leading organization for applied research in Europe, and Head of the advisory board of Ashoka Germany.

Prof. Achleitner is a prolific writer and well-known publisher of numerous articles and books and has earned many awards and honours. In particular, she was elected Global Leader of Tomorrow (GLT) by the World Economic Forum in 1998. She was honoured with the "Initiativpreis 2005" by the Stiftung Industrieforschung for the development of a new stock market index of German entrepreneurial firms. As an academic teacher she was awarded with the teaching award "Preis für gute Lehre" of the Bavarian State Minister of Sciences, Research and Arts in 2004. In 2006, she was recognised for her commitment to successfully promoting student careers and awarded the title of "Professor of the Year" by all German students and the magazine Unicum.

Prof. Achleitner was awarded the "Pro meritis scientiae et literarum" for exceptional contributions to Science in Bavaria in 2004 and the Order of Merit of the Federal Republic of Germany in 2007.

Francesca Cornelli is Professor of Finance at the London Business School. She has also held positions or taught at the Wharton School, University of Pennsylvania; the Fuqua School of Business at Duke University, North Carolina, USA; the London School of Economics; the Indian School of Business in Hyderabad; and the New Economic School in Moscow. Her interests include corporate finance, private equity, privatization, bankruptcy, contract theory and industrial organization. She has published several papers in the major finance and economics journals and she gives regular talks in conferences and universities. She is a member of the Council of the Royal Economic Society and of the Scientific Committee of the Banque de France Foundation. She is also an associate editor of the Journal of Finance and of the Journal of Financial Intermediation, a member of the Editorial Board of the Review of Economic Studies and a Research Fellow of the Center for Economic and Policy Research (CEPR). She is also a Fellow of the William Davidson Institute at the University of Michigan Business School and has been a member of the Council of the European Economic Association. She obtained her BA at Universit´a Commerciale Bocconi, in Milan, Italy, and her MA and PhD in Economics at Harvard University, Massachussetts, USA.

Lily Fang joined INSEAD, Singapore as an Assistant Professor of Finance in 2003. She holds an MA and PhD in Finance from the Wharton School, University of Pennsylvania. Prior to studying finance, she studied mathematics, actuarial science and management science at Simon Fraser University, Vancouver, Canada.

Professor Fang's research focuses on the role of information and information providers in the capital markets. For example, one of her earlier papers examines the relation between investment bank reputation and the price and quality of underwriting service. She has also studied incentives and performance measures of financial analysts and mutual fund managers. More recently, she has studied the relation between media coverage and stock prices. Her work has appeared in prestigious outlets such as the Journal of Finance and the Financial Times.

At INSEAD, Professor Fang teaches Financial Markets and Valuation, a core MBA Finance course, and Private Equity Finance, an elective course in Finance. She is the director of the Mastering Alternative Investments programme, an open-enrolment executive programme.

Roger S. Leeds is a Professor at the School of Advanced International Studies (SAIS) of the Johns Hopkins University, Washington DC, USA and Director of the School's Center for

International Business and Public Policy. He also serves as the Chairman of the Board of Directors of the Emerging Markets Private Equity Association, a global industry association, and is an Adjunct Professor at the Wharton School, University of Pennsylvania. Dr. Leeds' teaching and research focus on international financial markets, private equity investing in emerging markets and financial sector development. The Center he heads is involved in applied research and outreach activities that focus on a range of issues pertaining to private equity investing in emerging markets, and the interdependence of private sector performance and public policy, such as financial regulation and privatization.

Prior to joining SAIS in 1999, Dr. Leeds' career combined his professional interests in business, finance and public policy. Previous positions include: Managing Director and co-head of the emerging markets practice at Patricof & Co., a New York-based venture capital firm and merchant bank; Partner at KPMG (the Barents Group), where he headed their global privatization advisory services; senior staff member at the International Finance Corporation, the World Bank affiliate that provides financing for private companies in developing countries; and Associate at Salomon Brothers in New York. He has worked in more than 100 countries in Asia, Eastern Europe and the former Soviet Union, Latin America and Africa. His international career began 35 years ago in Brazil, where he served as a Peace Corps Volunteer for two years.

Dr. Leeds has longstanding ties to the academic community that pre-date his current position at SAIS. He spent two years at the Kennedy School of Government at Harvard University, Massachusetts, USA, teaching and heading a research project on privatization in developing countries. He also has guest-lectured at numerous universities around the world. He is the author of a book entitled Financing Small Enterprises in Developing Countries and more than 30 articles and book chapters. He has been a guest commentator on radio and television programmes including CNN, Bloomberg News, CBS News, CNBC and National Public Radio. Dr. Leeds is a member of the Council of Foreign Relations in New York, and has served on numerous boards. He received his undergraduate degree from Columbia University, New York, USA and his MA and PhD from SAIS.

Per Strömberg joined the Swedish Institute of Financial Research (SIFR), Stockholm in 2004 as a Senior Research Fellow. He is also Associate Professor of Finance at the Stockholm School of Economics, and Senior Research Fellow, Swedish Institute of Financial Research (GSB). He received his PhD in Financial Economics from Carnegie Mellon University, Pennsylvania, USA and holds an MBA (civilekonom) from the Stockholm School of Economics.

Dr Strömberg's research has primarily focused on the two areas of bankruptcy and private equity finance. His work has been published in the Journal of Finance, the American Economic Review, the Review of Economic Studies and the Journal of Financial Intermediation, and has been presented at numerous conferences and universities. His work on bankruptcy auctions was awarded with the 2001 Brattle Prize for best corporate finance paper published in the Journal of Finance.

Between 1997 and 2004, Dr Strömberg was a faculty member at the University of Chicago, where he taught the MBA case course in Financial Management as well as co-taught the PhD course in Corporate Finance. He still teaches corporate finance in the University of Chicago GSB International Executive MBA programs, where he won Best Teacher awards in 2004 and 2005. He has also taught at the Stockholm School of Economics and at Carnegie Mellon University.

He is a faculty Research Fellow of the National Bureau of Economic Research (NBER), a Research Affiliate of the Center for Economic Policy Research (CEPR), and a Research Associate of the European Corporate Governance Institute (ECGI). He is also an independent board member of Conversus Capital, L.P.

FROM THE WORLD ECONOMIC FORUM

Max von Bismarck is the Head of Investors at the World Economic Forum. In that capacity he leads an international team based in New York and Geneva responsible for Private Equity, Hedge Funds, Institutional Investors and Sovereign Wealth Funds. His team currently oversees projects concerning the "Globalization of Alternative Investments", "Global Growth Companies and Technology Pioneers", "Systemic Financial Risks" and "Green Investing". As an advisor to the Chairman he also led the process for the World Economic Forum 2005-2008 strategy development. Prior to joining the World Economic Forum, Max was a serial entrepreneur. He was Co-Founder and Managing Director at Public One Strategy Consulting. Previously, he was a founding team member and Director, Legal of the Oxford-based technology company Mondus Limited. He studied Law and Modern History at St John's College, Oxford University, UK and Humboldt Universität of Berlin. Max is a Global Leadership Fellow of the World Economic Forum and was named a German-American Young Leader of the Atlantik Brücke in 2004.

Anuradha Gurung is Senior Project Manager in the Investors Industry at the World Economic Forum USA, where she is also a Global Leadership Fellow. As Senior Project Manager, Anu is responsible for initiating, developing and managing the Globalization of Alternative Investments project as well as collaborating on other Investors Industry projects that relate to Private Equity, Hedge Funds, Institutional Investors and Sovereign Wealth Funds. Prior to joining the Forum, Anu was an Investment Banker in the Mergers and Acquisitions (M&A) team at UBS Warburg LLC (now UBS Investment Bank) and in the M&A and Financial Sponsor teams at Banc of America Securities, LLC. She worked on transactions across many sectors including general industrials, healthcare, media and telecommunications, technology, real estate, and retail and

consumer products. She was also a Research Analyst at Schneeweis Partners (now Alternative Investments Analytics, LLC), a research and consulting firm for hedge funds and other alternative investments. Anu was Phi Beta Kappa and graduated cum laude from Smith College, Massachusetts, USA with a BA in Economics (High Honours). She completed her Master's in Public Policy from Duke University, North Carolina, USA, where she was a James B. Duke Scholar and a Terry Sanford Scholar. Anu co-wrote the proposal for a mobile library system in rural Nepal, which was one of the top five recipients of a World Bank Development Marketplace grant in 2003.

Kevin Steinberg is Chief Operating Officer and Head of the Centre for Global Industries (New York) for the World Economic Forum USA, the North American affiliate of the Forum which acts as global headquarters for its industry-related efforts. There, he focuses in particular on the Financial Services sector, including the Investors Community, as well as overall operations of the organization. With the World Economic Forum, Kevin's prior roles included overseeing the Foundation's industry teams; leading its Membership and Partnership department; and guiding its Institutional Strategy function. Since 1992, internally or as an external adviser, he has led several initiatives including the launch of the Global Leaders for Tomorrow community, organized worldwide Industry Summits, and led Foundation-level strategy projects. Before joining the Forum, Kevin spent 10 years with the Wholesale and Investment Banking Practice of McKinsey & Company in New York and Switzerland, primarily focused on corporate, business unit and product strategy, serving wholesale and retail financial companies as well as non-profit institutions. He holds an AB in Economics from Harvard University, Massachusetts, USA, and a JD and an MBA from Stanford University, California, USA.

Acknowledgements

JOSH LERNER
Harvard Business School

ANURADHA GURUNG
World Economic Forum USA

On behalf of the World Economic Forum and the core research team for the "Global Economic Impact of Private Equity" project, we would like to thank the members of the Advisory Board for their invaluable contributions and feedback. We are indebted to the co-authors Steven J. Davis (University of Chicago Graduate School of Business), John Haltiwanger (University of Maryland), Ron Jarmin (US Bureau of the Census), Õguzhan Karakas (London Business School), Javier Miranda (US Bureau of the Census), Eva Nathusius (Technische Universität München) and Morten Sørensen (University of Chicago Graduate School of Business).

We are thankful to the casewriters Brian DeLacey, Kerry Herman and David Kiron at Harvard Business School and the numerous research associates who provided exemplary help with the research, especially Sarah Woolverton of Harvard Business School.

We would also like to express our gratitude to all the relevent individuals at the following firms and funds for their patience and willingness to provide information and support for the respective case studies:

3i Group plc
Allianz SE
Apax Partners Ltd
Bharti Tele-Ventures Limited
China Glass Holdings Limited
Freshfields Bruckhaus Deringer
Goldman Sachs International
Hony Capital Limited
ICICI Venture
Little Sheep Catering Chain Co.
Messer Group GmbH
Nalanda Capital
New Look Group Ltd
Permira Advisers LLP
Pilkington plc
Subhiksha Trading Services Ltd
Warburg Pincus

Special thanks are due to Franci J. Blassberg and Meir D. Katz at Debevoise Plimpton LLP, who provided legal counsel. Thank you to Kathi Hall and Debra Sheehan, who sub-edited the Working Papers. We are very grateful to Paula Beardsley, Armelle Vergucht and the team at Wardour and Kamal Kimaoui and the Publications Team at the World Economic Forum for their valuable assistance in the production of this volume of Working Papers. Last, but not least, we thank Mark Adams, Rick Samans and Kerry Wellman Jaggi at the World Economic Forum for their support.

WORLD ECONOMIC FORUM

COMMITTED TO IMPROVING THE STATE OF THE WORLD

The World Economic Forum is an independent international organization committed to improving the state of the world by engaging leaders in partnerships to shape global, regional and industry agendas. Incorporated as a foundation in 1971, and based in Geneva, Switzerland, the World Economic Forum is impartial and not-for-profit; it is tied to no political, partisan or national interests.

(www.weforum.org)