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John L. Chapman
American Enterprise Institute

Peter G. Klein
University of Missouri

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John L. Chapman
American Enterprise Institute
1150 17th St. NW
Washington, DC 20036
1.202.419.5207
John.Chapman@AEI.org

Peter G. Klein
Contracting and Organizations Research Institute
University of Missouri
135D Mumford Hall
Columbia, MO 65211
1.573.882.7008
pklein@missouri.edu

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Abstract: Is private equity an effective governance structure, or simply a means of transferring wealth from "Main Street" to "Wall Street"? How do buyouts affect target-company organization and strategy? How do deal characteristics such as size, industry, transaction complexity, buyer characteristics, holding period, and the like affect the performance of private-equity transactions? Are revenue improvements driven primarily by changes in employment and capital expenditures, or by changes in organization and strategy? Despite a healthy literature on buyouts, little is known about the details of private equity transactions, as most studies rely on publicly available data or confidential data from a single buyout firm. This paper uses a unique sample of 288 exited transactions over a 20-year period across 19 industries from 13 buyout firm firms, based on confidential data from detailed interviews with the general partners of several leading private-equity partnerships. While prior studies have focused on whole-company, going-private buyouts, our sample includes transactions with minority stakes, syndicate deals, and consolidating roll-up or add-on strategies, and we have detailed information on internal rates of return, leverage, equity stakes, and other deal characteristics. We find that the pursuit of ancillary consolidating acquisitions is the biggest driver of post-buyout revenue and profit growth, that solo deals and deals with controlling stakes outperform syndicated or "club" deals, that rates of return have declined over time as buyout markets have become more competitive, that mitigation of agency costs is critical for deal success, and more generally, that private equity can improve the performance even of sound businesses by providing access to resources, industry-specific expertise, capital for recombining assets (most often, consolidation in a fragmented industry), or recapitalization and ownership transition. Finally, our findings suggest the potential for further research of private equity at the transaction level.

JEL codes: G34, G32, L25, L26

Keywords: private equity, leveraged buyout, internal rate of return, diversification, syndication, entrepreneurship

INTRODUCTION

Since the heyday of leveraged buyouts in the 1980s, researchers, practitioners, and policymakers have sought to understand the role private equity (PE) plays in the economy as a whole.[1] Indeed, the global cataclysm in financial markets that began in 2008 has brought about retrenchment in highly visible segments of the buyout arena. Large firms such as Carlyle Group and Fortress Investments have announced significant staff layoffs, fundraising is off 90% from recent levels, and existing fund holdings have been subject to dramatic write-downs. Private equity, which as recently as 2006-07 provided 30% of all M&A funding globally, will likely provide less than 10% worldwide in 2009-10.[2] Further, the curtailment of bank credit for buyout deals portends a smaller footprint for PE in the next several years. Meanwhile, Blackstone Group's 2007 initial public offering puzzled many observers, including stalwart PE defenders such as Michael Jensen, who called the "publicly-traded private equity firm" structure an "oxymoron."[3] Jensen has wondered aloud if PE firms are now subject to the same kinds of agency problems they once resolved so effectively.

Critics argue that the PE sector's recent problems are the logical outcome of Wall Street excesses and faddish investing, ratifying their long-held belief that this sector serves mainly to transfer wealth "from Main Street to Wall Street." However, our knowledge of the nature and effects of private-equity investment is at best fragmentary and incomplete. There is a substantial literature on buyouts, starting with DeAngelo, DeAngelo, and Rice's (1984) study of 42 going-private transactions from the 1970s and now including more than 150 papers in major academic

[1] We follow convention in using the term "private equity" to refer to buyouts or equity investments in mature companies by equity limited partnerships; we exclude early-stage, "venture capital" investing. This paper is the first installment in an extended research project that seeks to delineate how value is created by private equity via changes in governance, strategy, and operations of existing companies, delivered by investors possessing specific knowledge of these areas in the respective industries or competitive situations of target investments.

[2] Source: Thomson Financial. Forward estimate cited in Wall Street Journal, February 4, 2009; industry sources confirm the magnitude of current and likely magnitude of the drop-off in activity.

[3] Apollo Group, Fortress Investments, and other high-profile PE firms also went public or talked about it before global equity market declines after Fall 2007.

journals. Most of these have dealt with whole-company buyouts, generally of public companies, using data from public sources such as SEC filings and press reports.[4] These sources, while providing valuable background information, lack the transaction-level data needed to perform detailed analyses (and are often incomplete and inconsistent).[5] A few studies have obtained confidential data at the fund level from institutional investors (Bull, 1989; Ljungqvist and Richardson, 2003); one recent study obtained data from private placement memoranda prepared by buyout firms (Groh and Gottschalg, 2008). None of these studies, however, is based on detailed transaction-level data over multiple PE firms and portfolio companies.

In this paper, we report empirical results from a study of 288 exited transactions across 19 NAICS two-digit industries from 13 PE firms. The data were obtained from interviews with the general partners of several leading PE partnerships who provided detailed financial data as well as information on the operating, strategic, and funding decisions the partners made during the investment period. Our sample includes a variety of transaction types: whereas prior studies have focused on going-private buyouts (the deal type that appears most often in publicly available information), our sample includes transactions with minority stakes, syndicate deals, and consolidating roll-up or add-on strategies. We can thus measure performance by PE firm, industry, transaction type, exit strategy, and other characteristics.

Our broader objective is to identify how and why private equity works and to compare it to public equity, particularly as means of corporate governance. What do buyouts do to the target firm's governance, strategy, and execution? What kinds of portfolio companies benefit

[4] Many of these papers appeared during two spikes in research activity by financial economists, one by US researchers from 1988 to 1993 and another, mainly by European researchers, from 2003 to 2007.

[5] Anderson and Lee (1997) looked at source data for ownership studies from four databases and found considerable variation in data quality and accuracy. More recently, Kaplan, Sensoy, and Stromberg (2002) examined venture-capital investments in two data bases and found serious omissions, leading to "unbiased but noisy" transaction data. We searched Thomson Financial's SDC Platinum database for information on Kohlberg Kravis Roberts & Co (KKR). Its first important deal, an acquisition of Houdaille Industries, was missing, and of more than 150 transactions in which KKR is the named buyer, only 30 appear in SDC Platinum. Meanwhile, in syndicated transactions it is often difficult to distinguish firms coded as "buyer" and firms coded as "investor."

from being owned by a PE firm? What deals should PE investors pursue: particular industries, deal sizes, transaction types, or other characteristics? Do some investors or investment strategies enjoy persistently superior returns as implied by Kaplan and Schoar (2005), or is there a tendency toward a "normal" rate of return?[6] What drives revenue and profit improvements? How do changes in employment, capital expenditures, or strategy and management vary across PE investments, and how do these compare to similar companies that remain public?

The paper is organized as follows. In the next section we summarize the background and context of the research and review previous findings on PE investment returns, particularly for middle-market buyouts. Next, we describe the mechanics of our small-company buyout research using transaction-level data, and then proceed to describe preliminary empirical results from this sample of U.S. middle-market transactions. Finally, we report regressions of transaction internal rates of return (IRRs) on key variables driving performance in small-company PE investments. Our conclusions and recommendations for future research follow.

BACKGROUND, CONTEXT, AND PRIOR LITERATURE

Our project is motivated by some early, detailed, "behind-the-curtains" looks at buyout deals. Baker and Wruck (1989) presented a detailed description of the organizational and strategic changes following the leveraged buyout (LBO) of O.M. Scott & Sons by Clayton & Dubilier, Inc., explaining how the LBO, as a governance structure, was able to create (unlock) economic value. Changes in ownership, capital structure, strategic direction, and management

[6] Kaplan and Schoar (2005) analyzed several hundred funds from Thomson's SDC Platinum and found average fund returns (net of fees) approximately equal the S&P 500, although there is substantial variety in performance across funds. They also found that returns persist across subsequent funds of a partnership, and that better performing partnerships are more likely to raise follow-on funds and larger funds. These results for PE firms differ dramatically from those for mutual funds, where there is regression to the mean. Beyond the scope of our topic, it is nonetheless interesting to note that Lerner, Schoar, and Wong (2007) found that a similar "persistence effect" is manifested in institutional investor returns in private equity (i.e., the limited partners such as endowment funds who capitalize the private equity partnerships run by general partners such as Blackstone or KKR).

incentives combined to produce success in this transaction. Later, Baker and Smith (1998) presented a history of KKR upon its 20th anniversary, at which time the firm had done about 75 deals (now more than 150); KKR gave the authors rich inside access to its end-to-end deal execution processes and governance philosophy.[7] The present work is part of a larger project to extend this line of research to a wide swath of the PE sector, to many PE firms instead of just one, and to many hundreds of deals in different industries, of different sizes and types, analyzed at the transaction level.

Our focus is on small and mid-sized deals. This end of the buyout market features not only the investment goals found in larger public-company buyouts, which include cost elimination via consolidation and exploitation of scale and scope economies, but also a variety of strategies aimed at improved management coordination and control. The range of transaction rationales seen in smaller and middle-market buyouts forces PE investors to take on several roles including banker, operating executive, board member, strategist, headhunter, coach, union negotiator, and occasionally family therapist. There is thus perhaps a "fuller" view available here with respect to the manner by which PE professionals seek to create value in their deal-making.

Before turning to the mechanics and results of our analysis we offer a few comments on the controversy surrounding PE investment returns. Table 1 below highlights 1-year to 20-year returns for various sizes and stages of PE deals using data from Thompson Financial.[8] These data, which include early-stage venture investing along with buyouts, depict pooled IRRs.[9] Beyond highlighting the extreme volatility inherent in PE investing, what is most interesting for

[7] See also Baker and Montgomery (1994), an operating and organizational comparison of publicly-traded conglomerates and PE firms (known then as "LBO associations"), which in many instances are tantamount to privately-held conglomerates. This offers another interesting and useful line of inquiry, more from an industrial organization than a finance perspective.

[8] The 20-year period in Table 1 is 1986 through 2006, chosen to match as closely as possible with our transaction sample that runs from 1984 to 2006.

[9] A pooled IRR is a calculation of an aggregate IRR by summing cash flows from disparate investments together to create a portfolio cash flow. The IRR is subsequently calculated on this portfolio cash flow.

our purposes are the long-horizon (20-year) returns. Over this period small-company buyouts, the focus of this paper, exhibited the highest returns.[10]

(Table 1 about here)

There is substantial debate among PE researchers and practitioners about categorizing returns. As mentioned, Kaplan and Schoar (2005) challenge the longstanding claim of PE firms that their returns are much higher than standard benchmarks such as the S&P 500. Kaplan and Schoar use fund-level returns (for both early-stage venture capital and buyouts, exactly as shown above) and find that using pooled IRRs, buyout funds performed slightly above the S&P 500 in the long run in gross performance, but under-perform the S&P net of fees.[11] They suggest that the results depend critically on the involvement of the general partners (GPs) and that GP capabilities are heterogeneous and difficult to imitate. Moreover, successful funds are better networked and can garner proprietary access to deal flow.

Ljungqvist and Richardson (2003) found different results using data on PE returns from a large, institutional (limited partner, or LP) investor. They concluded that returns to PE investment beat public-market equivalents by over 5% per annum over the long term, consistent with the theory that illiquid assets should garner higher returns. Moskowitz and Vissing-Jorgenson (2002) take a broader view of private equity than is commonly used, defining it as any form of non-publicly traded equity. They focus on entrepreneurial ventures driven from consumer or household finances, and do not find superior returns to PE, despite higher risk. They attribute this to non-pecuniary benefits or entrepreneurial zeal which results in over-estimation of a venture's realistic prospects. Phalippou and Gottschalg (2008) investigate

[10] This result is perfectly consistent with economic theory, which posits higher returns to the higher risk inherent in less efficient markets. Indeed, small-company buyouts consist almost exclusively of privately held firms in fragmented industries, and are less amenable to standard valuation and auction-pricing as obtained in more organized markets.

[11] Kaplan and Schoar (2005) report, however, that they *over-sample* first time funds by 25% as compared to the data in the Venture Economics data base; first time funds under-perform follow-on funds in general. Their results differ somewhat from what is depicted in Table 1 (perhaps highlighting the existence of extended controversy about returns).

returns from a data set of 1579 mature PE funds using the same source as Kaplan and Schoar (2005) and find, similarly, slight gross-of-fee performance advantages over the S&P 500, and net-of-fees underperformance, based on such issues as inflated values of present holdings.

Our specific aim in this paper is not to compare PE to public-equity returns, but to explain differences in returns among PE investments. Indeed, there is such variety among PE investment types that we doubt the usefulness of treating "private equity" as a homogeneous category. We construct consistent measures of returns among PE investments, for example by adjusting for leverage and other transaction-specific characteristics, to compare the results of different investment strategies.[12] As discussed in the next section, our key dependent variable is transaction IRR, which we take as the best proxy for value creation, broadly speaking, though only a part of the larger story.

SAMPLE AND DATA

To examine the effect of these characteristics on buyout performance we reviewed 288 exited PE transactions from 1984 to 2006.[13] This sample was constructed through live field interviews with professionals in 13 PE firms in the U.S., chosen from discussions with 96 firms in the U.S., U.K., and Japan, and based on their willingness to offer detailed transaction data on a confidential basis. We sought specific details of their transactions including not only financials

[12] This is the first step toward a broader objective of understanding PE versus public equity from a comparative corporate governance perspective. The focus there is not necessarily returns, given the measurement difficulties mentioned above,but on the more qualitative (and in our view, more important) aspects of governance and performance..

[13] Cumming and Walz (2004) discuss an important aspect of the ongoing controversy about PE returns discussed above, and one that has stimulated strong policy debates about PE regulatory oversight in the U.S. and Europe. They study several hundred PE funds across 39 countries over a 30-year period and find systematic over-reporting of *unrealized* IRRs (i.e., the hypothetical "mark-to-market" valuations of non-exited companies still held in a PE fund's portfolio). Such valuations are used mainly for periodic performance reporting to limited partner and for fund-raising. In our interviews with participating PE firms, we found such wide variation in the subjective self-assessed valuation of similar companies—in some cases, even those held within the same PE fund—that we did not use these values, but only valuations of exited transactions with significant liquidity events, in our analysis. Interestingly, Cumming and Walz report that the degree of mis-reporting is related to the legal and accounting environment, and to pressures for transparency, in the PE firm's host country..

but also governance and execution models, board oversight, strategic and financial advisory services, methods or strategies by which each firm differentiated its services in adding value, and any other pertinent issues specific to each transaction. After analyzing each firm's portfolio and the varying amounts of information provided, it became clear that the best path for statistical analysis was to include *exited* transactions only. There were 288 of these for the 13 firms.

The 13 firms range from 5 professionals and $25 million under management to 140 professionals and $6.5 billion across 20 years. Appendix 1 describes the firms in greater detail. Naturally, they are a self-selected group, so we do not claim that our findings necessarily hold for the universe of PE investments. However, the 13 firms in our sample represent a variety of firm types and their 288 transactions vary greatly by industry, deal type, and so on.

Variables

The main dependent variable in this study is transaction IRR.[14] We use both index- and industry-adjusted versions in our regressions. We measure both return on equity and "return on assets," which is really the IRR of the target company's change in market value.[15] In both cases, we ran models based on unadjusted values, S&P 500-adjusted, and Fama-French-adjusted values; results were largely the same, and we report below the S&P 500-adjusted results, which is an ultimate economy-wide barometer.

We also collected data on entry and exit dates, industry, type of exit, deal values at entry and exit, percentage of target equity acquired, percent of equity held by management,[16] options

[14] Here we follow Nikoskelainen and Wright (2007).

[15] The value of the firm being, of course, the value of the bundle of assets which comprise it; this necessarily includes all claims on assets, not just the equity claims.

[16] This proved to be a complex issue, because there are a variety of formulas employed for the vesting of options or related bonus-with-equity pay-for-performance arrangements. We coded this variable in order to capture the full incentive effects of possible payouts and equity awards, so determined what the maximal amount of equity could be at the time of deal entry, assuming there were full vesting based on agreed-upon performance metrics being achieved. In other words, if the ingoing equity split were 90% PE firm-owned and 10% management (and there were no other investors), but that in 3 years' time it would

to management and fully vested totals, sales revenues at deal entry and exit, *EBITDA* at deal entry and exit, *debt/EBITDA* at deal entry,[17] employment levels at deal entry and exit, and capital expenditures at entry and exit. Additionally we obtained information on the presence of acquisitions or divestitures combined with the deal, whether the buyer is the sole investor or part of a syndicate "club deal" with other PE firms, and, whether there are significant management changes with this deal within 6 months of entry. In some cases, particularly for target-firm capital expenditures and employment, the PE firms had not tracked (or, for transactions farther back in time, had lost) specific changes during the time of their ownership, but knew the *direction* of a change (e.g., increase or decrease), and we recorded these as binary variables.[18]

The 288 sample transactions were spread among 28 three-digit, 19 two-digit, and 8 one-digit NAICS industries. We collapsed these into five broad industry categories: 8 transactions in agriculture, construction, or utilities, 61 in consumer-goods manufacturing, 80 in capital-goods or equipment manufacturing, 44 in wholesaling, distribution, or retailing, and 95 transactions in professional services, recreation, and entertainment.[19]

To investigate how exit type affects exit valuation and thus investment return we categorized exit types as (1) IPO, (2) sale to industry buyer, (3) sale to another entity (almost

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be possible, if EBITDA growth targets were hit, for management to own 22% of the company, then we coded the deal at 78% and 22%.

[17] We arrive at total debt by subtracting total equity invested from transaction value at entry. This measures the EBITDA multiple of debt owed, and is thus an inverse of a traditional interest coverage ratio. We convert negative EBITDA at entry to the 99th percentile of range of coverage.

[18] For example, in the cases of employment and capital expenditures, we received hard numbers for 59 and 126 transactions, respectively, out of the 288 (meaning that we had both deal entry and exit totals and hence could measure percentage changes. But when asked whether employment and capital expenditures went up or down, the responses grew to 250 and 230, respectively. So, we captured these variables both in hard number terms for their change levels, and in larger subsets, as binary variables.

[19] One objective in constructing industry groups from lower- to higher-value-added activities is testing Williamson's (1988) thesis that debt and equity are forms of *governance structure,* each used according to industry and transaction conditions. Specifically, Williamson's thesis argues that debt is suitable for low-beta, slow growth, mature-industry, stable-cash-flow businesses, and hence would concur with Jensen (1986), who argued such businesses would be most suitable for LBOs. Conversely, a business with a high human capital-to-assets ratio (e.g., a biotech, software, or engineering consulting firm) should have a higher *beta* and more equitized capital structure.

always another PE firm), (4) recapitalization, usually involving effective sale or relinquishment of control to management (but occasionally involves a liquidity event or dilutive restructuring), and (5) bankruptcy (in this case, the portfolio firm may well not have entered actual bankruptcy proceedings—though some did—but may hold a *de facto* "fire sale" of assets or go through a similar break-up, which would involve the loss of most or all the PE firm's investment). We attempted to obtain valuations and IRRs for all transactions, including bankruptcies; if not available for bankruptcies, we assumed full loss of equity and coded the IRR as —100% and assigned an enterprise value of zero, which biases our average IRRs downward. We ended up with 35 bankruptcies out of 288 transactions.

We obtained industry betas for each transaction.[20] Mean beta for the sample is 0.92, which matches the industry distribution of the sample: 140 mostly low-tech manufacturing businesses, 44 distribution or retail deals, 8 in agriculture, construction, or utilities ("outdoor production"), and the remaining 95 in higher-beta services. For entry and exit multiples we use *EBITDA* multiples, as is standard among buyout practitioners.[21]

[20] For each firm, publicly-traded matched stocks are found by NAICS industry code. CAPM betas are estimated by regressing the contemporaneous excess monthly stock returns over the market excess returns (excess return being the difference between monthly return and the risk-free rate). Each year for each stock, the slope coefficient *Beta* is estimated using an OLS specification for the CAPM equation. Risk free rates and excess market returns are from Kenneth French's website (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/index.html).

[21] PE practitioners argue that their strategic oversight, along with negotiation skills and knowledge of industry buyers and market conditions, can optimize firm value at exit, and one measure of this is "uplift" in the value/EBITDA multiple. A modified *DuPont Formula* depicting sources of adding value in a transaction illuminates this:

$$\text{Classic DuPont Formula} = \frac{\text{Net Income}}{\text{Sales}} * \frac{\text{Sales}}{\text{Assets}} * \frac{\text{Assets}}{\text{Equity}}$$

where the three ratios signify, respectively, measures of efficiency in operations, marketing, and the finance of the firm, and signify return on equity. The modification for PE is as follows:

$$\text{PE firm value creation} = \frac{\text{EBITDA}}{\text{Sales}} * \frac{\text{Sales}}{\text{Firm value(n)}} * \frac{\text{Firm value(x)}}{\text{EBITDA}}$$

We also recorded PE firm characteristics (particularly, size and the number of prior transactions, to proxy for experience) and sought a qualitative sense of the firm's general investment strategy for each deal. Most prominently this involved the choice of industry type, but also included size of transaction, deal structure, whether or not a firm preferred healthy businesses or turnarounds (which could be acquired relatively cheaply), and in general, the sources of added value each firm (in theory) brings to their transactions. We were unable to obtain consistent information on portfolio company Boards, specific incentive plans offered to portfolio company managers, or the characteristics of individual general partners of the PE companies.[22]

Descriptive Statistics

Table 2 provides descriptive statistics for our sample transactions. The unadjusted mean IRR for equity is 40.1%, with a median of 30.90%.[23] IRR of the firm's assets (or enterprise value) has a mean of 15.1% and median of 13.6%. By comparison, the pooled IRR for the S&P

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where the product always totals the ratio of exit value to entry value, but can be broken into pieces corresponding to operational efficiency, growth, and added value from PE firm oversight (enclosing the multiplicands in brackets and taking their product to the power of (days held)/365, then subtracting 1, gives the transaction IRR assuming neutral intermediate cash flows). In actual deals, of course, EBITDA changes; future investigations into the specifics of GP activities will define the degree of their value-add.

[22] We also sought information on divestitures, and received responses for 189 transactions. However there were only 14 which had sold off a part of the business after deal entry, versus 175 who responded in saying that there had been none. Because we inferred that the vast majority of the 99 non-respondents to this question did *not* make any divestitures, we did not include the *divest* variable in this analysis beyond reporting descriptive statistics for the 14 deals which contained them. Divestiture, in any case, is a strategic tool utilized more appropriately in larger deals.

[23] The standard deviation of the sample equity IRR is 89.3%, typical for high-variance leveraged investing or venture capital. Skewness was 3.4, and kurtosis 26.7. Discussion of the third and fourth moments is not common in many statistical applications, but they are utilized in the investment world. As the head of one premier firm told us, "We sell skewness," when describing how institutional investors are approached during fund-raising. The Jarque-Bera test confirms this is a non-normal distribution, which means OLS regression results must be interpreted carefully in terms of broader applicability (however, assuming the residuals are normally distributed in our regression framework, we proceed as usual here and OLS results obtain). High skewness coupled with high kurtosis provide an institutional investor with the opportunity to diversify into alternative assets which offer the potential for superior returns.

500 during the same period is 9.81%, with a median 10.1%.[24] The S&P 500 index-adjusted IRR for equity is 27.2%, with a median adjusted value of 23.6%.[25] Of course, the unadjusted PE IRRs (40%) are prior to deal fees; using Swensen's (2000) estimate of 12% for fees, our net IRR falls to about 28%. As shown in Table 1, the 20-year pooled IRR (net of fees) for small buyouts (<$250 million) from 1986 through 2006 is 25.2%, close to that in our sample.[26] Moreover, the 20-year IRR of the S&P 500 from 1986-2006 is 9.70%, close to our unlevered 9.81% over about the same period. Mean deal size in our sample is $78.3 million, with a median of $29.2 million. Average leverage is 65.5%, and average *debt/EBITDA* ratio is 3.71. The PE firms took an average 55.8% stake in these transactions. About 44% of the sample transactions involve PE firm syndicates, a surprisingly high number given the small average transaction size.

(Table 2 about here)

Turning next to strategic choices, over half of our sample transactions included at least one *add-on* acquisition. Add-ons include both what practitioners call "bolt-on acquisitions" (add-ons to fill out a product line, achieve economies of scope in marketing or distribution, co-opt operating synergies, or expand service offerings) and "consolidating roll-up deals" (fragmented industry deals seeking economies of scale of similar businesses, often former direct competitors). Add-on transactions are perhaps most responsible for PE's impact on overall economic growth. Porter (1980, pp.191-215) discusses the nature of fragmented industries in

[24] And, standard deviation, skewness and kurtosis for the S&P 500 for our sample transaction matches are 10.9%, -0.15 and -0.40, respectively, so the volatility of our sample is, as expected, high. We also checked the IRRs for Russell-2000 and Fama-French (FF) smallest 30%-, 20%-, and 10%-of-firms portfolios, and the IRRs range from 7.5% to 14%, with FF-10 as the highest.

[25] Swensen (2000) points out that the best way to analyze PE returns against an index is on a full risk-adjusted basis, accounting for leverage in buyout deals. Investing the same dollar amounts in each of our 288 transactions with equal amounts of leverage in the S&P 500 index triples equity returns, from 9.8% to 25.82%, with median of 21.93%. The other return figure to note here is the value-weighted IRR for equity for our sample; it is 43.90%, up nearly 4 percentage points from the arithmetic mean.

[26] Note as well in Table 1 that the long-term IRRs for buyouts are higher for smaller deals. As described below, in our sample, as well as those used by Nikoskelainen and Wright (2007) and Loos (2006), IRRs are increasing in deal size. One might expect smaller buyouts to have a higher bankruptcy risk, corresponding to higher long-term returns. On the other hand, there may be a minimum efficient scale for successful deals. We hope to explore this more fully in future research.

terms of industry structure and characteristics, and lists over 100 4-digit manufacturing sectors in which top-4 and top-8 market shares were extremely low.[27] He was the first to identify formal strategies for consolidation *given* an industry's underlying economics, and his work helped to usher in the subsequent wave of mass consolidation the U.S. economy has witnessed in the intervening era of massive growth in PE and buyouts. Prior to the leveraged buyout wave of the 1980s, growth via consolidation of an industry sector containing multiple small firms was much harder to accomplish due to the lack of liquidity in capital markets serving deal-makers in the middle market. Private equity has singularly changed and improved accessibility to capital for consolidation (and thereby made easier the unlocking of previously unrealized value in capital assets). Moreover, as we explain below, transactions involving add-on acquisitions performed significantly better than those in which organic growth is the intended strategy.[28]

Management equity averaged 19.3% in our sample, ranging from 3.2% to 80%, while the mean and median holding times were 4.8 and 4.3 years, respectively.[29] Since the 1980s holding periods have fallen as the PE sector has evolved: more capital in play, more firms, and more speed to the process yield exits and another fundraising round. Over time PE firms came to learn that operating and strategic changes (as well as those dealing with governance, management, and monitoring and control) were front-loaded in the deal process, and via a *learning effect*, the PE sector has gravitated toward shorter holding times.[30]

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[27] And Porter's list contained *no* distribution or service industries, arguably more fragmented than most manufacturing sectors.

[28] The converse of a strategy based on consolidation via ancillary acquisitions is one of restructuring a firm with an uneconomic mix of assets via divestiture, in an effort to rationalize the core business. We received 189 responses to our request for data about this and 175 had not pursued any divestitures.

[29] Nikoskelainen & Wright (2007) report mean and median holding times of 3.5 and 3.3 years, respectively. Our sample goes back in time ten years further than theirs, to the early 1980s, when transactions were held for longer periods. Kaplan (1991) reports mean holding time of 6.82 years for a 1980s deal sample.

[30] In his exchange with Jensen (1989), Rappaport (1990) referred to LBO firms almost disparagingly as "transitional", which may have been a *double entendre* referring both to short holding periods and the LBO association itself as a temporary organizational form. Only the first has proven correct so far.

As seen in Table 2, most transactions brought about increases in revenue, *EBITDA*, employment, and capital expenditures. Slightly less than half reported increases in the *EBITDA* margin (*EBITDA*/revenues). If our sample is representative of small buyouts over time, these figures suggest that in this size range of transaction, at least, the Jensen (1986) agency-mitigation rationale for LBOs is less important than either *growth equity* opportunities, or *coordination-improving* investments in fundamentally sound businesses.

Looking more closely at operating performance yields some surprising results. The 115 transactions in which the *EBITDA* margin increases have a mean return on equity of 75.9%, while 139 deals with *EBITDA* margin decreases average only a 14.9% equity return. The ratio of *EBITDA* to revenue is thus closely correlated with value creation. Also, the increases in employment and capital expenditures make sense given that over half of our smaller middle-market transactions involve add-on acquisitions; where employment and capital expenditures increased (178 and 139 deals, respectively), mean equity returns were 60.6% and 52.8%, respectively; where they decreased (72 and 91 deals, respectively), returns were much lower, and negative for employment.[31] For this sample, strong firm performance and returns are associated with growth in employment and capital expenditures. Return on equity is also negatively correlated with both exit year and holding time, suggesting two important long term trends in PE investing. First, PE "industry maturation" implies elimination of excess returns; indeed, practitioners spoke often to us about the increasing competition for deals and the difficulty in extracting returns. Holding time is also significantly negatively related to equity returns: the correlation in our sample is -0.2907 (statistically significant at the 1% level),

[31] We view these results more cautiously than other returns data because there were sizable sub-sets of deals for both employment and capital expenditures which were unclear as to the direction of these parameters during the deal's holding time. And in both cases the *unknowns* exhibited strong returns. A larger data sample will shed light on these. It must also be remembered that declines in capital expenditure especially, but also potentially employment, are not inconsistent with a strategy to optimize investment returns and firm performance (and in some cases, survival). This fact often gets lost in discussions about restructuring via private equity.

consistent with the practitioner view that holding times have decreased as deal process and execution have become more efficient over time.[32]

DIFFERENCES BY SUBSAMPLES

Table 3 shows descriptive statistics by industry groups. Some patterns are predictable; for example, leverage at entry falls from 74% to 54% as the industry moves from physical asset-intensive manufacturing to high-value-adding human capital-intensive businesses. PE firm equity also falls from 64% to 45% as we move along this industry pattern, suggesting that other PE firms or investors assist in equitizing the capital structure of deals in more complex industries which exhibit higher growth (and volatility). The percentage of control-position deals likewise drops sharply from 80 to 43%. Meanwhile the percentage of risk-mitigating club-deals increases to the same degree, from 27% to 63%, while add-on acquisitions drop from 63% to 51%.

(Table 3 about here)

These results are consistent with both agency theory and transaction cost economics (Jensen, 1986; Williamson, 1988; Kochhar, 1996). Riskier deals entail lower leverage; at the same time, the greater the likelihood of costly *ex post* bargaining, the greater the equity, and the spread of equity, across multiple owners. Moreover, in dynamic, high-growth industries (e.g., professional services) there is both greater opportunity for organic growth, and added complexity in deal-making, so we would expect fewer add-on acquisitions in those industries than in physical asset-intensive businesses, which our data reflect. We also find that revenue and profit (*EBITDA*) increases are greatest in professional services (where overall growth opportunities are highest), though employment and capital expenditures grow in four of the five

[32] However this is not a unanimous view in private equity; for a minority of practitioners, especially for those firms organized as open-ended funds (including a few in our sample), their claim is that they offer "patient capital" and can optimize the exit without pressure of a fund's contractual life end. While it is unambiguously true for larger deals that holding times are shorter, here, for growth-oriented investments often involving consolidating roll-ups of smaller firms, holding time to an attractive exit may involve longer periods.

industry segments. Equity returns are highest in manufacturing segments, which is sensible given the ability to leverage in these businesses as well as the latent growth available via consolidation. The exit multiple is noticeably higher in fast-growing professional services than in the other four mature industries, which again is predictable and based on future prospects.

Next we break down the summary statistics by exit type: IPO, sale to an industry buyer, sale to financial buyer (most often, another PE firm), and recapitalization (usually a sale to incumbent management). These are provided in Table 4. The values change in linear fashion as one moves across the columns from IPOs to recaps. Industry buyers by degree have more knowledge about the sector than IPO (ultimately, retail) buyers, and typically in these kinds of industry segments there are several such potential acquirers. PE firms, as buyers, are typically not as aggressive as industry participants, both because they are more discerning and because they do not have *operating* synergies to co-opt.[33] A recapitalization, often involving the firm's incumbent management as new controlling owners, is the least liquid of the four exit types, and by definition involves those who are able to most clearly discern intrinsic firm value (and hence will be the most discerning of buyer types).

(Table 4 about here)

IPOs have the highest returns, at 101%, followed by trade sales (54.2%), sales to PE firms (44.2%), and recaps (28.2%). IPOs are also the largest transactions, averaging $227 million. IPOs are the least leveraged at 59.8%, consistent with the idea that smaller deals for stable, profitable companies are more easily leveraged and more amenable to management having eventual control. Similarly, management equity is highest for IPOs; in our sample

[33] The exception to this norm occurred in the recent boom years of record fund-raising; large funds needing to place capital did in several instances outbid "strategic", or industrial, buyers. The advent of club-deals has also increased the bidding power of PE acquirers. Some PE practitioners now question the wisdom of others in the sector who were aggressive bidders in the 2004-2007 era of easy money and record fundraising; vintage returns from this era may suffer. But as a general proposition, the more knowledgeable the *buyer*, the less "extractable rents" accrue to the *selling* PE firm at exit. Not un-coincidentally, the relationship applies equally well in running from deepest-capitalized buyer class (IPO) to least (recap).

management equity and leverage are negatively correlated (statistically significant at the 5% level). Meanwhile PE firm equity is strongly positively correlated with leverage (significant at 1%); higher PE firm equity usually implies lower management equity. Additionally, the best-performing deals are likely to lead to IPOs, and managers often can maximize their equity bonuses under such a scenario. At the other extreme, recaps might involve businesses which are marginal from the vantage point of the PE investor (though they return a positive IRR for our sample), and at the same time offer incumbent management great equity growth in return for the PE firm's liquidity.

Revenue and *EBITDA* growth are highest in IPO deals (32% and 45.2% per annum, respectively), falling to 10.4% and 2.5%, respectively, for recaps. Again, the best performing-deals tend to go public, based on strong operating results. *EBITDA* margins are also highest for IPOs and lowest for recaps. Likewise employment growth is highest for IPOs, averaging 49.4% for the firms reporting, and linearly decreases to the low for recaps (-4%). Rather fascinating are figures for capital expenditure growth: there is a straight-line *increase* from 8.9% for IPOs up to 16% for recaps. That capital investments increase in exact inversion to investor returns (and employment levels) belies the "conventional wisdom" that PE investors are short-sighted.[34] Exit multiples are highest for IPOs at 11.7, falling to 7.11 to 7.73 for the other exit types.

These data illustrate the variety of middle-market PE transactions. Those leading to IPOs are highly successful, while those exited through other means show more mundane returns. For buyouts in our size range the most common strategy is *buy-and-build*, via add-ons in the same or related markets (73.5% of the cases for IPOs), achieving economies across the firm's value chain, and seeing growth in both revenues and cost efficiencies. These in turn allow for increases in employment levels and capital investment. Sales to industry buyers and PE firms are less than 25% of the scale of the IPOs ($48 and $51 million, respectively, versus $227

[34] Indeed, Table 4 depicts a linear relationship between decreasing IRR, increasing capital expenditures, and increasing length of holding time.

million for IPOs) but exhibit strong returns. Even recaps, more likely to occur for firms with industry or growth challenges, nonetheless exhibit positive returns (28.2% mean IRR).

The 35 bankruptcies were, in the aggregate, cases of business plans that did not materialize; mean leverage at deal entry for these was 61.5%, and Debt Pay-down was below the sample mean at 3.48, so they were not overleveraged. However, all operating performance measures are highly negative, and this indicates that growth strategies were unsuccessful. These deals have the shortest holding times, supporting Jensen's thesis that PE is a highly efficient institutional form of restructuring.

We also review the summary statistics by our own measure of dimensions of PE firm strategies—ownership, syndication, or growth. Ownership deals are those in which the PE firm acquires a controlling (as opposed to minority) stake, and syndicate deals (also called "club deals") are those in which the firm partners with other PE firms to make the acquisition, an increasingly common practice.[35] We distinguish growth strategies according to whether the PE firm grows the target organically, or by *add-on* acquisition. Within each dimension, each particular strategy has benefits and costs, and PE firms have advertised opposite choices across all three strategy dimensions in recruiting investors and courting targets.

Table 5 shows key summary statistics according to these strategic dimensions. As seen in the table, various strategy pairs yield highly different results. First, it appears that *ownership* and *syndication* strategies are mutually dependent. The results for minority ownership deals parallel very closely those of syndicated deals, in almost every respect. Except for *EBITDA* margin change (improves for minority stakes, declines for club deals), the numbers are almost the same, starting with return on equity (25%) and transaction size ($125-$134 million), through leverage, holding time, add-ons, *beta,* revenue growth, exit multiple, and industry index (at 3.92

[35] FTC Commissioner William Kovacic stated in January 2007 that PE firms participating in syndicates would likely come under antitrust scrutiny for anti-competitive (collusive) practices. These are more prevalent today among high profile deals than the big solo ownership transactions of the 1980s.

and 4.04, these deals involve higher risk human-capital intensive businesses, which are generally faster growth than low-tech manufacturing, but may require more risk-sharing and more equity). There is a slight difference only in PE firm and management equity amounts; indeed, 90.5% of minority stakes *are* club-deals. So, there is a strong propensity for these two choices to be linked.

(Table 5 about here)

Likewise, the transactions involving controlling stakes are mirror images of those without syndicates (solo deals); 94% of solo deals are controlling stakes deals, and 84% of controlling stakes deals are solo deals. Again, in every case but *EBITDA* margin, the results are very similar, starting with equity returns (48% and 52%). These transactions are smaller in scale at only one-third the size of minority or club deals, and their industry index (3.25 to 3.28) is much lower, which is intuitive—most of these transactions are in low-tech manufacturing, which offers higher leverage opportunities, more fixed assets, often steady cash flows, and slower change. Other things equal, the higher the industry index, the faster growing and more complex the industry dynamics and hence the need for risk-sharing; the solo and controlling stake deals occur most frequently in slow-growth businesses.

The slower growth of these industries means that employment increases much more slowly, and as is depicted, is a small fraction of employment growth in more dynamic industry settings (4-5% versus 24-25% per annum). Capital expenditures also increase at less than half the rate of the minority-stakes or club deals. Additionally, revenue growth is slower and exit multiples and holding times are lower for these control deals in slow-growth manufacturing, compared to club deals in service or marketing businesses. Interestingly, however, the returns for solo or controlling-stakes deals are double those in club deals and minority stakes (48-52% versus 25%). Thus, growth in revenues, employment, or capital expenditures—or a higher exit multiple—do not always guarantee the strongest equity return.

Transactions involving add-on acquisitions perform significantly better than organic growth deals (IRRs of 50% and 33%, respectively). Add-on deals are twice as large ($98 versus $50 million), have half the debt pay-down, and generate higher increases in revenues, profit margins, employment, and capital expenditures. Interestingly, between these two there were no appreciable differences in leverage (65.4%), equity splits to either the PE firm or management, the numbers of control/minority deals, numbers of club or solo deals, or exit multiples. These data certainly support the idea that consolidating acquisitions can, when executed properly, create material value for equity holders.

REGRESSION RESULTS

We leave a more comprehensive analysis to future work but report here some preliminary OLS regressions of deal performance on governance and control variables. We start by regressing the S&P 500-adjusted return on equity (IRR) on transaction leverage, debt pay-down, management equity, PE firm equity, and dummy variables for the three strategic choice dimensions (controlling versus minority stakes, club deals versus solo, and add-on acquisitions versus organic growth). In a second specification we add indicators for each PE firm. Results are presented in Table 6. As seen in the table, the indicator for add-on acquisitions is statistically significant in both specifications. This is consistent with feedback we received from practitioners, who indicate considerable breadth of opportunities in fragmented industry sectors, particularly in basic manufacturing, wholesale distribution, and various business services. A buy-and-build strategy with add-on acquisitions, as followed by several PE firms in our study, has yielded solid returns over time in this industry.[36]

(Table 6 about here)

We then repeat these regressions using the IRR of the firm's assets as the dependent variable. PE investing focuses on leveraged returns to equity, and a simple arithmetical exercise

[36] Nikoskelainen and Wright (2007) find the same for U.K. middle-market buyouts.

can demonstrate that solid returns can be garnered on equity with little or no change in firm value (indeed, our data sample contained such deals). From the vantage point of the broader economy and macro growth, however, we care primarily how PE governance affects firm value.[37] Results are provided in Table 7. The dummy for add-on acquisitions is again positive and statistically significant, suggesting that building scale through profitable acquisitions is a good way to increase value. Leverage is also statistically significantly related to asset IRR, with higher leverage corresponding to lower returns. From Modigliani and Miller (1958) we know that in a frictionless world, capital structure is irrelevant, and hence from the vantage point of all of a firm's assets, value is derived solely from the operating cash flows generated by those assets. Hence leverage, which at high enough levels induces insolvency in a downturn, is negatively related to enterprise IRR (or, the bundle of firm assets in total). In our sample, 59 of 288 transactions (20.4%) earned negative asset returns, but the distribution of equity IRRs is highly skewed, with several "home runs." For asset or enterprise IRR, however, leverage has no positive impact.

(Table 7 about here)

We turn next to the distinctions among ownership, syndication, and growth strategies, regressing the model above on subsamples split by deal strategy. Table 8 shows results when the sample is split into solo and club deals. As noted above, club deals are prevalent in the middle-market buyout arena. However, they have equity returns in our sample of 25.2% (from a sub-sample of 124 deals), strongly underperforming stand-alone deals done by a single lead PE firm (52% equity IRR in a sub-sample of 157 deals).

(Table 8 about here)

[37] Additionally, PE investors today increasingly engage in *strip financing,* in which tranches of each layer of the capital structure are doled out to the same investor set (thus, a subordinated debt provider such as Allied Capital Corp. of Washington, D.C., will also hold an equity stake and perhaps preferred stock as well), with the express intent of fostering greater goal congruence among investors and lenders. Looking at IRR on the firm's assets thus provides for a balanced review of the effect of PE firm governance.

For solo deals executed and led by a single PE firm, leverage, management equity, and PE firm equity are statistically significant (at the 10%, 1%, and 1% levels, respectively). This is consistent with what practitioners report: equity splits to management provide incentives, equity to the PE firm ensures active monitoring and strategic support, and leverage provides both discipline and, where it applies, fuel for expansion (when unlocking firm value and resources via recapitalization). For club deals, only the add-on indicator is statistically significant. Because club deals are pursued primarily to spread risk and combine resources to spur growth, they are a solid vehicle for making scale-building ancillary acquisitions. As we detail below, however, their execution often falls short of expectations because of conflicts of interest among multiple PE investors.

We next split the sample into deals in which the PE firm has a controlling stake and deals in which it has a minority stake. As noted above, transactions in which our PE firm had a majority stake substantially outperformed those in which it took a smaller position (equity IRRs of 48% and 25%, respectively). Table 9 shows the results of the main regressions above run separately for each subsample. The results strongly mirror those in Table 8. For transactions with controlling stakes, the four major governance variables are all statistically significant. The management equity and PE firm equity coefficients have the largest magnitudes; the amount of PE firm equity affects IRR negatively for the minority deals and positively for the controlling deals.[38] Leverage is a statistically significant (and positive) determinant of performance for controlling deals, consistent with the Jensen thesis on the value of leverage in mitigating agency problems, at least when performance is measured by equity (not asset) returns.

(Table 9 about here)

[38] In related specifications of regression analysis (not reported here) examining minority versus controlling ownership, a derived variable, $MGMTeqty^2$, had negative coefficients as would be predicted, but was not significant. PE practitioners have not spoken to us of any concern about an *entrenchment effect*, but there is great debate about the optimality of the contract with management in terms of the "right" equity splits and type of incentives. In other words, is there a "point of optimality" for the equity split to management, after which managers engage in perquisite consumption? This is a subject for further investigation.

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Focusing on middle-market transactions highlights some interesting characteristics of the PE world that are hidden in studies of larger deals. Most prior work distinguishes between two types of buyouts: restructuring deals designed to mitigate agency costs in mature, low-growth, low-*beta* industries; and growth-equity transactions based on investments in high-growth industries. There is a third category as well, however, an intermediate type we might call *coordination-improving* deals. These typically involve sound businesses that can nonetheless benefit from PE firm ownership bringing access to resources, industry-specific expertise, capital for recombining assets (most often, consolidation in a fragmented industry), or recapitalization and ownership transition. The intended result in these transactions is better *coordination* of deployment of a firm's assets, often in recombination with market-based resources. These kinds of transactions occur often in our sample, and would appear to manifest a major benefit of—and under-reported storyline about—private-equity governance.

More generally, our preliminary analysis of this sample of middle-market transactions suggests that, fundamentally, growth is the ultimate driver of wealth creation for smaller companies. Over three quarters of our sample experienced increases in revenues and operating profits, and, not surprisingly, those transactions with the highest revenue and profit growth rates have the highest rates of return. The same applies to increases in employment. For these deals, PE was a catalyst for exploiting scale and scope economies and providing operating leverage.

Second, for this sample, return on equity for PE transactions is negatively (and significantly) correlated with exit year, suggesting a secular decline in returns (and, the increasing competitiveness of the PE industry), even for the lower middle-market arena for small-cap transactions. This can be seen as part of the relentless Schumpeterian efficiency wrought from dynamic, innovative, and competitive markets.

Third, insights from agency theory (Jensen 1986, 1988) and transaction cost economics (Williamson 1988, 1996) are substantiated in our sample transactions. The low-tech, slow-growth consumer-goods manufacturers have the highest-return transactions, highest average leverage, highest average levels of management equity and PE firm equity, and most of the controlling-stakes deals. More broadly, the slow-growth manufacturing businesses are more heavily leveraged and exhibit better returns than marketing and services businesses. Marketing and professional services firms have less average leverage, more syndicate club deals, more minority-stakes deals, and exhibit higher revenue and profit growth (and, more organic growth deals than those involving add-on acquisitions). IPOs have the highest returns as an exit type, followed in order by exit types characterized by progressively more knowledgeable buyers. These straight-line differences in results across exit types apply as well to leverage, holding time, revenue, profit and employment growth, capital expenditure growth, and management equity.[39]

Fourth, controlling-stakes and solo deals are characterized by twice the return, one-third to one-fourth the size, shorter holding times, much higher leverage, and lower debt pay-down ratios than their counterparts. They are also far more heavily concentrated in slow-growth manufacturing industries. This is not to deny the growing importance of syndication in private equity. However, our data clearly show the long-term performance advantages of control transactions focused on low-beta industries that are amenable to leverage (and, the ability of the majority or sole owner to bring about a new, more focused, strategy).

[39] The case of management equity (which decreases in linear fashion as one scans the columns from IPOs to recaps, as shown in Table 4) goes against some theoretical arguments that highest leverage levels are associated with highest levels of concentrated equity holdings. This theory has support in the "traditional" literature on buyouts, in which public firms are taken private and management acquire substantial equity stakes. In our data sample, which were mostly private-to-private deals, management equity was already held in substantive amounts pre-transaction. At *exit,* however, it may become a motivator and driver of performance again (e.g., management recaps looked to vastly increase their holdings). In any case, the differing characteristics which comprised firms based on exit type and/or industry type validate the thesis that the tenets of transaction cost economics lend support to organization theory (see, e.g., Williamson [1996, pp. 219ff.]).

In our sample, the pursuit of ancillary consolidating acquisitions is the single most important determinant of transaction IRR for equity. This shows the extent of available "slack" in fragmented industries ripe for exploitation by small- and mid-cap PE investors. Additionally, leverage affects equity IRRs positively and asset (or total firm) returns negatively, consistent with received theory. For improvements in operating performance, the presence of an add-on transaction and the amount of leverage are key to explaining revenue growth, and leverage is the main driver of growth in *EBITDA*. That is to say, the fastest-growing firms are burdened with the least amount of debt, as Williamson (1988) suggests.

What do these findings imply for future research? Our close-up view of PE practitioners offers several suggestions to guide future work on the process of value creation in PE transactions. Specifically, besides its direct effect on the portfolio companies it owns and manages, the PE sector may be even more influential on the firms that remain public. Manne's (1965) thesis about the disciplinary role of takeovers applies equally well in today's PE world: a liquid and increasingly efficient market for corporate control compels public companies to control costs, to innovate, to build and maintain customer relations, and to respond more effectively to increasingly global competition. Jensen (1993) decried the failure of internal control systems in the rationalization and restructuring of inefficient industry, but private equity, even as it has provided an *external* impetus to such needed change, has also motivated improvements in internal control as well. What emerges in analyzing these middle-market buyouts at close range is the need for a more fully integrated understanding of all the ways that PE firm general partners seek to create value in their portfolios.

Hubbard (2005) encourages judgment about the efficacy of financial markets and institutions to be based on how well three related services are provided to market actors: liquidity, information-generating, and risk-bearing. Schumpeter (1911), Mises (1949), Kirzner (1973, 2000), Baumol (2002), and others would add that entrepreneurship, the heart of the market economy, flourishes when economic institutions provide these three services efficiently.

Private equity has been particularly important to the U.S. economy, relative to other OECD economies, in the modern era. From viewing these capitalist-entrepreneurs up close, we believe strongly that PE has been good for entrepreneurship, as entrepreneurial activity is fostered not only through the profits accruing to successful ventures, but through the feedback of the trial-and-error process itself, in correcting prior error and redeploying assets quickly to higher-valued uses (Mises, 1951; Klein, 1999). Private equity can lead to better coordination of assets across firms and markets, as new organizational methods and combinations, structures, and processes are tested and deployed.

Of course, more empirical research is needed to support these conjectures. A critical task moving forward is to build more comprehensive databases of global PE firms for more detailed and rigorous analysis. A particular challenge, of course, is dealing with the potential endogeneity between returns and ownership, governance, and exit characteristics. Obviously, PE firms do not choose their targets, and their strategies for turning them around, at random. The regressions presented above show correlations, not causal relationships. While we control for unobserved PE-firm characteristics we obviously cannot control for transaction-specific unobservables, and do not have effective instruments for PE firms' strategic choices. These are important issues for future research. Ultimately, such research may help to better quantify and explain the portfolio-firm changes brought by PE ownership or investment, the nature of entrepreneurial initiatives such as buy-and-build strategies (which effectively restructure fragmented industries over time), and the changes in PE contracting itself (in particular, the puzzle of the publicly-held private equity firm needs better understanding). These objectives are part of the larger task facing economists, of explaining how changes in ownership, governance, corporate control, and entrepreneurship impact economic growth.

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Table 1. Internal Rates of Return for Private and Public Equity

Table 1 presents internal rates of return (IRRs) for 1,860 US venture-capital and private-equity investments ending December 31, 2006 (i.e., the 20-year returns are for investments made in 1986 and exited in 2006). Source: Thomson Financial and the National Venture Capital Association (via VentureXpert). Returns are net of management fees and carried interest. Buyout funds sizes defined as the following: Small = $0-250m, Medium=$250-500m, Large = $500m to $1b, Mega = greater than $1b.

Fund type	1 Year	3 Year	5 Year	10 Year	20 Year
Early/seed venture capital	2.90%	5.50%	-5.40%	38.30%	20.50%
Balanced venture capital	10.70	12.80	1.80	16.80	14.60
Later Stage venture capital	27.80	10.50	2.70	9.40	13.90
All venture capital	**10.80**	**9.40**	**-1.00**	**20.50**	**16.50**
Small buyouts	11.30	9.40	5.00	6.00	25.20
Med buyouts	37.20	12.30	6.10	10.90	15.30
Large buyouts	23.10	16.40	8.30	8.30	12.40
Mega buyouts	23.40	16.20	10.10	8.90	11.60
All buyouts	**23.60**	**15.60**	**9.20**	**8.80**	**13.20**
Mezzanine	-8.10	4.70	2.90	5.90	8.40
All private equity	**19.00**	**13.20**	**5.90**	**11.20**	**14.00**
NASDAQ	5.50	7.80	8.70	7.10	11.40
S & P 500	9.70	9.90	5.20	7.50	9.70

Table 2. Descriptive Statistics

Table 2 provides descriptive statistics for the full sample of 288 buyouts.

	N	Mean	Median	Standard deviation	Min	Max
Returns						
Gross IRR, return on equity	288	40.10%	30.90%	89.30%	-100%	849%
Gross IRR, return on assets	288	15.10%	13.60%	42.70%	-100%	223%
S&P 500-Adjusted return on equity	288	27.20%	23.60%	72.90%	-100%	635%
Value-weighted return on equity	288	43.90%	--	--	--	--
IRR of S&P 500	288	9.81%	10.10%	10.80%	-21%	31%
Leveraged S&P 500 IRR	288	25.90%	21.90%	34.60%	-68%	182%
Value-weighted IRR of S&P 500	288	6.74%	--	--	--	--
Governance						
Leverage	288	65.50%	70%	19.50%	0	94.40%
Debt pay-down (debt/EBITDA)	288	3.71X	3.01X	--	--	--
Management equity	288	19.30%	15%	12.80%	3.21%	80%
PE firm equity	288	55.80%	64.30%	25.20%	2.80%	94.50%
Control Variables						
Transaction size	288	$78.3m	$29.2m		$1.4m	$4.51b
Holding period	288	4.8 years	4.3 years			
Bankruptcy	288	12.1% of total			0	1
Controlling stake	288	62.8%			0	1
Club deal?	281	44.1%			0	1
Add-on acquisitions?	271	55.7%			0	1
Industry Beta	288	0.924				
Performance variables (average annual increase)						
Revenue growth	254	13.90%				
EBITDA growth	255	11.60%				
EBITDA margin growth	254	-0.33%				
Employment change	59	13.40%				
Capital expenditures	119	8.30%				
Entry multiple	238	7.54X				
Exit multiple	241	7.58X				

Table 3. Descriptive Statistics by Industry Group

Table 3 presents selected descriptive statistics by industry group.

Industry	Outdoors production	Consumer-goods manufacturing	Capital-goods manufacturing	Retail and distribution	Professional services
Industry examples	Agriculture, mining, construction	Food/beverage, furniture, rubber, plastics	Steel, industrial machinery, electronics	Wholesale distributors and retailers	Consulting, administrative services, real estate
Number of observations	8	61	80	44	95
Return on equity	-13%	59%	40.50%	34.10%	36.30%
Transaction size	$29.1m	$86.4m	$39.8m	$74.1m	$112m
Leverage	55.50%	74.30%	70.30%	69.80%	54.70%
Debt pay-down	3.69	4.28	8.1	4.35	1.80
Management equity	20%	20.60%	20.20%	17.90%	18.50%
PE firm equity	61%	64.30%	62.10%	55.60%	44.90%
Holding period (days)	1,657	1,820	1,775	1,879	1,638
Bankruptcies	3	5	7	9	11
% Control deals	75% (8)	80.3% (61)	75% (80)	56.8% (44)	43.1% (95)
% Club deals	50% (6)	27.1% (59)	34.1% (79)	44.1% (43)	63% (92)
% Add-on deals	33% (6)	63.1% (57)	57.8% (76)	55% (40)	51% (92)
Industry beta	1.00	0.73	0.99	0.90	0.99
Revenue Δ (#)	-9.4% (5)	9.8% (56)	9.2% (73)	8.8% (40)	25.1% (80)
EBITDA Δ (#)	-5% (5)	6.3% (56)	4.8% (74)	-1.9% (40)	10.2% (80)
EBITDA margin Δ (#)	4.8% (4)	-3.6% (56)	-1.3% (74)	-4.9% (40)	-2.1% (80)
Employment Δ (#)	1% (2)	10.6% (9)	17.1% (13)	1.9% (12)	21.5% (23)
CapEx Δ (#)	-11.3 (3)	9.9% (30)	11% (28)	5.2% (25)	8.6% (33)
Exit multiple	7.17 (4)	6.96 (55)	6.66 (67)	6.71 (40)	9.32 (76)

Table 4. Descriptive Statistics by Exit Type

Table 4 presents selected descriptive statistics by exit type (IPO, trade sale, sale to PE firm, recap, bankruptcy).

Variable	IPO	Trade Sale	PE Firm	RECAP	Bankruptcy
Number of observations	37	123	65	28	35
Return on equity	101%	54.20%	44.20%	28.2%	-68.20%
Transaction size	$227m	$48.8m	$51.2m	$115m	$45.4m
Leverage	59.80%	65.30%	68.70%	71.10%	61.50%
Debt pay-down	7.37	1.79	4.86	5.06	3.48
Management equity	20.50%	19.80%	19.40%	14.70%	19.80%
PE firm equity	41.40%	59.70%	59.50%	56%	49%
Holding period (days)	1,693	1,733	1,760	2,080	1,604
% Control deals (# deals reporting)	43.2% (37)	71.5% (123)	64.6% (65)	60.7% (28)	51.4% (35)
% Club deals	63.8% (36)	38% (121)	38.4% (65)	51.8% (27)	50% (32)
% Add-on deals	73.5% (34)	52.9% (119)	53.1% (64)	64% (25)	44.8% (29)
Industry beta	0.99	0.90	0.95	0.95	0.86
Revenue Δ (# deals reporting)	32% (34)	17.7% (112)	11.2% (56)	10.4% (24)	-14.7% (28)
EBITDA Δ (#)	45.2% (34)	18.4% (112)	14.9% (56)	2.5% (24)	-56.2% (29)
EBITDA margin Δ (#)	19% (34)	7.2% (112)	2.9% (56)	-9.7% (24)	-36.6% (28)
Employment Δ (#)	49.4% (9)	13.1% (25)	11.9% (17)	-4% (3)	-34.2% (5)
CapEx Δ (#)	8.9% (20)	10% (43)	11.6% (35)	16% (13)	-29.75% (8)
Exit multiple (#)	11.7 (34)	7.62 (110)	7.11 (55)	7.73 (23)	1.11 (19)

Table 5. Descriptive Statistics by Investment Strategy

Table 5 presents selected descriptive statistics by the PE firm's investment strategy (ownership, syndication, or growth), as described in the text.

	Ownership		Syndication		Growth	
Variable	**Minority**	**Control**	**Solo**	**Club deal**	**Organic**	**Add-on**
Number of observations	107	181	157	124	120	151
Return on equity	25%	48.10%	52%	25.20%	33%	50%
Transaction size	$134m	45.5m	43.6m	125m	50.7m	98.3m
Leverage	57.90%	70.10%	69.70%	59.80%	65.30%	65.40%
Debt pay-down	3.93	3.56	3.57	3.86	5.06	2.72
Management equity	21.70%	18%	21.20%	16.40%	18.80%	19.70%
PE firm equity	27.40%	72.90%	73.10%	33.80%	57%	56%
Holding period	1,828	1,707	1,662	1,849	1,628	1,857
% Control deals	0%	100%	93.60%	22.60%	63.30%	63.60%
% Club deals	90.50%	16%	0%	100%	43.3%	43%
% Add-ons	55%	55.80%	55.80%	55.50%	0%	100%
Industry BETA	0.98	0.89	0.91	0.93	0.87	0.95
Revenue Δ	16.30%	12.45%	11.30%	17.10%	4.10%	21.30%
EBITDA margin Δ	Up	Down	Up	Down	Down	Up
Employment Δ	24.7%	5.1%	4.1%	25.2%	13.4%	13.4%
Employment Δ obs.	(25)	(34)	(33)	(26)	(28)	(31)
CapEx Δ	12.50%	5.80%	5.30%	12.60%	-1.20%	14.30%
Exit multiple	8.46	7.04	6.8	8.51	7.41	7.68
Industry index*	4.04	3.25	3.28	3.92	3.65	3.5

* Note: Industry index is computed by averaging each transaction's assigned Industry Group, from 1 to 5, moving from left to right in Table 3 (i.e., from Agriculture and Mining [1], to Professional Services [5].) -- roughly speaking, as the index moves from 1 to 5, the industry type moves from more capital-intensive to less, and the human capital-assets ratio increases.
(n#) = number of observations in subset.

Table 6. Relationship between Equity IRR & Governance/Ownership

Table 6 reports regressions of S&P 500-adjusted equity IRR on selected ownership and governance variables. N=230. Standard errors in parentheses. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

Leverage	.2951	.3079
	(.2873)	(.2907)
Debt pay-down	-.0004	-.0004
	(.0009)	(.0009)
Management equity	.1248	.1001
	(.4770)	(.4845)
PE firm equity	.2912	.2729
	(.5272)	(.5315)
Controlling stake	-.1027	-.0958
	(.2136)	(.2152)
Club deal	-.0497	-.0616
	(.1905)	(.1946)
Add-ons	.1973**	.1988**
	(.1005)	(.1008)
Log(size)	-.0022	.0057
	(.0476)	(.0542)
PE Firm indicator		-.0055
		(.0176)
Constant	-.0618	-.1434
	(.9118)	(.9499)
R-Squared	.0336	.0332

Table 7. Relationship between Total Firm (Assets) IRR & Governance/Ownership

Table 7 reports regressions of S&P 500-adjusted asset or enterprise IRR on selected ownership and governance variables. N=227. Standard errors in parentheses. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

Leverage	-.2779**	-.2533**
	(.1265)	(.1301)
Debt pay-down	-.0000	-.0000
	(.0004)	(.0004)
Management equity	.1563	.0163
	(.1733)	(.2167)
PE firm equity	.1251	-.0784
	(.0960)	(.2378)
Controlling stake		.0393
		(.0962)
Club deal		-.0488
		(.0870)
Add-ons		.1684*
		(.0451)
Log(size)		-.0020
		(.0242)
PE Firm Indicator		.0016
		(.0078)
Constant	.1603	.2071
	(.0989)	(.4250)
R-Squared	.0275	.0883

Table 8. Equity IRR by Deal Type

Table 8 reports regressions of S&P 500-adjusted equity IRR on selected ownership and governance variables for club (syndicate) deals (N=89) and solo deals (N=138). Standard errors in parentheses. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

	Club deals	**Solo deals**
Number of observations	**89**	**138**
Leverage	.0090	.8673***
	(.3414)	(.4598)
Debt paydown	-.0002	-.0305
	(.0007)	(.0285)
Management equity	.2342	.3151*
	(.6676)	(.1071)
PE firm equity	-.3975	.3201*
	(.5432)	(.1113)
Controllingstake	.0203	.1592
	(.2245)	(.3766)
Add-ons	.3462*	.1456
	(.1283)	(.1411)
Log(size)	-.0080	.0537
	.0775	(.0535)
Constant	-.8263	-.3218***
	(.9687)	(.1818)
R-Squared	.1266	.0974

Table 9. Equity IRR by Equity Stake

Table 9 reports regressions of S&P 500-adjusted equity IRR on selected ownership and governance variables deals in which the PE firm takes a controlling stake (N=149) and deals in which the PE firm takes a minority stake (N=78). Standard errors in parentheses. ***, **, and * indicate statistical significance at the 1, 5, and 10 percent levels, respectively.

	Controlling-stake deals	**Minority-stake deals**
Number of observations	**149**	**78**
Leverage	.9184*	.1415
	(.4707)	(.3476)
Debt pay-down	-.0452*	-.0003
	(.0263)	(.0007)
Management equity	2.771***	.3397
	(1.015)	(.6681)
PE firm equity	3.005*	-.5433
	(1.017)	(.5725)
Club deal	.3632	.2071
	(.2542)	(.3695)
Add-ons	.1537	.2665***
	(.1310)	(.1434)
Log(size)	.0146	.0629
	(.0718)	(.0585)
Constant	-3.218***	-1.209
	(1.692)	(1.224)
R-Squared	.1058	.1124

Appendix 1. Summary of PE Firms

Firm, # deals in study, capital managed, and summary comments
** indicates Cambridge Associates (or other) has ranked as top quartile performer in private equity.*

***Firm A,** 68, $7 billion. 25 years of success based on well-defined industry/situation focus *across six industry sectors,* $200mm-$1.5bn range; need *industry dynamics* to be strong, not just company. Increasingly willing to partner in deals. Believes international markets now better for PE investing.

***Firm B,** 27, $2 billion. Spin off of larger investment firm's VC arm. Long tradition of doing club deals successfully though in lead capacity. Has spanned industries and transaction structures in past, but new focus on business services and higher margin, high value-add businesses now.

***Firm C,** 43, $4 billion. 20 years of narrow focus (basic manufacturing, >$10 mm EBITDA) and structure type (demand control, seek consolidation). Heavy investments in infrastructure to garner proprietary deal flow.

Firm D, 8, $150mm. Since 1993 focus on closely-held businesses with $2-15 mm EBITDA, and which have succession/liquidity and/or growth capital needs. Manufacturing, distribution, service businesses.

Firm E, 10, $69mm. 3 small funds, all minority stakes in post-startup growth equity; conservative capital structure. Heavy focus on IT services. 100% minority investor. Had SBIC license but poor showing led to inability to raise follow-on.

Firm F, 14, $275mm. Focus on $5-15mm EBITDA manufacturing companies primarily in industrial Midwest. Usually control position, then consolidate fragmented industries.

***Firm G,** 17, $800mm. Middle market buyouts of companies $35-$300mm. Extremely well-thought out value proposition: require strong managers day one, sustainable competitive advantages, diversification in products, customers, markets. Mostly control, & manufacturing. Latest fund over-subscribed.

Firm H, 6, $150mm. Just closed on $120mm fund; background in control-oriented deals, mid-size consumer niche manufacturers up to $100 mm in value.

Firm I, 23, $300mm. Investment vehicle for two former CEOs. Just raised first formal fund. Heavy focus on services businesses until now; changing strategies. $2-20mm EBITDA, California businesses only, avoid auctions.

***Firm J,** 16, $1.6 billion. Firm focused on smaller deals (<$100mm), almost carbon copy of B's strategy. Heavy focus on basic manufacturing, with ability to consolidate product lines or manufacturing facilities.

Firm K, 5, $25mm. Small buyout firm focused on low-tech manufacturing or easy-to-understand distribution, business services businesses in southeastern U.S. $1-3mm EBITDA, invest alongside management.

Firm L, 21, $50mm. 20+ years opportunistic investor does PE as ancillary to real estate deals. Focused on real-estate-related plays (e.g., small restaurant chain) and services deals in western U.S.

Firm M, 30, $2.3 billion. Started in 1984 and for 10 years did earlier-stage tech related. Switched focus to late-stage buyouts; no industry focus, but seek a growth story and "management quality tells all". Increasingly doing club deals.