Do Publicly Listed Private Equity Firms

Make Bad Deals?

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ABSTRACT

Investors, regulators, and private equity (PE) firms, are showing interest in permanent PE investment capital raised on public markets. Also, a number of PE fund management firms (GPs) have sought listings on public stock exchanges. However concerns have been expressed that both of these developments weaken the incentives for private equity firms to make good deals and make them work. In this study, we construct a novel and comprehensive dataset of buyout deal performance measures for public and private PE firms. We find little evidence that deals by private PE firms outperform deals by public PE firms, or that deals by PE fund managers (GPs) perform better than deals by permanent PE firms. However, deals by public GPs outperform those of private GPs, and of permanent PE firms.

JEL classification: G23, G34.

I.   Introduction

Private equity is playing an increasingly significant role in the modern economic land-scape. The sector is the largest private employer in the United States, employing an esti-mated 11 million people[1], has assets under management (AUM) are valued at \$4.3 trillion, and by some estimates, AUM will expand to \$15 trillion in 10 years[2]. The rise of private equity has consequences for the wider economy and society. On the negative side, private equity has been linked with a reduction in the number of companies listed on public stock exchanges and reducing citizen-investors' exposure to corporate profits (Ljungqvist, Pers-son, and Tåg (2016)), while on the positive side, industries where private equity funds invest grow more quickly in terms of total production and employment and appear less exposed to aggregate shocks (Bernstein, Lerner, Sorensen, and Strömberg (2016)).

Given the rapid growth and the significant economic impact of the private equity model, understanding the organization and performance of private equity firms seems an important area of research. While a number of prior studies have examined private equity performance[3], there are few if any studies that empirically examine the link between performance and the organization forms of private equity firms. In this paper, we address this gap by comparing the deal-level performance of private equity firms that have adopted different organization structures. Given that the business activity of all private equity firms is fundamentally the same - acquiring, holding, and exiting leveraged buyout deals - private equity provides a unique setting for examining more generally the interaction between the organization form chosen by a firm and firm performance

The traditional private equity buyout fund (Kaplan and Strömberg (2009)) is structured as a private partnership that has a limited life (10 to 13 years) and is managed by a General Partner (GP), usually a private equity partnership firm. Investors participate in the fund

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[1]See "Private equity and Donald Trump's quest for jobs", Financial Times, 4.May.2017.
[2]See "Ten Predictions For Private Equity In 2017", Forbes, 25.Jan, 2017.
[3]Some recent studies include Jegadeesh, Kräussl, and Pollet (2015), Harris, Jenkinson, and Kaplan (2014), ?.

by becoming Limited Partners (LPs). These investors must be large and patient, as the minimum fund investment is typically several millions of dollars, which is committed to the fund for the duration of the fund life.

However market-based alternatives to the traditional PE partnership fund exist. Investors of all sizes and investment horizons may gain exposure to the PE asset class by purchasing the stocks of PE firms that are listed on international stock markets. Investors can choose between the shares of listed PE firms which raise and manage traditional PE partnership funds (listed GPs), or of listed PE firms and funds which invest their IPO capital in private companies; the latter may be viewed as PE funds (or fund-like firms) with unlimited life - their investment capital is permanent. Listed traditional PE partnership firms give shareholders access to the fees earned by GPs, while permanent PE firms give shareholders direct exposure to the gains earned on the PE deals made by the firm (see Table I for an overview of the terminology used in this paper to identify different PE organization forms and fundraising models).

Permanent capital has attracted interest[4] from private equity firms looking to meet their own desire for longer-term capital, from investors looking for yield in the current low-interest rate environment, and from regulators looking to measure and distribute risk. Traditional PE partnership firms have also continued to seek listings on public stock markets, either to provide liquidity to the stakes built up by senior managers, or to raise funds to develop new product lines, or both[5].

However concerns have been raised about giving PE firms permanent public capital to invest (Jensen (2007)). As traditional PE firms have their reputations on the line, are forced to repay investors, and must regularly raise new funds, they are incentivized to do "good deals and make them work" (p.25). These incentives would be weakened or lost if PE firms were

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[4]See, for example, "Long-term private equity funds: The Omaha play", The Economist, 10.September 2016; "Permanent capital: Perpetual cash machines", Financial Times, 4.January, 2015; "Business-development companies: Shadowy developments", The Economist, 22.November, 2014; "Private equity for ordinary folk", Reuters, 29.April, 2014.

[5]See, for example, "K.K.R. Going Public Next Week", New York Times DealBook, 7.July, 2010.

given permanent public capital. Furthermore, taking traditional PE firms public raises the risk of misalignment between the interests of public shareholders of the firm and the interests of the limited partners investing in the firm's funds. In a similar vein, publicly traded PE firms may have a short investment horizon (Lopez-de Silanes, Phalippou, and Gottschalg (2015)), and thus may opt for large fund size at the cost of poorer future performance, as being large increases fees in the short term but lowers returns in the long term.

A further motivation for this study is that, after an extensive consultation process, the regulator of the $10 trillion[6] European insurance industry recently adopted an index of listed PE firms as the private equity benchmark for its Solvency II framework. This move has stimulated vigorous debate in the PE industry (EIOPA (2013)). Opponents to using listed PE as a PE benchmark argue, among other things[7], that the performance of funds managed by listed PE firms may be different from the performance of the PE asset class as a whole.

Our study aims to examine the empirical evidence for the concerns that deals by listed PE firms underperform those by private PE firms. To do this, we build a comprehensive dataset of transactions and realized deals by public and private PE firms using transaction data from CapitalIQ[8]. Our sample consists of 33,471 solo buy and sell transactions for non-financial targets, with an imputed[9] value of almost $3 trillion (in 2007 US dollars), and 4,624 realized solo deals (5,581 if club deals are included). Our dataset is among the largest and most complete used in private equity research, and is free of selection and survivorship bias.

We start in the spirit of Kaplan (1991) and Strömberg (2007) by providing a demogra-

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[6]Source: www.insuranceeurope.eu, accessed 25.November, 2016.

[7]Other arguments against using an index as the PE benchmark are that an index of companies may carry too much idiosyncratic risk to be considered a good measure for all private equity; some buyout firms in the index are more leveraged (and therefore riskier) than the average private equity firm; part of the return for firms in the index is due to management fees and other non-investment driven returns, not only the performance of any underlying investments.

[8]CapitalIQ data has been used in a number of significant studies of private equity, including Strömberg (2007), Kaplan and Strömberg (2009), Lerner, Sorensen, and Strömberg (2011), Axelson, Jenkinson, Strömberg, and Weisbach (2013), Arcot, Fluck, Gaspar, and Hege (2015), and Bernstein et al. (2016).

[9]As total transaction values for some transactions are missing or incomplete, we follow standard practice in the literature that uses CapitalIQ data and estimate imputed transaction values using a Heckman procedure (see Appendix). We also estimate imputed deal multiples using a similar technique.

phy of transactions and deals by public and private PE firms. The quantity and value of transactions made by public PE firms in proportion to those made by private PE firms has remained relatively stable over time. Transactions by public PE firms represent about 7%, by number, of those by private PE firms, and about 11% by value. Thus while public PE involves fewer transactions than private GPs, public PE transactions are, on average, higher in value. Also, the growth rates in terms of the number and value of transactions by private and public PE are similar - between the 1990s and the 2010s, the number of transactions for private GPs grew 395% (363% for public PE), and their value increased by 424% (396% for public PE).

In the second part of this study, we compare the performance of realized deals by public and private PE firms[10]. Specifically, we test four pairs of hypotheses comparing performance of public and private PE; traditional GPs and permanent PE; private GPs and public GPs; and permanent PE closed-end funds and permanent PE public limited companies.

The performance of public and private PE is virtually indistinguishable. The mean imputed multiples and PME[11] values are almost identical for both subsamples. Public PE firms hold their deals for a slightly shorter period, on average, and their capital gains are larger, on average.

Comparing performance of traditional GPs and permanent PE, we find that the evidence is not strong enough to reject the null hypothesis that deal performance for traditional GPs is the same as that for permanent PE. The mean imputed deal multiple for traditional PE firms is 2.38 which is larger than that of permanent PE whose mean imputed multiple is 2.16, but the difference is not statistically significantly. The mean imputed PME value for permanent PE (1.84) is actually larger than that for traditional PE (1.8), but again this difference is not statistically significant. Thus we find no evidence that traditional PE firms make better deals than permanent PE firms.

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[10]We do not examine fund-level performance. As Braun, Jenkinson, and Stoff (2015) point out, funds are merely legal wrappers for deals by the same PE firm.

[11]The Public Market Equivalent (PME) measure of private equity fund performance was first proposed by Kaplan and Schoar (2005) and has used in many studies of private equity performance since then.

Looking at the performance of private GPs and public GPs, we do not find sufficient evidence to prove that the performance of public GPs is different from private PEs. The mean imputed multiple for public GPs (3.11) is larger than that for private GPs (2.36), but this difference is not statistically significant. By the PME measure, public GP deal performance (mean imputed PME of 2.39) is again greater than that of unlisted PE (1.79), but not significantly so. Thus, contrary to our prior expectation that private GPs make better deals than public ones, we find that in fact private GPs make worse, but not significantly worse, deals than listed traditional PE firms. Furthermore, we find that public GP deal performance actually improves after the GP goes public.

Our final set of hypotheses exploit one of the unusual aspects of permanent PE capital, which is that two public organizational forms are possible - limited companies and closed-end funds. This unique setting gives an opportunity to make a direct comparison of the characteristics and performance of these two public organization structures. We find that permanent PE firms do in fact tend to make shorter deals than permanent PE funds, and have lower multiples, but their annualized multiple is slightly greater. Permanent PE funds, on the other hand, hold their deals for longer and achieve higher overall deal multiples.

The contribution of this paper is fourfold. First, we give a detailed demography of private equity transaction and deal characteristics, focusing on listed private equity. Second, we develop a novel and comprehensive dataset of private equity deal performance metrics. In particular, we extend the use of CapitalIQ data to estimate deal multiples and PMEs. Third, we contribute to the debate on the effectiveness of the private equity partnership model. We add to the literature, not by identifying specific agency or incentive problems in the traditional partnership model, but by examining whether there is evidence that the partnership model balances incentives and agency conflicts in a way that forces GPs to make better deals than PE firms that use a permanent capital model, or that forces private GPs to make better deals than public ones. Fourth, we exploit the unique setting provided by permanent PE to compare the performance of two types of public organization structure,

limited companies and closed-end funds.

This paper is structured as follows: in the next section, Section II, we start by outlining the evolution of the private equity model and reviewing relevant literature; in Section III we describe how we construct our dataset and present detailed transaction and deal demographics; in Section IV we develop and test hypotheses about the characteristics and performance of deals by public and private PE firms. Sections V and VI round out our analysis with a deeper look at deal performance by holding period, and deal performance by vintage buy and sell year. Section VII discusses the findings; Section VIII concludes.

II. Background and Related Literature

A. *Private Equity and Leveraged Buyouts*

Leveraged buyouts (LBOs) first emerged as an important phenomenon in the 1980s (Lerner et al. (2011)), and in his influential paper, "The Eclipse of the Public Corporation", Jensen (1989) predicted that the LBO would become the dominant corporate organizational form. With its emphasis on corporate governance, concentrated ownership, monitoring by active owners, strong managerial incentives, and efficient capital structure, he argued that the buyout is superior to the public corporation with its dispersed shareholders and weak governance. These features enable LBO managers to add value more effectively and make long-run investments without catering to the public market's demands for steadily growing quarterly profits, which Stein (1988) and others argue can lead firms to myopically sacrifice such expenditures.

Leveraged buyout investment firms today are known as private equity firms. Jensen (1989), and later Kaplan and Strömberg (2009), describe these firms as lean, decentralized organizations with relatively few investment professionals and employees, and which are small relative to the firms in which they invest. PE firms manage funds in which investors commit money to pay for investments in private companies, as well as management fees to

the private equity firm.

B. *Fundraising Models*

[Table 1 about here.]

There are three ways that private equity firms raise funds. The first, and the most common, approach is for the PE firm to raise funds that are legally organized as limited partnerships in which the general partners (GPs) manage the fund and the limited partners (LPs) provide most of the capital. The LPs typically include institutional investors, such as corporate and public pension funds, endowments, and insurance companies, as well as wealthy individuals. The private equity firm serves as the fund's GP. It is customary for the GP to provide at least 1 percent of the total capital.

The partnership fund typically has a fixed life, usually ten years, but can be extended for up to three additional years. The GP normally has up to five years to invest the fund's capital committed into companies, and then has an additional five to eight years to return the capital to its investors. After committing their capital, the LPs have little say in how the GP deploys the investment funds, as long as the basic covenants of the fund agreement are followed. Common covenants include restrictions on how much fund capital can be invested in one company, the types of securities a fund can invest in, and the amount of debt at the fund level (as opposed to debt at the portfolio company level, which is unrestricted).

Some PE firms (GPs) list on public stock exchanges, not to raise private equity investment capital, but rather to realize some firm value on behalf of the PE firm's partners or to raise funds for developing new product lines (eg hedge-funds, REITs). These PE firms continue to raise their PE investment capital from private investors following the partnership fund model. Shareholders are thus not directly exposed to the inherent risk of the underlying PE investments. They are entitled instead to a share of the fee income earned by the PE firm (and income from the firm's other product lines).

The second way private equity firms raise investment capital is to create a closed-end fund and list it on public stock-markets. Listed closed-end funds exist for a variety of illiquid assets (real estate, municipal bonds etc), and are subject to regulation in the jurisdiction where the fund is listed (such as the Securities and Exchange Commission (SEC) in the United States[12]).

Regulated closed-end funds enjoy tax benefits (such as corporation tax exemption on gains made on disposals of investments), however they face restrictions on investment activities which are similar to the covenants imposed by LPs in partnership PE funds - caps on leverage, fees, the amount investable in a single firm, etc. Regulated closed-end funds are usually "evergreen", in that the fund has indefinite life, although a fund's shareholders may move a resolution to wind up the fund at the fund's general meetings.

Some closed-end PE funds invest as LPs in partnership funds raised by other PE firms rather than investing directly in private companies[13]. Such funds are known as indirect PE funds, or funds-of-funds.

The third way PE firms may raise investment capital is to seek a listing on the stock market as a public limited company, and use the IPO proceeds to invest in private companies. Public limited PE companies do not enjoy the tax benefits that regulated closed-end PE funds do, but face fewer restrictions in their investment activities. In the United States, unfettered access to PE investments is perceived by regulators as too risky for smaller and possibly less informed investors, therefore raising PE investment capital this way is not permitted.

Public limited PE firms and public closed-end PE funds are closely related, in that they both raise permanent PE investment capital from public investors, and for most of this study we do not distinguish between these two forms of permanent PE except where explicitly noted.

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[12]In the United States, listed closed-end PE funds are known as Business Development Companies (BDCs).

[13]Funds-of-funds, like LPs in general, occasionally take direct positions in private companies as co-investors with their GPs.

C. Jensen's arguments for the partnership model

Thus leveraged buyouts may be performed by private equity firms that raise their investment capital in different ways and that adopt different structural forms. The way investment capital is raised and the structural form of the PE firm does not change the inherent benefits of the LBO model as identified by Jensen (1989). However in his later remarks, Jensen (2007) identifies what he sees as the strengths of the fixed-life partnership funding model, and the weaknesses of the permanent public capital funding model. He argues that the reputation of partnerships' GPs is very important - the necessity to pay back investors (LPs) funds at the end of the contract period, and raise new funds, mean that mediocre returns are a disaster for GPs - two low-return funds and they are "out". GPs have big incentives to do good deals and make them work. On the other hand, PE firms that raise investment capital by listing a closed-end fund or a private limited company, do not have the same reputational concerns faced by GPs. They do not have to return funds to their investors, nor do they have to go back to investors to raise new funds on a regular basis. Therefore, Jensen implies, they do not have the same incentives to make successful deals that GPs have.

Jensen's arguments have not gone unexamined however, and there is a growing body of literature highlighting incentive problems and agency costs in partnership funds. Axelson, Strömberg, and Weisbach (2009) develop an optimal contracting model in which the financial structure of partnership funds is designed to minimize agency conflicts between fund managers and investors. However, even optimally designed PE contracts do not completely eliminate incentive problems and agency costs embedded in the GP-LP relationship. Arcot et al. (2015) show how GPs that find themselves with unspent committed capital at the end of their fund's investing period (usually the first 5 years of the fund's life) can feel pressure to make quick acquisitions, typically secondary buyouts from other PE firms, and these deals are often expensive relative to comparable mergers and acquisitions (M&A) transactions. Likewise GPs holding unsold investments at the end of their fund's life feel pressure to make secondary deals, and these deals sell at relatively low transaction multiples. Robinson and

Sensoy (2013) report that GP behavior in booms and around certain contractual triggers seems consistent with the existence of agency conflicts. In particular they find evidence that suggests GPs hold on to underperforming investments instead of selling them and returning the cash to investors. Robinson and Sensoy (2013) suggest that, as GPs receive fee income from their LPs for managing active investments, and these fees are discontinued when the investment is sold, so GPs may delay selling in order to prolong their fee income. Other studies have highlighted window-dressing behavior by GPs. Brown, Gredil, and Kaplan (2016) and Jenkinson, Sousa, and Stucke (2013) find that around the time the GP needs to raise a new fund, the valuations of their current fund tend to be inflated.

D.   Public PE and risk-taking

The incentives for PE firms to take risks may differ depending on whether the PE firm is public or private. While the general literature on why firms go public is too large to survey here, the debate on innovation and the decision to go public is enlightening. The decision by a firm to invest in an innovative project is very similar to the decision by a PE firm to acquire a target. Both decisions involve risk, the investment can be discontinued or exited early, and information on the success (or failure) of the innovation or the acquisition is likely to be of interest to investors (and to move share prices in the case of public companies). Two opposing views on risk-taking incentives for private and public firms have been put forward in the innovation literature.

In the first view, Ferreira, Manso, and Silva (2014) argue that, as private firms can choose an early exit if they receive bad news, they are more tolerant of failure and thus more inclined to invest in risky innovative projects. In contrast, the prices of publicly traded securities react quickly to good news, providing incentives to public firms to choose lower-risk conventional projects and cash in early[14]. Therefore they suggest that firms wishing to explore new innovations should remain private, while firms wishing to exploit an existing

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[14]Interestingly, Ferreira et al. (2014) cite improvements in patent quality from public-to-private private equity deals to support their arguments.

innovation may consider going public.

The second view, advanced by Bebchuk and Fershtman (1994), is that the ability to trade on the basis of private information provides managers of public firms with incentives to undertake risky projects. The ability to sell shares before information about low profitability becomes public works as a put option that convexifies the payoffs enjoyed by insiders, which makes risky projects more attractive.

Parallel arguments may be made for private equity: private PE firms operating away from the gaze of public investors may choose to invest in more risky targets, knowing they can exit early if things do not go smoothly, while public PE firms may choose less risky targets and cash in early in order to please their public investors.

Alternatively, managers in public PE firms may take on more risky deals knowing that they may place a put option on their firms shares if they have information that a deal is not working out.

E. Jensen's arguments about GPs going public

Jensen (2007) also expresses concern about traditional PE firms going public, suggesting that the interests of the holders of a public PE firm's stock may not be aligned with the interests of the investors (LPs) in the partnership funds managed by the public PE firm. This tension between public shareholder and LP interests is unique to publicly listed GPs; in permanent PE vehicles there are no LPs, and in private GPs there are no public shareholders.

Chemmanur and Jiao (2012) develop a model of the choice of security-voting structure, in which market-driven short-termism plays a key role. In their model, entrepreneurs may prefer to go public with a dual-class share structure to commit to pursuing long-term strategies. By selling equity without votes, the entrepreneur can insulate himself from short-term market pressure. This form of managerial entrenchment can be beneficial in situations in which agency costs are low.

Listed GPs may organize their share structure to minimize pressures from public share-

holders. The shareholders (common unitholders) of most listed GPs[15] have virtually no say in the governance of the enterprise - they have limited voting rights and no right to elect or remove the general partner or directors.

F.   Listed private equity and unlisted private equity performance

A number of studies relate listed private equity stock and NAV returns to unlisted private equity performance. Jegadeesh et al. (2015) derive an estimate of expected ex-ante returns to traditional PE funds using the prices of listed funds-of-funds. McCourt (2016) exploits the fund nature of permanent PE vehicles to apply tests for skill and luck that have been developed in the mutual fund literature, and finds levels of skill that are comparable to those found in studies of traditional PE. Preqin and LPX Group (2012) compare NAV returns of the LPX50 index of listed PE and the Preqin Private Equity Quarterly Index of traditional PE returns, and finds a high correlation (0.94).

III.   Data

In this section we describe the dataset used for the study. We first examine transactions in CapitalIQ, the building blocks of our database; we then describe how we identify realized deals and estimate their performance, and then compare our sample with that of other recent studies. We finish the section by providing a detailed demography of transactions and deals, by region, year and industry.

A.   Transactions

The S&P CapitalIQ database contains comprehensive data on buy and sell transactions for public and private targets by public and private companies. CapitalIQ data has been used in a number of significant studies of private equity, including Strömberg (2007), Kaplan

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[15]See for example Jensen (2007), or "Here's The Real Problem With Investing In The Carlyle IPO", Business Insider, 4.February, 2012.

and Strömberg (2009), Axelson et al. (2013), Arcot et al. (2015) and Bernstein et al. (2016). Strömberg (2007) provides a very detailed analysis of CapitalIQ data from a private equity perspective.

We start by creating three subsets of CapitalIQ data - buy transactions, sell transactions, and bankruptcies - for targets located in the 35 member countries of the OECD. We identify all buy and sell transactions by private GP/VC investment firms, public investment firms, and public funds in CapitalIQ which closed between January 1st, 1990 and June 30th, 2016. To identify buy transactions where there is a change of control, we exclude transactions which are not going private transactions, leveraged buyouts (LBOs), secondary LBOs, management buyouts (MBOs), or cash mergers. We also exclude transactions by non-investment firms and funds, investment arms of corporations or financial service firms, transactions involving financial targets or targets located outside the 35 OECD countries, and sell transactions involving public companies or stock mergers. For bankruptcies we identify all private company bankruptcies in CapitalIQ.

We classify buy transactions as "public" where at least one of the buyers is a public investment company or a public fund; the remainder are classified as private. Using information hand-collected from PE firm websites and annual reports, public PE firms are further categorized according to the activity of the firm - public traditional PE fund manager, public permanent PE firm, and others (usually funds-of-funds, or venture capital firms).

We identify and correct a small number of misclassifications in CapitalIQ data where some public PE firms are misclassified as private PE firms, or as hedge funds. Also, to control for outliers and potential data errors, the values of buy and sell transactions are winsorized at the 1% and 99% levels. All transaction values[16] are converted to 2007 US dollars. The value of IPO sell transactions are adjusted to reflect the percentage of equity offered in the IPO. Price information is not available in CapitalIQ for all transactions, so

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[16]For transaction values we use Total Transaction Value in Capital IQ. Total Transaction Value is the same as the Total Gross Transaction Value when the latter is available in CapitalIQ, which is the consideration paid, plus net assumed liabilities and adjustment size, plus total cash and short-term investments.

we use a Heckman procedure introduced by Strömberg (2007), and also used in Arcot et al. (2015) and Bernstein et al. (2016), to estimate imputed values for the transactions where values are missing. Details of the procedure are given in the Appendix.

Table II and Table III present summary statistics on the number and value of buy and sell transactions in our final sample. We identify 23,651 buy transactions, 5,646 of which are club deals. Of the 18,005 solo buy transactions, 16,666 are by unlisted PE firms and 1,339 (8% of the unlisted PE total) are by public PE firms.

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[Table 2 about here.]

[Table 3 about here.]

[Table 3 about here.]

Our database of sell transactions consists of 30,477 observations[17]. 15,446 of these are solo transactions, 14,333 of which are by private PE firms and 1,133 (7.9% of the private GP total) are by listed PE firms.

Our raw bankruptcy database consists of 22,669 private company bankruptcy observations. As bankruptcies in CapitalIQ do not include ownership information, it is impossible to determine how many of these are linked to private equity deals until they are matched to buy transactions, as described in the next section.

B.   Deals

To ensure that deal characteristics are identified as precisely as possible, we focus on deals where there is a single PE sponsor (solo deals), and where there is a change in control of the target company. Focusing on solo deals means that the deal multiple reflects the

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[17]Terms are not disclosed in CapitalIQ for a subset of sell transactions, thus some of these may involve sales of minority stakes rather than full changes of control.

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maximum individual contribution a PE firm makes to the value of the target firm. In deals where a PE firm invests alongside other PE firms (syndicate or club deals), it is not possible to precisely identify the value added by each individual PE firm. Similarly, for deals which do not involve a change in control, the PE sponsor may not have full control of the target firm, and thus the multiple may reflect value added to the target firm from sources other than the PE sponsor.

We define a deal using CapitalIQ data as two transactions involving a target firm, a buy transaction where there is a change of control for the target firm, followed by a sell transaction where the sellers are the same as the buyers from the buy transaction, or a bankruptcy, for the same target firm, whichever comes first. In the small number of cases where there is more than one buy transaction for a target involving the same buyers, we keep the one where the largest stake is acquired, usually the first transaction. We treat multiple sell transactions involving the same targets and sellers in a similar way. Using the target name and the list of buyers as keys, we match buy transactions with sell transactions and with bankruptcies.

The buy date for the deal is the closing date of the buy transaction and the sell date is the closing date of the nearest matching sell transaction (or the announcement date in the case of bankruptcy) to the buy date. We exclude deals of less than 30 days duration.

We estimate the multiple of invested capital for a deal as the deal's sell value divided by its buy value. We use actual (not imputed), unwinsorised, values to estimate actual multiples, but to control for outliers and potential data errors, multiples are winsorized at the 1% and 99% levels. As actual value information is not available for all deals, we use a Heckman procedure to impute the multiple for deals where the value information is incomplete. Details of the procedure are given in the Appendix.

The Public Market Equivalent (PME) measure has been shown by Sorensen and Jagannathan (2015) to control for market risk and other risks which vary with the credit cycle, such as leverage. Our deal-level PME measure consists of the return achieved by investing

$1 in the deal (the deal's multiple) divided by the return that could have been achieved by investing $1 in the S&P500 at the deal buy date and selling at the deal sell date. A PME value less than one means that the deal earned less than could have been achieved by investing in the S&P500 over the lifetime of the deal, and a PME value greater than one means that the deal earned more than the market. To estimate the market return, we use daily total return data for the value-weighted S&P500 index downloaded from the Center for Research in Securities Prices (CRSP).

Table IV presents data on the number, value, and performance of deals. Our final sample consists of 5,581 deals, of which 4,640 are solo deals. 4,242 deals are by private PE firms, and 398 (9.5% of the private GP total) are by public PE firms.

[Table 4 about here.]

[Table 4 about here.]

C.   Comparison with Other Studies

A small number of other studies use deal-level data, and these source deal-level data from LPs. However, only GPs who sought capital from these LPs are included in their sample, thus selection bias is a possibility. Survivorship bias may be a concern too - GPs who had raised funds in the past (from other investors) but subsequently quit the sector will be excluded. Also LPs do not invest in deals by public permanent capital firms, so these deals are completely excluded. Our sample avoids all of these problems - it includes deals by all GPs, even if they did not seek investment from certain investors, or if the GP exited the sector. Of course, we also include all deals by permanent capital PE firms.

Nonetheless, our measures of deal-level performance are consistent with results from other recent studies. Comparing deal performance characteristics with those found by Braun et al. (2015) in their study of PE persistence, their average multiple for 6,048 realized deals for the period 1990-2013, ranges from 1.5 to 2.2, while our average imputed multiples for non-

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financial targets located in OECD countries in the 1990-2016 period, are 2.3 for 4,640 solo deals, and 2.0 for 941 syndicate deals. In their study of economies of scale in PE, Lopez-de Silanes et al. (2015) report a median multiple of 2.1 for their sample of 5,106 deals realized between 1973-2005, which is also in line our finding.

D. Demography

We finish this section by giving a demographic picture of private and public PE in Table V. We break down transaction volumes and values, and deal volumes and performance, by time period (from the 1990s through to the 2010s), by the geographic location of target firms, and by the industry classification of target firms.

The quantity and value of transactions made by public PE firms in proportion to those made by private PE firms has remained relatively stable over time. Transactions by public PE firms represent about 7%, by number, of those by private PE firms, and about 11% by value. Thus while public PE involves fewer transactions than private GP, public PE transactions are higher in value. Also, the growth rates in terms of the number and value of transactions by private and public PE are similar - between the 1990s and the 2010s, the number of transactions for private GP grew 395% (363% for public PE), and their value increased by 424% (396% for public PE). The mean purchase value for both private and public PE rose over the period (16% and 9% respectively) while the mean sale value dropped slightly (-9% for private GP and -5% for public PE).

Looking more closely at public PE, we see that the transaction profile of permanent PE firms changed significantly between the 1990s and the 2010s. The number of transactions by permanent PE firms increased over the period at just half the rate of public GPs (190% versus 400%), however the mean imputed transaction value for permanent public PE increased four times more than that for public GPs (94% versus 21%). Thus permanent PE has evolved from being a niche player targeting smaller transactions in the 1990s, to being a significant player in the 2010s with mean imputed transaction size in excess of that of traditional PE

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($128 million versus $90 million). Public GPs dominate the other PE types in terms of mean imputed transaction size throughout the period of the study ($282 million in the 2010s), with mean imputed transaction size typically three times that for private GP or public permanent PE.

[Table 5 about here.]

[Table 5 about here.]

[Table 5 about here.]

A further insight from this analysis is that, consistent with Braun et al. (2015) and Kartashova (2014), we find that buyout deal performance declined during the 2000-2009 period. This decline has been interpreted to be a sign of the increasing competition for deals among PE firms (Braun et al. (2015)). However in the period 2010-2015, buyout deal performance has rebounded significantly. Thus competition for deals may have declined since the 2007-2008 financial crisis, allowing skilled GPs to differentiate themselves from unskilled ones, and to deliver strong deal-level returns in the years following the crisis.

IV.   Deal Performance Comparison

In the previous section we estimated and presented two core measures of deal performance, the multiple of invested capital and the Public Market Equivalent (PME). In this section we do a detailed comparison of deal performance for different PE types.

Specifically, we test 4 sets of hypotheses:

1. Private GP versus Public PE

   - Assuming public companies are myopic (Stein (1988)), and suffer from agency problems (Jensen (1989)), we expect to find that deal performance is better for private PE firms than for public PE firms & funds.

- We further infer that public PE firms and funds make shorter deals than private PE firms.

2. Traditional GP versus Permanent PE

   - Assuming traditional GPs are incentivized to make good deals and make them work (Jensen (2007)), we expect to find that deals by traditional GPs (public and private together) outperform those by public permanent PE firms.

   - Assuming their permanent capital gives permanent PE firms more flexibility to time deal entry and exit (Strömberg (2007)), we expect to find that the deal holding period for public permanent PE firms is longer than that of traditional GPs (public and private together).

3. Private GP versus Public GP

   - Assuming shareholder and LP interests are misaligned for public GPs (Lopez-de Silanes et al. (2015), Jensen (2007)), we expect to find that deals by private GPs outperform those by public GPs.

   - We also expect to find that deal performance declines after a GP goes public.

4. Permanent Closed-End Funds versus Permanent Limited Companies

   - Assuming public limited companies are myopic (Stein (1988)), and suffer from agency problems (Jensen (1989)), we expect to find that deal performance is better for permanent PE organized as closed-end funds than for permanent PE organized as limited companies.

   - We also expect that deal holding times for permanent PE closed-end funds are longer than for permanent PE limited companies

A. Overview of results

Table VI presents the results of t-tests comparing deal performance (multiple, PME and capital gain), and deal holding period, for different types of PE firm. We also include t-tests

for the annualized imputed multiple (i.e. the annual return which when compounded over the period of the deal yields the deal multiple).

Comparing private GPs and public PE, there is little difference in the imputed multiple or PME per deal, or in the capital gain per deal. Public GPs performance measures dominate those of private GPs. There is little difference, statistically, between the performance measures for traditional GPs and public permanent PEs. For the holding period, differences emerge between public PE and traditional GPs (traditional GP holding periods are larger).

[Table 6 about here.]

B.   Private GP versus Public PE

The imputed multiples and imputed PMEs for private GPs are indistinguishable economically or statistically from those for public PE. Thus the hypothesis that deals by private GPs perform better is not supported. The hypothesis that the holding period for public PE firms is shorter than for private GPs is supported however. This is in line with the argument that public PE firms may cash out early in order to impress shareholders.

C.   Traditional GP versus Permanent PE

We find that for the hypothesis that deal performance for traditional GPs is the same as that for permanent PE, the evidence is not strong enough to reject the null. The mean imputed deal multiple for traditional PE firms is 2.38 which is larger than that of permanent PE whose mean imputed multiple is 2.16, but the difference is not statistically significantly. The mean imputed PME value for permanent PE (1.84) is actually larger than that for traditional PE (1.8), but again this difference is not statistically significant. Thus we find no evidence that traditional PE firms make better deals than permanent PE firms.

There is evidence to reject the second hypothesis that the holding period for deals by permanent PE firms is the same as for traditional PE firms. However, the result is the

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opposite to what we hypothesized - the holding period for deals by traditional PE firms is longer, on average, than for permanent PE firms, and this result is statistically significant. For deals by permanent PEs, the mean holding period is 4.2 years, while for traditional GPs, the mean holding period is 4.5 years.

We see two possible explanations why traditional PE firms may hold their investments for longer than permanent PE firms. The first is that traditional PE firms make better deals and hold them for longer in order to maximize the deal multiple. However, as the results for our first hypothesis show, there is no significant difference in the deal multiples for traditional versus permanent PE. The second explanation is that, consistent with the findings of Robinson and Sensoy (2013), traditional PE firms hold their investments for longer in order to prolong the fee income they earn from their LPs for managing these investments. Given our results, this second explanation seems more plausible.

D.   Private GP versus Public GP

For the first hypothesis (that there is no difference in performance for deals by unlisted GPs and by listed traditional PE partnership firms), there is not sufficient evidence to reject the null. The mean imputed multiple for public GPs (3.11) is larger than that for private GPs (2.36), but this result is not statistically significant. By the PME measure, public GP deal performance (mean imputed PME of 2.39) is again greater than that of unlisted PE (1.79), but not significantly so. Thus, contrary to our prior expectation that private GPs make better deals than public ones, we find that in fact private GPs make worse, but not significantly worse, deals than listed traditional PE firms.

The main wave of GP listings took place in the mid- to late-2000s. For the purposes of the study up until now, we classified all transactions by listed GPs as public GP transactions, even if the transactions were completed before the GP went public. We take a closer look here at the characteristics of transactions and deals by public GPs before and after their IPO. In particular, going back to Jensen's prediction in 2007, we are looking to see if going

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public had a negative impact on deal performance (this is our second hypothesis in this section).

First we examine deal size. A t-test (unreported) of imputed buy values for deals initiated before and after GPs go public shows that post-IPO, public GPs make significantly larger deals (t-stat=2.48).

In Table VII we present the results a t-test to compare deal performance for public GPs before and after their IPO. Imputed multiples and annualized imputed multiples are larger for deals initiated after the GP's IPO than before it. Imputed PMEs are also larger, but not significantly so.

[Table 7 about here.]

The post-IPO performance identified in the simple t-test may be due to a variety of factors, not just the GP's IPO, so we also run a regression of the log of the imputed multiple for all deals on a dummy variable (Post-IPO) which is set to 1 for deals by public GPs initiated after the GP goes public, and 0 otherwise, and another dummy variable (Public-GP) which is set to 1 for all deals by public GPs, irrespective of initiation date. The loading on the Public-GP dummy is positive and significant, confirming our finding in Section III.B that deals by public GPs have significantly larger multiples than the rest of the deal population over the entire sample period; the coefficient on the Post-IPO dummy is positive, but not statistically significant. We repeat the test using the log of the actual PME for each deal as the dependent variable, but the conclusions are unchanged.

[Table 8 about here.]

E. *Permanent Closed-End Funds versus Permanent Limited Companies*

One of the unusual aspects of permanent PE capital is that two organizational forms are possible - public limited companies and listed closed-end funds. The underlying activities for both are fundamentally the same - leveraged buyouts. The incentives and agency costs

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for fund managers and firm managers however are different. Fund managers take fees from their investors which are similar to those of private PE firms, including fixed investment management fees and variable performance fees. Firm managers, on the other hand, earn a compensation package that includes a salary, and usually a performance related bonus, and a stock or stock options component. As a result, the transaction characteristics and deal performance may be different for firms versus funds. Permanent PE provides a unique setting to make a direct comparison of the characteristics and performance of these two structural forms.

Table IX gives information on the transaction characteristics of permanent PE firms and funds. Permanent PE funds make slightly more buy transactions, on average, than permanent PE firms (19.67 deals per fund vs 18 deals per firm), also the average imputed value of buy transactions is higher for permanent PE funds ($103 million versus $94 million), but an unpaired t-test (results not reported) shows this difference is not significant.

Looking at realized deals (see Table X), the performance measures for deals by permanent PE funds are better than for permanent PE firms. The average capital gain ($119 million vs $65 million), imputed multiple (2.31 versus 1.78) and imputed PME (2.09 versus 1.78) are all higher for deals by permanent PE funds than for permanent PE firms. The average holding period is also longer for funds than for firms (4.6 years versus 4 years).

The results of unpaired t-tests of deal performance characteristics given in Table XI show that permanent PE funds make better deals, but not significantly better, than permanent PE firms, and hold them for significantly longer. To test how well permanent PE funds use this extra holding time to increase the deal multiple, we compare the annualized imputed multiples for permanent PE funds and permanent PE firms. We find that funds add less value to their target firms each year than permanent PE firms. Permanent PE firms tend to make shorter, higher impact deals that have higher annualized returns, while funds make deals that take longer to mature but in the end, deliver higher deal-level returns. These results also suggests that permanent PE funds do not game their fee structure to prolong fee

income from their investors - funds do actually add value to their targets during the longer holding period.

[Table 9 about here.]

[Table 10 about here.]

[Table 11 about here.]

V.   Performance and Holding Period

In this section we illustrate the relationship between performance and holding period in more detail. The length of time a private equity firm holds a position in a target firm is an area where differences between listed and unlisted PE firms may arise. For example, Ferreira et al. (2014) suggest that private firms may prefer to take on risky projects and terminate them early if they go bad, while public firms prefer to take on less risky projects and to cash in early if they go well (to give their share price a boost). The results we have already presented show that permanent PE firms hold their deals for a shorter time than traditional PE firms. Also, we have already seen that private GPs hold their deals for longer than permanent PE firms, yet there is no difference in average deal performance.

Looking first at Figure 1, Panel A, we see that a higher proportion of deals by permanent PE have shorter holding periods than either public or private GPs, but the difference is not huge. For example, about 75% of deals by permanent PE firms have holding period of 5 years or less, while for the other PE types the proportion is about 65%.

Figure 1, Panel B and Panel C, provide graphs of the fitted multiples and PMEs from a linear regression of deal multiples on the holding period, and the square of the holding period. Using the square of holding period captures possible non-linearity (convexity) of multiples over holding periods. In general, multiples decline for deals with longer holding periods. While the outperformance of public GPs across all holding periods is clearly visible,

performance declines almost linearly with holding period. For private GPs, there is little change in performance for deals up to about year 5, and then a decline in performance after year 5. The curvature for permanent PE is quite pronounced, with performance rising slightly up to year 5, and then declining rapidly.

Figure 1 also illustrates how multiples for private GPs are higher, on average, across all holding periods than for permanent PE. Using the PME measure, however, permanent PE firms clearly outperform private GPs for all deals with a holding period of less than ten years. PME may be vewed as a risk-adjusted return measure for private equity as it controls for market risk and other risks that vary with the credit cycle. In this sense, permanent PE deals earn higher risk-adjusted returns than private GPs.

[Figure 1 about here.]

VI. Buy and Sell Vintage Year Performance

In Figure 2, we graph deal performance by the buy year and sell year of deals by permanent PE, public GPs and private GPs. We use the t-statistic of the mean multiple (adjusted to have expected value of 0) of deals initiated in the buy year, or exited in the sell year. Using the t-statistic controls for variation in risk-taking, and survivorship bias.

Looking at buy year performance (Figure 2, Panel A), the boom-bust cycle of private equity described by Kaplan and Schoar (2005) is evident. Deals initiated in 2002 and 2003 (after the bust of the dot-com bubble) perform well, especially for public GPs; likewise multiples increased for deals initiated in the period after the 2007-2008 sub-prime crisis. Deals initiated during the booming 2004-2007 period did not perform particularly well. 2008 was a wipeout for permanent PE deals with negative performance, but permanent PE performance improved very strongly after the crisis in 2010 and 2011. The number of active permanent PE firms fell after the sub-prime crisis (see Table V); clearly those firms and funds that survived were skilled, or faced less competition for deals, or both. Overall, deals

by public GPs perform better than the other PE types in most years; there is less difference in deal performance for permanent PE firms and private GPs.

Looking at sell year performance (Figure 2, Panel B), there is less variation than for buy year performance. It may be that PE firms smooth returns, to reduce the impact of boom and bust cycles for their investors. Public GP performance is consistently stronger than the other PE types, while permanent PE and private GP performance are generally close, with a couple of exceptional years for permanent PE in 2000 and 2014.

[Figure 2 about here.]

VII.   Discussion

Based on our analysis, publicly traded PE firms make deals which perform at least as well as those made by private GPs, and in the case of publicly traded GPs, outperform those of private GPs. So a number of questions arise: Why do deals by publicly listed GPs perform the best? Why do so few private GPs go public? Why do investors place their funds with PE firms that are not public GPs? While we cannot hope to fully answer these questions, we try to shed some new light using the results of our analysis.

One explanation why deals by public GPs outperform could be that these GPs are more skilled than other PE firms at finding good targets in the first place, and are then better at adding value to these targets. There may be a matching phenomenon going on that allows public GPs choose the best deals, leaving the leftovers for other PE firms. Sørensen (2007) finds that experienced Venture Capital (VC) firms choose to invest in better targets, and better targets choose investments from more influential VCs. Likewise, the buyout fund GPs that choose to go public do so clearly because they were already successful, and therefore better able to find, or match with, good deals. Another possible explanation for their superior deal-level performance is that public GPs take on riskier deals and are rewarded by higher returns. Bebchuk and Fershtman (1994) propose that managers of public firms take on risky

projects as they can use their inside information to sell the firms stock if the projects go wrong. Certainly deals by public GPs are larger than those by other PE firms, however there is little evidence that they take on riskier deals - fewer deals by public GPs go bankrupt compared to private GPs.

Some of the GPs that listed on public stock markets did so during an unprecedented boom time for private equity - the mid-2000s. KKR and Partners Group listed in 2006, Blackstone in 2007. Apollo and Carlyle were a little late to the party, listing in 2011 and 2012, respectively. These firms were already successful by the time of their IPO, and senior executives benefited significantly from these IPOs - the New York Times[18] reported that Henry Kravis and and George Roberts, the founders of KKR, earned $800 million each from their firm's IPO, while Stephen Schwarzman, Blackstone's founder, earned $684 million. These managers saw going public as a way to make the stakes they had built up in their firms more liquid, and eventually allowing them to sell their shares and diversify their portfolios.

So why do most GPs choose not to go public? First, the stock performance of the public GPs has been somewhat disappointing. Both KKR and Blackstone stocks traded below their IPO price for many years after their IPO. Private GPs may now feel that investors will adjust downwards the price they are willing to pay for future GP IPOs. Second, the process of going public forces the PE firm to expose many details about their business that they may prefer not to reveal. For example, the KKR IPO prospectus showed that the cost of Henry Kravis' use of company limousines in 2009 came to $98,771. Perhaps some private GP managers prefer to keep these kinds of details out of the public eye. Third, some GPs that went public did so to raise investment capital for new business lines, such as hedge funds, real estate investment trusts etc. It may be that GPs that choose not to go public are making a strategic decision to focus on LBOs, and thus did not see the need for any extra investment capital[19].

It is a well known investors rule of thumb to invest with "top quartile" funds, so the

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[18]"K.K.R. Going Public Next Week", New York Times DealBook, 7.July, 2010

[19]An example is Clayton Dubilier Rice - see "Engineers of a different kind", The Economist, 22.June, 2013.

question why some investors continue to place money with mediocre funds instead of with public GPs is somewhat of a mystery. It may be that search costs for investors are high - Korteweg and Sorensen (2016) note that skilled GPs are difficult to identify, therefore investors with the skills required to identify them are also rare. However Korteweg&Sorensen did not separate deals by public and private GPs, and therefore may not have observed the important distinction in performance between these two different organization forms. Another possible explanation is that our performance measure, the multiple of invested capital, is a measure of gross performance, not the net performance to the investor. For closed-end funds, Berk and Stanton (2007) argue that skilled managers raise their fees to absorb the rents they generate, leaving investors with no abnormal return. This may also be the case with private equity, although Korteweg and Sorensen (2016) find evidence of significant abnormal net returns for skilled traditional PE buyout funds, and McCourt (2016) finds similar results to Korteweg&Sorensen for permanent PE buyout firms.

VIII.   Conclusions

We examine whether concerns about publicly listed private equity capital firms are justified. Listed private equity firms may suffer from agency costs (conflicts between the public shareholders of GP firms and the LPs that invest invest in the GP firms' funds), or may not be sufficiently incentivized to make good deals and make them work (permanent capital PE firms do not have to regularly return capital to investors and raise new funds).

Using a new, large sample of leveraged buyout deal performance, we first examine whether the deal–level performance of public PE firms is inferior to that of traditional private PE firms. We find no significant difference in overall deal performance, but we do find evidence that deals by public PE firms are shorter. Public PE firms seem to be able to generate the same deal multiples that private PE firms do, but do so more quickly.

Next we examine whether the incentives for traditional private equity partnership funds

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are such that they force traditional PE fund managers to do better deals than PE fund managers that obtain permanent capital by listing limited companies or closed-end funds on public stock markets. Again we find little difference in the multiple of invested capital, or the public market equivalent, between deals by traditional PE firms and public permanent capital PE firms. We do find, however, a significant difference between the deal holding times - traditional PE firms hold their deals for longer, on average, than permanent capital PE firms.

We then consider whether private traditional partnership fund managers make better deals than publicly listed traditional partnership fund managers. We find that the opposite is the case - deals by public traditional PE fund managers are larger, earn higher multiples and higher public market equivalent, and make bigger capital gains, than private traditional PE fund managers. This finding holds for deals completed before and after the IPO of the public traditional PE fund manager; in fact deal performance improves somewhat after the IPO.

Finally we look closer at permanent capital PE organizations. Permanent capital PE managers may raise funds by listing a limited company or a closed-end fund. We find that limited company permanent PE vehicles hold their deals for shorter periods and earn lower overall multiples than permanent closed-end PE funds, however their annualized multiples are higher. This suggests that limited company PE organizations target short-term, high growth deals, while closed-end PE funds focus on higher long-run performance. This result is consistent with Jensen (1989)'s characterization of public firms in general being incentivized to focus on short-term profits at the expense of long-term performance.

Overall, we find that deals by publicly listed PE firms perform at least as well as deals by private PE firms. Whether private equity investors can profit from this information, however, is another question - our measures of deal performance are gross measures, the net return to investors may be different due to factors such as the fees applied by the PE fund manager, and the amount of leverage used in the deal.

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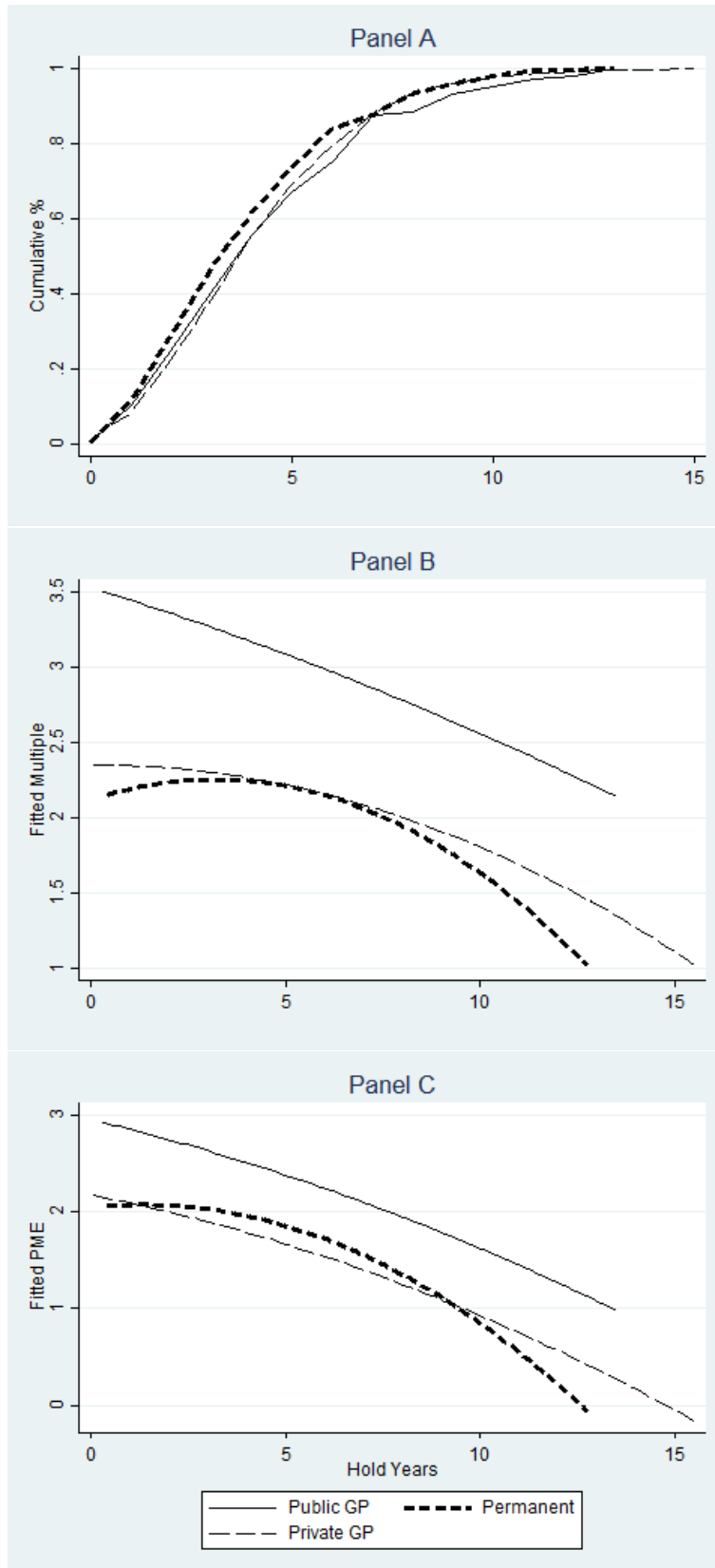
Figure 1. Holding Period Effect on Performance

Panel A (top) graphs the cumulative proportion of deals, as a percentage of all deals for a PE type, by deal holding period. Panel B (middle) graphs a quadratic fit of deal multiples against deal holding periods, and Panel C (bottom) plots fitted deal PME values.

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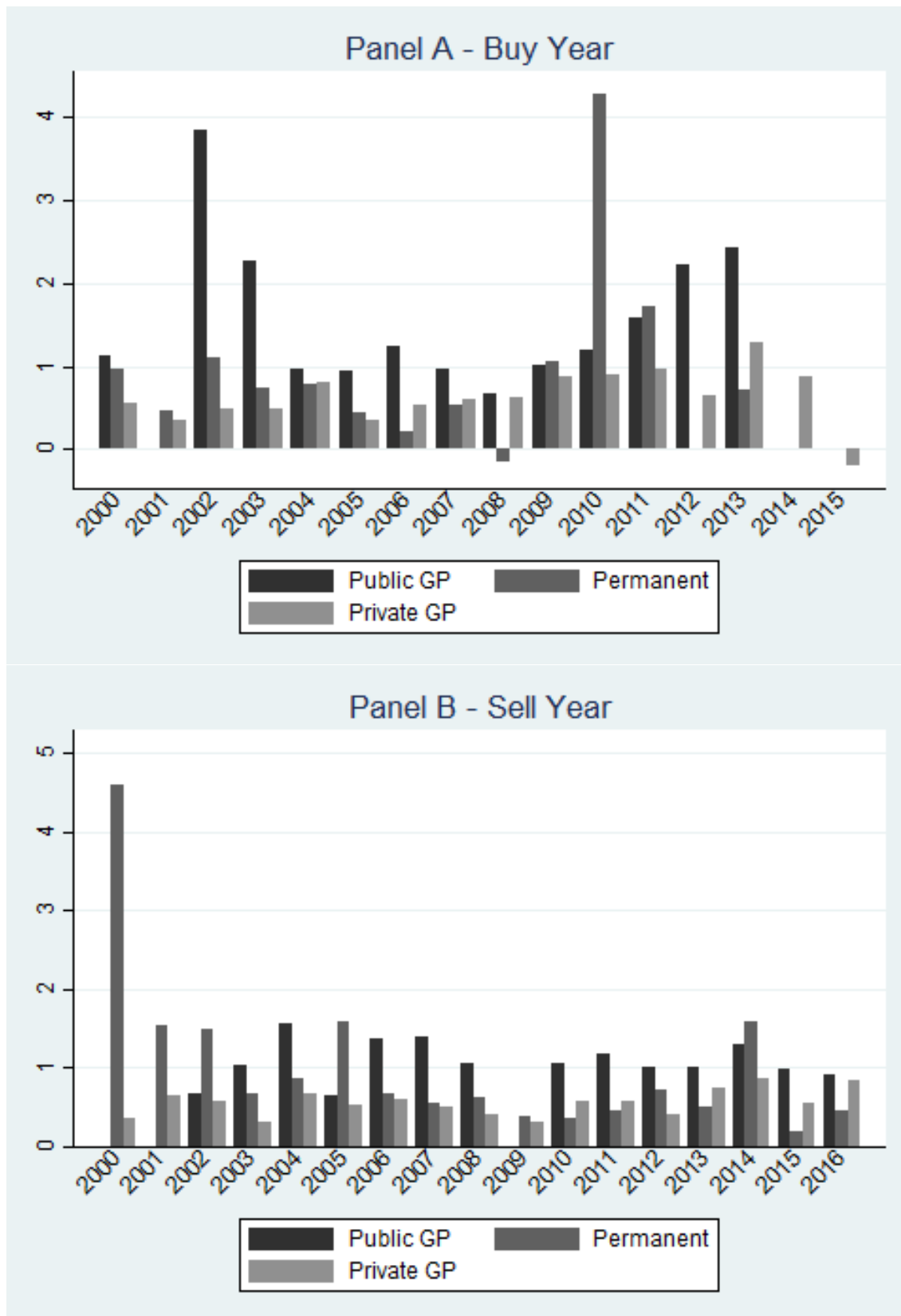
Figure 2. t-Statistic of Mean Multiple by Buy and Sell Year

This figure charts the t-statistic of the adjusted mean imputed multiple for different PE types, where deals are sorted by buy year (Panel A) and sell year (Panel B).

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Table I Private Equity Organization Structures and Fundraising Styles

This table presents an overview of private equity organization structures and fundraising styles.

Type	Investment capital	Subtype	Organization form	Shareholder Entitlements	Ownership
Traditional GP	Sequence of fixed-life partnership funds	Private GP	Private company or partnership	N/A	Private PE
		Public GP	Publicly listed company or partnership	Share of fees earned managing PE funds	Public PE
Permanent PE	Investment funds raised on public markets	Permanent PE fund	Publicly listed closed-end fund	Share of profits on deals	
		Permanent PE firm	Publicly listed limited company		

Table II Summary of Transaction Counts

This table presents summary statistics for the numbers of transactions by public (listed) and private (unlisted) PE firms between January 1st, 1990 and June 30th, 2016. Transactions are grouped into acquisitions (Buys) and disposals (Sells) and by transaction features. Transaction turnover counts (ie the sum of buy and sell transaction counts) are provided in the last section. The first column gives data for all solo transactions. Columns 2 and 3 present data for solo transactions by private PE firms and public PE firms respectively. Columns 4-6 give a more detailed breakdown of solo public PE transactions for listed GPs, public permanent PE firms, and other public PE firms. Column 7 summarizes data for syndicate transactions. See Appendix A1 for variable definitions.

	Transaction Count						
	1	2	3	4	5	6	7
Buys	Solo	Private GP	Public PE	Public GP	Permanent	Public Other	Syndicate
	N	N	N	N	N	N	N
Total number of transactions	18,005	16666	1339	371	492	476	5646
Mean	4.76	4.60	8.42	61.83	20.50	3.69	
Median	2	2	2	52	8	1	
Std Deviation	9.80	9.02	20.43	48.26	33.10	6.41	
Unique Targets	17,296	15257	1330	369	492	469	5,367
Unique PE firms	3784	3625	159	6	24	129	
Percentage of Private GP		100.0%	8.0%	2.2%	3.0%	2.9%	
Percentage of Public PE			100.0%	27.7%	36.7%	35.5%	

	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Public-to-private	683	3.8%	614	3.7%	69	5.2%	40	10.8%	12	2.4%	17	3.6%	295	5.2%
Divisional buyout	3,897	21.6%	3531	21.2%	366	27.3%	85	22.9%	160	32.5%	121	25.4%	1235	21.9%
Secondary buyout	2,055	11.4%	1922	11.5%	133	9.9%	53	14.3%	57	11.6%	23	4.8%	627	11.1%
MBO	3,702	20.6%	3439	20.6%	263	19.6%	57	15.4%	178	36.2%	28	5.9%	1601	28.4%
Distressed	582	3.2%	557	3.3%	25	1.9%	4	1.1%	6	1.2%	15	3.2%	175	3.1%
Cross-Border	3,577	19.9%	3064	18.4%	513	38.3%	154	41.5%	180	36.6%	179	37.6%	1813	32.1%
Unclassified	7	0.0%	0	0.0%	7	0.5%	1	0.3%	1	0.2%	5	1.1%	3	0.1%

Table II, continued

	Transaction Count						
	1	2	3	4	5	6	7
Sells/Exits (All)	Solo	Private GP	Public PE	Public GP	Public Permanent	Public Other	Syndicate
	N	N	N	N	N	N	N
Total number of transactions	15445	14295	1150	288	715	147	14977
Mean	3.70	3.47	20.54	48.00	26.48	6.39	
Median	2	2	6	45	5	6	
Std Deviation	8.8	5.96	54.11	33.19	74.65	5.03	
Unique Targets	14630	13606	1140	283	713	144	14309
Unique PE Firms	4170	4114	56	6	27	23	
Percentage of Private GP		100.0%	8.0%	2.0%	5.0%	1.0%	
Percentage of Public PE			100.0%	25.0%	62.2%	12.8%	

	N	%	N	%	N	%	N	%	N	%	N	%	N	%
IPO	237	1.5%	161	1.1%	76	6.6%	44	15.3%	18	2.5%	14	9.5%	615	4.1%
LBO	3614	23.4%	3353	23.5%	261	22.7%	59	20.5%	185	25.9%	17	11.6%	2078	13.9%
Secondary buyout	1859	12.0%	1747	12.2%	112	9.7%	25	8.7%	84	11.7%	3	2.0%	849	5.7%
MBO	1055	6.8%	942	6.6%	113	9.8%	13	4.5%	94	13.1%	6	4.1%	520	3.5%
Bankrupt	385	2.5%	365	2.6%	20	1.7%	6	2.1%	14	2.0%	0	0.0%	319	2.1%
Cross-Border	4018	26.0%	3688	25.8%	330	28.7%	76	26.4%	228	31.9%	26	17.7%	4050	27.0%
Cash merger	6360	41.2%	5873	41.1%	487	42.3%	121	42.0%	322	45.0%	44	29.9%	6398	42.7%
Stock merger	525	3.4%	499	3.5%	26	2.3%	12	4.2%	6	0.8%	8	5.4%	1254	8.4%
Unclassified	4314	27.9%	4045	28.3%	269	23.4%	56	19.4%	165	23.1%	48	32.7%	3919	26.2%

	Solo	Private GP	Public PE	Public GP	Public Permanent	Public Other	Syndicate
Turnover (Buys & Sells)	N	N	N	N	N	N	N
Total number of transactions	33,450	30,961	2,489	659	1,207	623	20,623
Percentage of Private GP		100.0%	8.0%	2.1%	3.9%	2.0%	
Percentage of Public PE			100.00%	26.5%	48.5%	25.0%	

Table III Summary of Transaction Values

This table presents summary statistics for the imputed total transaction values (iValue) of transactions by public (listed) and private (unlisted) PE firms between January 1st, 1990 and June 30th, 2016. All values are converted to millions of 2007 US dollars, and are winsorized at the 1% and 99% levels. Transactions are grouped into acquisitions (Buys) and disposals (Sells), and by transaction features. Transaction turnover values (ie the sum of buy and sell transaction values) is provided in the last section. The first column summarizes data for all solo transactions. Columns 2 and 3 present data for solo transactions by private PE firms and public PE firms respectively. Columns 4-6 give a more detailed breakdown of solo public PE transactions for listed GPs, public permanent PE firms, and other public PE firms. Column 7 summarizes data for syndicate transactions. See Appendix A1 for variable definitions.

Transaction Values														
	1		2		3		4		5		6		7	
Buys	Solo		Private GP		Public PE		Public GP		Public Permanent		Public Other		Syndicate	
	iValue		iValue		iValue		iValue		iValue		iValue		iValue	
Total value of transactions	1,566,828		1,386,759		180,069		97,872		49,681		32,516		695,656	
Mean	87		83		134		264		101		68		123	
Median	44		43		58		183		53		48		63	
Std Deviation	129		122		185		218		140		138		163	
Percentage of Private GP			100.00%		12.98%		7.06%		3.58%		2.34%			
Percentage of Public PE					100.00%		54.35%		27.59%		18.06%			
	iValue	%	iValue	%	iValue	%	iValue	%	iValue	%	iValue	%	iValue	%
Public-to-private	158,094	10.1%	135,203	9.7%	22,891	12.7%	17,869	18.3%	2,307	4.6%	2,715	8.3%	90,658	13.0%
Divisional buyout	333,056	21.3%	291,324	21.0%	41,732	23.2%	20,644	21.1%	12,477	25.1%	8,611	26.5%	153,785	22.1%
Secondary buyout	397,122	25.3%	356,328	25.7%	40,794	22.7%	21,509	22.0%	14,300	28.8%	4,985	15.3%	132,190	19.0%
MBO	280,701	17.9%	248,800	17.9%	31,901	17.7%	9,738	9.9%	19,480	39.2%	2,683	8.3%	163,584	23.5%
Distressed	22,598	1.4%	21,821	1.6%	777	0.4%	312	0.3%	149	0.3%	316	1.0%	16,748	2.4%
Cross-Border	515,204	32.9%	424,091	30.6%	91,113	50.6%	45,950	46.9%	24,831	50.0%	20,332	62.5%	348,091	50.0%
Unclassified	313	0.0%	0	0.0%	313	0.2%	87	0.1%	91	0.2%	135	0.4%	57	0.0%

Table III, continued

Transaction Values

Sells/Exits	1 Solo iValue		2 Private GP iValue		3 Public PE iValue		4 Public GP iValue		5 Public Permanent iValue		6 Public Other iValue		7 Syndicate iValue	
Total value of transactions	1,430,750		1,284,796		145,954		73,286		60,975		11,693		1,720,142	
Mean	93		90		127		254		85		80		115	
Median	41		40		51		148		42		23		50	
Std Deviation	146		139		210		297		134		204		170	
Percentage of Private GP			100.0%		11.4%		5.7%		4.7%		0.9%			
Percentage of Public PE					100.00%		50.21%		41.78%		8.0%			
	iValue	%	iValue	%	iValue	%	iValue	%	iValue	%	iValue	%	iValue	%
IPO	59,955	5.6%	37,243	2.9%	22,711	15.6%	15,015	20.5%	3,373	5.5%	4,323	37.0%	103,562	7.9%
LBO	537,610	50.4%	488,281	38.0%	49,329	33.8%	26,348	36.0%	21,015	34.5%	1,966	16.8%	400,255	30.4%
Secondary buyout	356,242	33.4%	324,621	25.3%	31,621	21.7%	17,347	23.7%	13,749	22.5%	525	4.5%	220,689	16.8%
MBO	108,462	10.2%	96,784	7.5%	11,678	8.0%	3,088	4.2%	8,069	13.2%	521	4.5%	75,243	5.7%
Bankrupt	6,923	0.6%	6,420	0.5%	503	0.3%	241	0.3%	262	0.4%	0	0.0%	8,545	0.6%
Cross-Border	472,880	44.3%	421,717	32.8%	51,163	35.1%	24,807	33.8%	24,739	40.6%	1,617	13.8%	559,935	42.6%
Cash merger	877,273	82.2%	797,486	62.1%	79,786	54.7%	36,629	50.0%	39,715	65.1%	3,442	29.4%	1,007,870	76.6%
Stock merger	51,954	4.9%	48,269	3.8%	3,685	2.5%	1,799	2.5%	1,307	2.1%	579	5.0%	130,780	9.9%
Unclassified	167,366	11.7%	151,645	11.8%	15,722	10.8%	8,641	11.8%	5,616	9.2%	1,465	12.5%	227,743	13.2%

Turnover (Buys & Sells)	Solo iValue	Private GP iValue	Public PE iValue	Public GP iValue	Public Permanent iValue	Public Other iValue	Syndicate iValue
Total value of transactions	2,997,578	2,671,555	326,023	171,158	110,656	44,209	2,415,798
Percentage of Private GP		100.0%	12.2%	6.4%	4.1%	1.7%	
Percentage of Public PE			100.00%	52.5%	33.9%	13.6%	

Table IV Deals by Listed and Unlisted Private Equity Firms

This table presents the number, average holding period (Hold Years), buy value, sell value, capital gain, imputed multiple (iMultiple), and imputed PME (iPME), for deals by public (listed) and private (unlisted) PE firms, between January 1st, 1990 and June 30th, 2016. Data are presented for solo and syndicate deals, deals by private and public GPs (traditional GPs), deals by public permanent PE firms and public GPs (public PE), and deals by other public investment firms (typically funds-of-funds or venture firms). Deals for each PE firm type are further grouped by the characteristics of their buy and sell (exit) transactions. The number of unique PE firms and targets are also given. See Appendix A1 for variable definitions.

	Solo							Syndicate						
	N	Hold Years	Buy Value	Sell Value	Capital Gain	iMultiple	iPME	N	Hold Years	Buy Value	Sell Value	Capital Gain	iMultiple	iPME
All deals	4640	4.51	125.91	231.49	105.58	2.35	1.79	941	4.28	151.32	259.43	108.12	2.02	1.58
Public-to-private	168	4.5	218.03	341.59	123.56	1.92	1.47	54	3.85	350.89	366.4	15.51	1.51	1.27
Secondary buyout	491	4.41	200.52	326.66	126.13	2	1.49	87	4.32	214.15	343.03	128.88	1.4	1.09
MBO	1381	4.72	100.97	184.04	83.07	2.17	1.64	351	4.64	135.45	217.73	82.27	2.02	1.57
Distressed	105	3.72	152.13	313.15	161.02	2.48	1.87	24	3.72	359.74	351.76	-7.97	1.47	0.99
Cross-border	842	4.23	177.73	320.49	142.77	2.65	2.05	303	3.98	207.9	297.18	89.29	1.91	1.48
LBO exit	1626	4.68	139.84	257.01	117.17	2.47	1.85	313	4.47	178.33	300.15	121.82	2.13	1.63
SBO exit	1236	4.68	138.96	263.89	124.93	2.51	1.88	237	4.5	186.38	317.47	131.09	2.19	1.68
MBO exit	223	4.56	113.48	223.12	109.64	2.23	1.75	96	4.2	167.88	272.79	104.92	2.23	1.82
IPO exit	60	4.52	319.39	852.68	533.28	3.66	2.51	15	3.32	322.57	3045.12	2722.55	4.75	4.4
Bankruptcy exit	167	3.78	117.92	40.25	-77.67	0.23	0.22	21	3.45	177.42	92.13	-85.28	0.27	0.28
Cross-border exit	1312	4.44	139.85	256.79	116.94	2.78	2.11	275	4	161.58	248.77	87.19	2.08	1.56
Unique targets	4386							932						
Unique PE firms	1402													

	Private GP							Traditional GP						
	N	Hold Years	Buy Value	Sell Value	Capital Gain	iMultiple	iPME	N	Hold Years	Buy Value	Sell Value	Capital Gain	iMultiple	iPME
All deals	4242	4.54	122.6	226.49	103.89	2.36	1.79	4346	4.54	125.24	233.72	108.48	2.38	1.8
Public-to-private	149	4.45	209.8	316.93	107.13	1.88	1.44	162	4.51	211.15	338.38	127.23	1.95	1.48
Secondary buyout	450	4.43	184.98	311.86	126.88	1.99	1.47	462	4.42	183.97	312.02	128.05	2.03	1.5
MBO	1262	4.7	96.29	179.11	82.82	2.17	1.62	1286	4.71	96.2	179.44	83.24	2.19	1.64
Distressed	103	3.76	157.89	329.47	171.58	2.49	1.88	103	3.76	157.89	329.47	171.58	2.49	1.88
Cross-border	689	4.23	167.18	308.15	140.97	2.76	2.13	735	4.22	168.9	321.51	152.61	2.77	2.12
LBO exit	1508	4.72	132.4	247.69	115.3	2.5	1.86	1536	4.72	137.22	256.87	119.64	2.5	1.86
SBO exit	1152	4.74	130.38	250.22	119.84	2.52	1.88	1172	4.73	134.03	259.19	125.16	2.53	1.88
MBO exit	402	4.58	107.03	218.93	111.91	2.29	1.78	406	4.59	111.24	227.66	116.41	2.29	1.78
IPO exit	37	4.42	273.02	963.15	690.13	3.71	2.42	52	4.46	261.31	928.27	666.96	3.83	2.59
Bankruptcy exit	152	3.83	117.92	40.25	-77.67	0.24	0.22	153	3.85	117.92	40.25	-77.67	0.24	0.22
Cross-border exit	1183	4.48	139.58	252.65	113.07	2.82	2.12	1215	4.49	141.94	257.19	115.26	2.82	2.12
Unique targets	4026							4119						
Unique PE firms	1340							1345						

Table IV, continued

	Public GP							Public Permanent						
	N	Hold Years	Buy Value	Sell Value	Capital Gain	iMultiple	iPME	N	Hold Years	Buy Value	Sell Value	Capital Gain	iMultiple	iPME
All deals	104	4.7	199.35	437.12	237.78	3.11	2.39	192	4.2	132.09	223.33	91.24	2.16	1.84
Public-to-private	13	5.14	231.86	665.55	433.69	2.74	1.99	3	4.52	.	.	.	1.3	1.31
Secondary buyout	12	3.8	135.39	319.93	184.53	3.58	2.91	21	4.24	413.88	553.93	140.05	1.6	1.36
MBO	24	5.19	90.44	199.57	109.13	3.36	2.66	80	4.82	139.14	236.52	97.37	2.04	1.78
Distressed	0	.	.	.	.	.	.	0	.	.	.	.	.	.
Cross-border	46	4.13	189.5	481.75	292.25	2.79	2.07	65	4.15	180.72	297.87	117.15	2.03	1.8
LBO exit	28	4.39	266.97	503.37	236.4	2.81	2.1	63	3.75	107.05	175.72	68.67	2.01	1.82
SBO exit	20	3.82	242.16	525.26	283.1	3.01	2.23	45	3.63	114.51	220.99	106.48	2.17	1.9
MBO exit	4	5.93	290.4	598.35	307.95	1.85	1.29	30	4.43	80.89	85.26	4.37	1.82	1.64
IPO exit	15	4.55	237.88	858.51	620.63	4.12	3.01	6	5.57	493.65	625.89	132.25	2.69	2.02
Bankruptcy exit	1	7.1	.	.	.	0.14	0.14	8	2.7	.	.	.	0.16	0.17
Cross-border exit	32	4.96	217.94	403.66	185.72	2.88	2.11	68	3.74	108.52	225.22	116.7	2.57	2.25
Unique targets	104							192						
Unique PE firms	5							14						

	Public PE							Public Other						
	N	Hold Years	Buy Value	Sell Value	Capital Gain	iMultiple	iPME	N	Hold Years	Buy Value	Sell Value	Capital Gain	iMultiple	iPME
All deals	398	4.22	147.64	264.36	116.72	2.25	1.81	102	3.79	131.56	194.41	62.85	1.55	1.16
Public-to-private	19	4.89	318.51	642.44	323.93	2.24	1.71	3	4.17	665.12	550	-115.12	1.05	0.92
Secondary buyout	41	4.17	337.64	457.18	119.54	2.06	1.73	8	4.56	319.98	355.18	35.2	1.01	0.93
MBO	119	4.92	139.49	224.68	85.19	2.25	1.88	15	5.03	181.89	194.34	12.45	1.56	1.11
Distressed	2	1.55	60	52	-8	1.56	1.48	2	1.55	60	52	-8	1.56	1.48
Cross-border	153	4.21	208.72	356.76	148.04	2.14	1.69	42	4.38	271.2	346.37	75.17	1.61	1.1
LBO exit	118	4.1	195.03	326.09	131.05	2.17	1.78	27	4.61	266.07	393.15	127.08	1.89	1.33
Secondary buyout exit	84	3.89	211.67	379.76	168.09	2.38	1.9	19	4.6	296.56	436.48	139.92	2.19	1.56
MBO exit	45	4.43	159.18	252.79	93.61	1.69	1.46	11	3.88	254.36	413.31	158.94	1.27	1.03
IPO exit	23	4.68	365.77	742.2	376.44	3.58	2.64	2	3.02	.	.	.	2.21	1.7
Bankruptcy exit	15	3.23	.	.	.	0.17	0.16	6	3.29	.	.	.	0.18	0.14
Cross-border exit	129	4.09	141.4	281.04	139.64	2.47	2	29	3.95	160.46	318.72	158.26	1.77	1.32
Unique targets	398							102						
Unique PE firms	62							44						

Table V Deal Demography

This table presents demographic statistics for transactions and deals by public (listed) and private (unlisted) PE firms. The variables of interest are: the number (N) of firms that closed at least one buy transaction (Active Firms); the number (N) of closed buy transactions (Buy Tx); the mean imputed value in millions of 2007 US dollars of closed buy transactions (Buy Tx iValue); the number (N), mean holding period (Years), imputed multiple (iMultiple) and imputed PME (iPME) for realized deals. The demographic categories are the yearly interval when the firm was active, or when the buy transaction was closed, or when the deal was initiated; the headquarter country of the target firm; and the GICS industry sector classification of the target firm. See Appendix A1 for variable definitions.

	Private GP													Traditional GP									
	Active Firms N		Buy Tx N		Buy Tx iValue (Mean, % Total)		Realized Deals N		Years	iMultiple	iPME		Active Firms N		Buy Tx N		Buy Tx iValue (Mean, % Total)		Realized Deals N		Years	iMultiple	iPME
1990-1999	552	9.9%	1808	10.8%	76	9.9%	722	17.0%	5.45	2.75	1.87	557	9.9%	1862	10.9%	80	10.0%	741	17.1%	5.47	2.78	1.91
2000-2004	996	17.8%	2442	14.7%	81	14.3%	1049	24.7%	4.6	2.24	1.79	1001	17.8%	2496	14.7%	85	14.2%	1075	24.7%	4.62	2.24	1.8
2005-2009	1837	32.9%	5431	32.6%	80	31.4%	1808	42.6%	4.66	2.05	1.7	1842	32.8%	5532	32.5%	84	31.2%	1846	42.5%	4.66	2.06	1.71
2010-2016	2204	39.4%	6985	41.9%	88	44.4%	663	15.6%	3.09	2.97	1.93	2210	39.4%	7147	41.9%	93	44.6%	684	15.7%	3.09	2.99	1.95
US	1929	42.3%	7985	47.9%	87	50.1%	2123	50.0%	4.68	2.24	1.68	1933	42.1%	8172	48.0%	92	50.4%	2172	50.0%	4.69	2.26	1.7
Canada	275	6.0%	499	3.0%	52	1.9%	85	2.0%	4.68	2.06	1.38	279	6.1%	506	3.0%	54	1.8%	85	2.0%	4.68	2.06	1.38
UK & Ireland	535	11.7%	2286	13.7%	91	15.0%	648	15.3%	4.44	2.07	1.57	540	11.8%	2324	13.6%	95	14.8%	660	15.2%	4.43	2.08	1.58
France & BeNeLux	483	10.6%	1881	11.3%	77	10.5%	444	10.5%	4.6	2.36	1.76	487	10.6%	1906	11.2%	81	10.3%	448	10.3%	4.59	2.36	1.76
Germanic De-Aus-CH	386	8.5%	1201	7.2%	87	7.5%	317	7.5%	4.24	1.66	1.3	391	8.5%	1225	7.2%	92	7.6%	326	7.5%	4.25	1.69	1.31
Spain, Italy, Portugal	301	6.6%	857	5.1%	75	4.6%	174	4.1%	4.16	2.3	1.77	304	6.6%	871	5.1%	79	4.6%	177	4.1%	4.13	2.29	1.77
Scandinavia	280	6.1%	1030	6.2%	72	5.4%	235	5.5%	4.38	2.31	1.75	282	6.1%	1081	6.3%	74	5.4%	252	5.8%	4.45	2.45	1.86
Australia & NZ	125	2.7%	332	2.0%	82	2.0%	94	2.2%	4.44	2.97	2.3	129	2.8%	191	1.1%	125	1.6%	96	2.2%	4.4	2.95	2.28
Korea & Japan	74	1.6%	176	1.1%	112	1.4%	35	0.8%	3.87	0.98	0.76	76	1.7%	338	2.0%	87	2.0%	41	0.9%	3.82	1.28	0.94
RoW	169	3.7%	419	2.5%	54	1.6%	87	2.1%	4.04	10.46	8.29	172	3.7%	423	2.5%	55	1.6%	89	2.0%	4.06	10.33	8.17
Consumer Discretionary	1649	22.5%	4372	26.2%	91	28.7%	1170	27.6%	4.62	1.9	1.43	1655	22.4%	4493	26.4%	96	29.1%	1195	27.5%	4.63	1.92	1.44
Consumer Staples	639	8.7%	1121	6.7%	90	7.3%	323	7.6%	4.56	4.46	3.36	644	8.7%	1136	6.7%	93	7.1%	330	7.6%	4.58	4.43	3.33
Energy	209	2.8%	337	2.0%	105	2.6%	58	1.4%	3.67	2.79	2.06	214	2.9%	348	2.0%	108	2.5%	59	1.4%	3.65	2.77	2.04
Healthcare	708	9.7%	1401	8.4%	87	8.8%	375	8.8%	4.34	2.44	1.86	713	9.7%	1431	8.4%	92	8.9%	381	8.8%	4.34	2.47	1.87
Industrials	1703	23.2%	4841	29.0%	77	26.9%	1237	29.2%	4.66	2.07	1.6	1709	23.1%	4929	28.9%	80	26.6%	1271	29.2%	4.65	2.1	1.62
Information Technology	1094	14.9%	2289	13.7%	68	11.2%	599	14.1%	4.34	2.56	1.96	1099	14.9%	2339	13.7%	71	11.2%	618	14.2%	4.36	2.57	1.96
Materials	801	10.9%	1517	9.1%	86	9.4%	400	9.4%	4.68	2.36	1.73	806	10.9%	1547	9.1%	89	9.3%	406	9.3%	4.72	2.4	1.75
Telecommunication Services	106	1.4%	134	0.8%	116	1.1%	33	0.8%	3.52	3.66	2.86	110	1.5%	140	0.8%	127	1.2%	37	0.9%	3.39	3.65	2.85
Utilities	138	1.9%	319	1.9%	130	3.0%	32	0.8%	3.28	2.25	1.7	142	1.9%	332	1.9%	143	3.2%	33	0.8%	3.3	2.21	1.66
Other	287	3.9%	335	2.0%	40	1.0%	15	0.4%	4.59	2.32	1.54	291	3.9%	342	2.0%	44	1.0%	16	0.4%	4.52	2.25	1.53

Table V, continued

	Public GP											Public Permanent										
	Active Firms N		Buy Tx N		Buy Tx iValue		Realized Deals					Active Firms N		Buy Tx N		Buy Tx iValue		Realized Deals				
	N		N		Mean	% Total	N		Years	iMultiple	iPME	N		N		Mean	% Total	N		Years	iMultiple	iPME
1990-1999	5	23.8%	54	14.6%	190	10.3%	19	19.0%	6.29	3.85	3.32	8	15.1%	66	13.4%	58	7.9%	22	11.5%	5.76	2.25	1.54
2000-2004	5	23.8%	54	14.6%	267	14.4%	26	26.0%	5.11	2.59	1.94	9	17.0%	127	25.8%	75	19.7%	73	38.0%	4.22	2.22	1.96
2005-2009	5	23.8%	101	27.2%	275	27.8%	34	34.0%	4.59	2.75	2.16	21	39.6%	185	37.6%	110	42.0%	86	44.8%	3.92	1.7	1.58
2010-2016	6	28.6%	162	43.7%	293	47.5%	21	21.0%	2.92	3.72	2.51	15	28.3%	114	23.2%	129	30.4%	11	5.7%	3.16	5.21	3.72
US	4	11.1%	187	50.4%	275	51.4%	49	47.1%	5.08	3.11	2.43	14	25.5%	123	25.0%	110	28.0%	55	28.6%	4.58	2.32	1.8
Canada	4	11.1%	7	1.9%	186	1.3%	0	-	-	-	.	2	3.6%	7	1.4%	146	2.1%	3	1.6%	7.25	1.19	1.11
UK & Ireland	5	13.9%	38	10.2%	340	12.9%	12	11.5%	3.89	2.3	1.83	9	16.4%	102	20.7%	106	22.4%	35	18.2%	4.21	2.1	1.91
France & BeNeLux	4	11.1%	25	6.7%	359	9.0%	4	3.8%	3.67	2.53	1.77	10	18.2%	70	14.2%	116	16.8%	28	14.6%	4.09	2.13	1.83
Germanic De-Aus-CH	5	13.9%	24	6.5%	358	8.6%	9	8.7%	4.89	2.61	1.81	9	16.4%	107	21.7%	76	16.8%	41	21.4%	3.05	1.89	1.68
Spain, Italy, Portugal	3	8.3%	14	3.8%	323	4.5%	3	2.9%	2.19	1.71	1.86	4	7.3%	29	5.9%	92	5.5%	12	6.3%	4.39	2.85	2.77
Scandinavia	2	5.6%	51	13.7%	106	5.4%	17	16.3%	5.38	4.29	3.31	4	7.3%	50	10.2%	75	7.8%	17	8.9%	5.31	2.12	1.64
Australia & NZ	4	11.1%	6	1.6%	352	2.1%	2	1.9%	2.57	1.83	1.6	1	1.8%	2	0.4%	125	0.5%	0	-	-	-	.
Korea & Japan	2	5.6%	15	4.0%	277	4.2%	6	5.8%	3.56	3.01	2.02	2	3.6%	2	0.4%	24	0.1%	1	0.5%	2.45	3.1	2.57
RoW	3	8.3%	4	1.1%	144	0.6%	2	1.9%	4.81	4.88	3.33	0	-	0	-	-	-	-	-	-	-	.
Consumer Discretionary	6	12.2%	121	32.6%	267	32.3%	25	24.0%	4.92	2.97	2.22	18	19.8%	132	26.8%	108	29.5%	55	28.6%	3.77	2.39	2.05
Consumer Staples	5	10.2%	15	4.0%	317	4.8%	7	6.7%	5.45	2.94	2.09	9	9.9%	33	6.7%	102	7.0%	13	6.8%	5.38	2.05	1.51
Energy	5	10.2%	11	3.0%	235	2.6%	1	1.0%	2.1	1.54	1.3	4	4.4%	7	1.4%	55	0.8%	4	2.1%	3.6	2.05	1.93
Healthcare	5	10.2%	30	8.1%	300	9.0%	6	5.8%	4.3	4.02	2.86	9	9.9%	46	9.3%	122	11.6%	16	8.3%	4.44	2.14	1.83
Industrials	6	12.2%	88	23.7%	263	23.2%	34	32.7%	4.24	3.06	2.55	17	18.7%	156	31.7%	105	33.9%	55	28.6%	4.21	2.15	1.83
Information Technology	5	10.2%	50	13.5%	219	11.0%	19	18.3%	5.01	2.79	2.11	13	14.3%	64	13.0%	63	8.3%	30	15.6%	4.32	2.07	1.78
Materials	5	10.2%	30	8.1%	261	7.8%	6	5.8%	7.2	4.82	3.26	10	11.0%	42	8.5%	84	7.3%	18	9.4%	4.42	1.75	1.54
Telecommunication	4	8.2%	6	1.6%	375	2.3%	4	3.8%	2.31	3.58	2.83	4	4.4%	4	0.8%	71	0.6%	1	0.5%	2.92	2.63	2.41
Utilities	4	8.2%	13	3.5%	437	5.7%	1	1.0%	4.06	1.03	0.58	1	1.1%	1	0.2%	93	0.2%	0	0.0%	-	-	.
Other	4	8.2%	7	1.9%	207	1.4%	1	1.0%	3.41	1.18	1.3	6	6.6%	7	1.4%	59	0.9%	0	0.0%	-	-	.

Table V, continued

	Permanent Firm											Permanent Fund										
	Active Firms N		Buy Tx N		Buy Tx iValue (Mean, % Total)		N		Realized Deals Years	iMultiple	iPME	Active Firms N		Buy Tx N		Buy Tx iValue (Mean, % Total)		N		Realized Deals Years	iMultiple	iPME
1990-1999	6	14.0%	25	7.7%	77	21.4%	9	6.8%	5.46	2.51	1.45	2	14.3%	41	23.2%	45	10.5%	13	20.6%	5.97	2.07	1.6
2000-2004	8	18.6%	64	19.8%	71	19.8%	40	30.1%	4.33	1.98	1.59	1	7.1%	63	35.6%	79	18.4%	33	52.4%	4.07	2.51	2.4
2005-2009	16	37.2%	143	44.1%	92	25.6%	73	54.9%	3.77	1.75	1.56	6	42.9%	45	25.4%	163	38.0%	15	23.8%	4.83	2.05	1.84
2010-2016	13	30.2%	92	28.4%	119	33.1%	11	8.3%	2.77	5.69	4.18	5	35.7%	28	15.8%	142	33.1%	2	3.2%	3.21	2.49	1.9
US	8	17.4%	96	29.6%	115	11.9%	52	39.1%	4.42	2.41	1.89	7	46.7%	28	15.8%	90	13.3%	3	4.8%	7.27	0.76	0.4
Canada	2	4.3%	7	2.2%	145	15.0%	3	2.3%	7.25	1.19	1.11	0	.	.	.	.	.	0	0.0%	.	.	.
UK & Ireland	7	15.2%	23	7.1%	155	16.1%	8	6.0%	3.82	1.17	0.94	3	20.0%	82	46.3%	90	13.3%	29	46.0%	4.22	2.31	2.14
France & BeNeLux	9	19.6%	53	16.4%	109	11.3%	18	13.5%	3.71	2.41	2.02	2	13.3%	18	10.2%	132	19.5%	11	17.5%	4.5	2.19	1.96
Germanic De-Aus-CH	9	19.6%	94	29.0%	63	6.5%	39	29.3%	3.11	2.13	1.77	1	6.7%	15	8.5%	153	22.6%	3	4.8%	3.17	2	1.81
Spain, Italy, Portugal	4	8.7%	7	2.2%	36	3.7%	1	0.8%	1.05	2.59	2.63	1	6.7%	23	13.0%	106	15.6%	11	17.5%	4.7	2.87	2.78
Scandinavia	3	6.5%	39	12.0%	66	6.8%	11	8.3%	4.93	1.98	1.56	1	6.7%	11	6.2%	107	15.8%	6	9.5%	6.01	2.38	1.78
Australia & NZ	1	2.2%	2	0.6%	24	2.5%	0	0.0%	.	.	.	0	.	.	.	.	.	0	0.0%	.	.	.
Korea & Japan	2	4.3%	2	0.6%	125	13.0%	1	0.8%	2.45	3.1	2.57	0	.	.	.	.	.	0	0.0%	.	.	.
RoW	1	2.2%	1	0.3%	126	13.1%	0	0.0%	.	.	.	0	.	.	.	.	.	0	0.0%	.	.	.
Consumer Discretionary	16	22.2%	88	27.2%	102	13.4%	40	30.1%	3.3	2.46	1.98	4	17.4%	48	27.1%	113	12.7%	17	27.0%	4.85	2.45	2.39
Consumer Staples	8	11.1%	22	6.8%	113	14.8%	10	7.5%	5.24	1.99	1.57	1	4.3%	11	6.2%	80	9.0%	3	4.8%	5.87	2.27	1.31
Energy	2	2.8%	3	0.9%	64	8.4%	2	1.5%	5.52	1.61	0.52	2	8.7%	4	2.3%	46	5.2%	2	3.2%	1.68	2.5	3.34
Healthcare	7	9.7%	29	9.0%	124	16.2%	7	5.3%	4.92	1.18	1.05	2	8.7%	17	9.6%	118	13.3%	9	14.3%	4.06	2.89	2.44
Industrials	14	19.4%	101	31.2%	95	12.4%	42	31.6%	4.12	2.1	1.77	4	17.4%	56	31.6%	124	14.0%	13	20.6%	4.5	2.29	2
Information Technology	11	15.3%	46	14.2%	61	8.0%	21	15.8%	3.98	2.52	1.96	3	13.0%	22	12.4%	58	6.5%	11	17.5%	4.71	2.1	1.8
Materials	7	9.7%	28	8.6%	88	11.5%	11	8.3%	3.8	1.93	1.61	3	13.0%	14	7.9%	77	8.7%	7	11.1%	5.38	1.47	1.44
Telecommunication	3	4.2%	3	0.9%	50	6.5%	0	0.0%		.	.	1	4.3%	1	0.6%	130	14.6%	1	1.6%	2.92	2.63	2.41
Utilities	0	0.0%	0	0.0%	0	0.0%	0	0.0%		.	.	1	4.3%	1	0.6%	91	10.2%	0	0.0%	.	.	.
Other	4	5.6%	4	1.2%	67	8.8%	0	0.0%		.	.	2	8.7%	3	1.7%	51	5.7%	0	0.0%	.	.	.

Table VI Deal Performance Comparison for Unlisted and Listed PE

This table presents the results of unpaired t-tests comparing deal performance statistics for unlisted GPs and listed PE (listed GPs and permanent PE together), permanent PE and traditional GPs, and unlisted GPs and listed GPs. The performance measures are the average imputed multiple, the average annualized imputed multiple (iMultiple per Year), the average PME (public market equivalent), and the average capital gain per deal. The results of an unpaired t-test comparing the holding period (years) is also presented. t-statistics are given in parentheses. ***,**, and * denote significance at the 1%, 5% and 10% level, respectively.

	imputed Multiple	iMultiple per Year	imputed PME	Capital Gain	Hold Years	Deal Count
Public PE vs Private GP:						
Public PE	2.49	1.45	1.81	140.75	4.37	296
Private GP	2.36	1.37	1.79	103.89	4.53	4242
Difference	0.13	0.08	0.02	36.86*	-0.16	
	(0.32)	(0.33)	(0.08)	(1.69)	(-1.05)	
Traditional GP vs Permanent PE:						
Traditional GP	2.38	1.38	1.80	108.48	4.54	4346
Permanent PE	2.16	1.25	1.84	91.24	4.20	192
Difference	0.22	0.14	-0.04	17.24	0.34*	
	(0.42)	(0.45)	(-0.09)	(0.64)	(1.83)	
Public GP vs Private GP:						
Public GP	3.11	1.84	2.39	237.78	4.70	104
Private GP	2.36	1.37	1.79	103.89	4.54	4242
Difference	0.75	0.47	0.60	133.89***	0.16	
	(1.05)	(1.13)	(1.09)	(3.62)	(0.62)	

Table VII t-Test of Public GP Deal Performance Pre- and Post-IPO

This table presents the results of an unpaired t-test of the imputed deal multiples (iMultiple), annualized imputed multiples, and imputed PMEs (iPME) for deals by public GPs initiated before and after the GP's IPO date. Annualized multiples are estimated as the geometric average annual multiple over the deal holding period. t-Statistics are in parentheses. ***,**, and * denote significance at the 1%, 5% and 10% level, respectively.

	Mean iMultiple	Annualized iMultiple	Mean iPME	Obs
post-IPO	3.79	3.23	2.61	27
pre-IPO	2.87	1.35	2.31	77
Difference	0.92*	1.88*	0.3	
	(1.66)	(1.95)	(0.64)	

Table VIII Public GP deal Performance Pre- and Post-IPO

This table presents the results of a regression of the log of imputed deal multiples on a dummy variable (Public GP) which is 1 for all deals by public GPs both before and after their IPO, and a dummy variable (Post-IPO) which is 1 for deals by public GPs initiated after the GP's IPO date. Dummy variables for other deal characteristics are also included as controls, as are dummies for deal buy and sell year, industry, country, and holding period (in years). The test is repeated using the log of the imputed PME. Standard errors are clustered by the deal buy year. t-statistics are given in parentheses. ***,**, and * denote significance at the 1%, 5% and 10% level, respectively.

	imputed ln_multiple	imputed ln_pme
Public GP	0.211***	0.216***
	(4.95)	(4.99)
Post-IPO	0.094**	0.085*
	(2.18)	(2.01)
Industry dummies	Yes	Yes
Country dummies	Yes	Yes
Year dummies	Yes	Yes
Hold-year dummies	Yes	Yes
Tx-characteristic dummies	Yes	Yes
N	4,640	4,640
Adj R-square	0.814	0.807

Table IX Transaction Characteristics of Permanent PE Funds and Firms

This table presents summary data for transactions by permanent PE funds and firms. The number (N) and imputed total transaction values (iValue), in millions of 2007 US dollars, for buy and sell transactions from CapitalIQ for the period January 1990 to June 2016 are given. †denotes mean, median and standard deviations of the number of deals per firm.

Buys	Firm		Fund		Sells/Exits	Firm		Fund	
	N	iValue	N	iValue		N	iValue	N	iValue
Total	324	30,543	177	18,156	Total	295	28,719	427	33,072
Mean	18.00†	94	19.67†	103	Mean	16.39†	97	38.82†	77
Median	10†	49	1†	57	Median	12†	54	3†	36
Std Deviation	20.00†	141	49.03†	136	Std Deviation	17.37†	124	117.18†	140
Unique Targets	324		177		Unique Targets	295		427	
Unique PE firms	18		9		Unique PE Firms	18		11	
Going-private	6	422	6	1,849	IPO	11	1,877	7	1,496
Divisional buyout	112	7,364	51	4,730	LBO	75	9,753	113	11,982
Secondary buyout	39	10,204	19	3,991	Secondary buyout	39	6,533	47	7,641
MBO	70	8,383	110	10,808	MBO	27	2,988	67	5,081
Distressed	6	144	2	19	Bankrupt	10	218	4	43
Cross-Border	118	15,568	72	8,895	Cross-Border	89	9,480	141	15,316
Unclassified	1	91	0	.	Cash merger	126	17,354	200	22,823
					Stock merger	2	1,161	4	146
					Unclassified	70	2,908	96	2,731

Table X Deal Characteristics of Permanent PE Funds and Firms

This table presents the number (N), and averages for the following variables: : holding period (Hold Years), total transaction values (Buy Value, Sell Value) in millions of 2007 US dollars, capital gain, imputed multiple (iMultiple), and imputed PME (iPME), for deals by permanent PE funds and firms, between January 1st, 1990 and June 30th, 2016. Deals for each PE firm type are further grouped by the characteristics of their buy and sell (exit) transactions (see Appendix A1 for variable definitions). The number of unique PE firms and targets are also given. †denotes mean, median and standard deviations of the number of deals per firm.

	Permanent Firm							Permanent Fund						
	N	Hold Years	Buy Value	Sell Value	Capital Gain	iMultiple	iPME	N	Hold Years	Buy Value	Sell Value	Capital Gain	iMultiple	iPME
Deals	133							63						
Unique targets	133							63						
Unique PE firms	12							3						
Mean	11.08†	3.97	139.65	205.08	65.43	2.2	1.78	21†	4.62	117.92	237.58	119.66	2.31	2.09
Median	8†	3.18	60.15	131	21.68	1.6	1.39	2†	4.5	53.94	94.44	43.6	1.64	1.46
Std Deviation	12.46†	2.62	194.04	249.83	189.92	3.34	2.42	33.78†	2.18	148.97	286.32	177.29	2.11	2.24
Going-private	1	2.06	.	.	.	1.13	1.41	2	5.75	.	.	.	1.38	1.26
Secondary buyout	17	4.55	470.55	569.38	98.83	1.64	1.3	4	2.91	300.54	523.05	222.51	1.4	1.63
MBO	32	4.95	255.04	360.13	105.09	1.7	1.29	48	4.74	111.55	207.09	95.54	2.27	2.11
Distressed	1	0.21	.	.	.	2.26	2.14	0	.	.	.	.	.	.
Cross-border	37	3.62	182.62	223.08	40.46	2.09	1.68	32	4.64	151.98	364.71	212.73	2.42	2.17
LBO exit	41	3.19	87.49	141.49	54	2.31	1.96	24	4.7	100.89	206.78	105.89	2.17	1.94
Secondary buyout exit	31	3.16	49.49	124.55	75.06	2.58	2.17	16	4.55	126.58	282.55	155.97	2.33	1.9
MBO exit	14	3.55	163.01	171.53	8.52	1.63	1.56	16	5.2	48.04	50.75	2.71	1.98	1.71
IPO exit	5	6.18	666.16	660.41	-5.75	2.48	1.79	1	2.47	148.62	556.86	408.24	3.75	3.18
Bankruptcy exit	7	2.8	.	.	.	0.14	0.14	1	2.01	.	.	.	0.3	0.35
Cross-border exit	42	3.58	83.2	150.41	67.21	2.72	2.3	27	4.05	128.41	284	155.58	2.26	2.1

Table XI t-test of Performance Characteristics for Deals by Permanent PE Funds and Firms

This table presents the results of unpaired t-tests comparing deal performance characteristics of permanent PE firms and funds. Performance characteristics include the imputed multiple (iMultiple), the geometric average annual imputed multiple (iMultiple per Year) the imputed Public Market Equivalent (iPME), and the capital gain on the deal. The average deal holding period (Hold Years) is also given.

	imputed Multiple	iMultiple per Year	imputed PME	Capital Gain	Hold Years	Deal Count
PermanentFund vs PermanentFirm						
PermanentFund	2.31	1.22	2.09	119.66	4.62	63
PermanentFirm	2.09	1.26	1.72	53.36	3.99	129
Difference	0.22	-0.03	0.37	66.29	0.62	
	(0.49)	(-0.34)	(1.03)	(1.25)	(1.63)	

Appendix A.

[Table A1 about here.]

[Table A1 about here.]

[Table A2 about here.]

[Table A3 about here.]

[Table A4 about here.]

[Table A5 about here.]

Table A1 Variable Definitions

This table describes variables used in this study.

LBO	is a dummy variable equal to one if the buy or sell transaction	is a Leveraged Buyout
Going-private	is a dummy variable equal to one if the buy transaction	is a public to private buyout
Divisional	is a dummy variable equal to one if the buy transaction	is a buyout of a company division
SBO	is a dummy variable equal to one if the buy or sell transaction	is a Secondary Buyout
Distressed	is a dummy variable equal to one if the buy transaction	is a buyout of a company in financial distress
MBO	is a dummy variable equal to one if the buy or sell transaction	is a Management Buyout
Sponsor>20 deals	is a dummy variable equal to one if the buy or sell transaction	is sponsored by an investment firm with more than 20 deals in the sample
Solo	is a dummy variable equal to one if the buy or sell transaction	is sponsored by just one investment firm
Cross-border	is a dummy variable equal to one if the buy or sell transaction	involves a sponsor and a target in different countries
Bankrupt	is a dummy variable equal to one if the sell transaction	is a bankruptcy
IPO	is a dummy variable equal to one if the sell transaction	is an Initial Public Offering
Cash Merger	is a dummy variable equal to one if the sell transaction	is a cash merger exit
Stock Merger	is a dummy variable equal to one if the sell transaction	is a stock merger exit
Buyer=Seller	is a dummy variable equal to one if the buy or sell transaction	is a syndicate transaction involving the same buyers and seller
Public Inv Firm	is a dummy variable equal to one if the buy or sell transaction	is sponsored by a public investment firm
LPE GP	is a dummy variable equal to one if the buy or sell transaction	is sponsored by a public GP
LPE Permanent	is a dummy variable equal to one if the buy or sell transaction	is sponsored by a public permanent PE firm
France-Benelux	is a dummy variable equal to one if the buy or sell transaction	target is located in France, Belgium, Luxembourg or Holland
Germany-Austria-Switz	is a dummy variable equal to one if the buy or sell transaction	target is located in Germany, Austria, or Switzerland
Scandinavia	is a dummy variable equal to one if the buy or sell transaction	target is located in Sweden, Norway, Finland or Denmark
Southern Europe	is a dummy variable equal to one if the buy or sell transaction	target is located in Spain, Italy, Porugal or Greece
Eastern Europe	is a dummy variable equal to one if the buy or sell transaction	target is located in Czech Republic, Slovakia, Slovenia, Poland, Hungary or Estonia
Korea-Japan	is a dummy variable equal to one if the buy or sell transaction	target is located in Japan or South Korea
Australia-New Zealand	is a dummy variable equal to one if the buy or sell transaction	target is located in Australia or New Zealand
Canada	is a dummy variable equal to one if the buy or sell transaction	target is located in Canada
RoW	is a dummy variable equal to one if the buy or sell transaction	target is located in any other OECD country

1990-1999	is a dummy variable equal to one if the transaction or deal was initiated	between 1990 and 199
2000-2004	is a dummy variable equal to one if the transaction or deal was initiated	between 2000 and 2004
2005-2009	is a dummy variable equal to one if the transaction or deal was initiated	between 2005 and 2009
2010-2012	is a dummy variable equal to one if the transaction or deal was initiated	between 2010 and 2012
Hold years <2	is a dummy variable equal to one if the deal was held for	less than 2 years
Hold years $>=2 <4$	is a dummy variable equal to one if the deal was held for	2 to 3 years
Hold years $>=4 <6$	is a dummy variable equal to one if the deal was held for	4 to 5 years
Hold years $>=6 <8$	is a dummy variable equal to one if the deal was held for	6 to 7 years
Consumer staples	is a dummy variable equal to one if the transaction or deal target GICS industry sector is	Consumer staples
Consumer discretionary	is a dummy variable equal to one if the transaction or deal target GICS industry sector is	Consumer discretionary
Energy	is a dummy variable equal to one if the transaction or deal target GICS industry sector is	Energy
Health	is a dummy variable equal to one if the transaction or deal target GICS industry sector is	Health
Industrials	is a dummy variable equal to one if the transaction or deal target GICS industry sector is	Industrials
IT	is a dummy variable equal to one if the transaction or deal target GICS industry sector is	IT
Materials	is a dummy variable equal to one if the transaction or deal target GICS industry sector is	Materials
Telecoms	is a dummy variable equal to one if the transaction or deal target GICS industry sector is	Telecoms
Utilities	is a dummy variable equal to one if the transaction or deal target GICS industry sector is	Utilities

Table A2 Heckman Selection Model to Estimate Buy Values

This table shows the results of a Heckman selection model used to create the imputed buy values (total transaction values) for buy transactions without complete value information. The dependent variable is the log of the transaction buy value. See Table A1 for independent variable definitions. The outcome equation includes transaction buy year dummies, country dummies, and industry dummies, where industries are defined using the 10 Global Industry Classification Standard (GICS) sectors (for the selection regression) and 157 GICS sub-industries (for the outcome regression). Standard errors are reported in parentheses and the symbols ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) ln_buyvalue	(2) select	(3) mills
Going-private (Buy)	1.116***	1.133***	
	(0.144)	(0.0442)	
Divisional (Buy)	0.153**	0.468***	
	(0.0626)	(0.0203)	
SBO (Buy)	1.077***	0.101***	
	(0.0542)	(0.0288)	
MBO (Buy)	-0.0669	0.0719***	
	(0.0407)	(0.0227)	
Distressed (Buy)	-0.839***	0.571***	
	(0.0981)	(0.0478)	
Sponsor>20 deals	0.620***	0.241***	
	(0.0440)	(0.0209)	
Solo	-0.464***	-0.223***	
	(0.0415)	(0.0211)	
Cross-border	0.721***	0.139***	
	(0.0396)	(0.0218)	
Public Inv Firm	-0.587***	1.438***	
	(0.165)	(0.0284)	
LPE GP	1.195***	-1.402***	
	(0.183)	(0.0624)	
LPE Permanent	0.443***	-1.186***	
	(0.151)	(0.0537)	

VARIABLES	(1) ln_buyvalue	(2) select	(3) mills
1990-1999		0.145***	
		(0.0300)	
2000-2004		-0.197***	
		(0.0267)	
2005-2009		-0.218***	
		(0.0300)	
2010-2012		-0.370***	
		(0.0302)	
UK & Ireland		0.143***	
		(0.0416)	
US		-0.364***	
		(0.0373)	
France-Benelux		-0.635***	
		(0.0424)	
Germany-Austria-Switz		-0.883***	
		(0.0487)	
Scandinavia		-0.545***	
		(0.0503)	
Southern Europe		-0.00818	
		(0.0486)	
Eastern Europe		-0.332***	
		(0.0787)	
Korea-Japan		0.262***	
		(0.0781)	
Australia-New Zealand		0.0919	
		(0.0640)	
Canada		-0.318***	
		(0.0578)	

VARIABLES	(1) ln_buyvalue	(2) select	(3) mills
Consumer staples		0.0490	
		(0.0492)	
Consumer discretionary		-0.0652	
		(0.0569)	
Energy		0.181**	
		(0.0742)	
Health		0.0468	
		(0.0541)	
Industrials		-0.0339	
		(0.0497)	
IT		-0.0727	
		(0.0527)	
Materials		-0.0384	
		(0.0553)	
Telecoms		0.0800	
		(0.0907)	
Utilities		-0.162**	
		(0.0733)	
lambda			0.0661
			(0.206)
Constant	1.145	-0.0834	
	(0.907)	(0.0634)	
Industry Dummies	Yes		
Year Dummies	Yes		
Country Dummies	Yes		
Observations	27630		
Censored obs	16310		
Uncensored obs	11320		

Table A3 Heckman Selection Model to Estimate Sell Values

*This table shows the results of a Heckman selection model used to create the imputed sell values (total transaction values) for sell transactions without complete value information. The dependent variable is the log of the transaction sell value. See Table A1 for independent variable definitions. The outcome equation includes transaction sell year dummies, country dummies, and industry dummies, where industries are defined using the 10 Global Industry Classification Standard (GICS) sectors (for the selection regression) and 157 GICS sub-industries (for the outcome regression). Standard errors are reported in parentheses and the symbols ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.*

VARIABLES	(1) ln_sellvalue	(2) select	(3) mills
IPO	1.054***	1.338***	
	(0.174)	(0.0377)	
LBO (Sell)	0.221*	-0.818***	
	(0.121)	(0.0283)	
SBO (Sell)	0.607***	-0.0274	
	(0.0791)	(0.0354)	
MBO (Buy)	-0.202***	-0.180***	
	(0.0714)	(0.0309)	
Bankrupt	-1.988***	-0.0173	
	(0.0919)	(0.0522)	
Stock Merger	0.375***	0.952***	
	(0.141)	(0.0307)	
Cash Merger	0.910***	1.390***	
	(0.181)	(0.0170)	
Cross-border	0.633***	0.113***	
	(0.0345)	(0.0176)	
Solo	0.553***	0.127***	
	(0.0511)	(0.0267)	
Sponsor>20 deals	-0.510***	-0.177***	
	(0.0354)	(0.0160)	
Public Inv Firm	-0.163***	0.399***	
	(0.0565)	(0.0230)	
LPE GP	0.711***	-0.799***	
	(0.150)	(0.0593)	
LPE Permanent	0.139*	-0.281***	
	(0.0812)	(0.0435)	

VARIABLES	(1) ln_sellvalue	(2) select	(3) mills
1990-1999		0.0849***	
		(0.0305)	
2000-2004		-0.0790***	
		(0.0277)	
2005-2009		-0.190***	
		(0.0290)	
2010-2012		-0.334***	
		(0.0286)	
UK & Ireland		-0.201***	
		(0.0331)	
US		-0.496***	
		(0.0269)	
France-Benelux		-0.648***	
		(0.0346)	
Germany-Austria-Switz		-0.789***	
		(0.0407)	
Scandinavia		-0.639***	
		(0.0402)	
Southern Europe		-0.263***	
		(0.0435)	
Eastern Europe		-0.507***	
		(0.0700)	
Korea-Japan		0.105*	
		(0.0635)	
Australia-New Zealand		-0.123**	
		(0.0563)	
Canada		-0.249***	
		(0.0417)	

VARIABLES	(1) ln_sellvalue	(2) select	(3) mills
Consumer staples		-0.0163	
		(0.0549)	
Consumer discretionary		-0.0919	
		(0.0614)	
Energy		0.342***	
		(0.0680)	
Health		0.180***	
		(0.0567)	
Industrials		-0.0628	
		(0.0553)	
IT		-0.0339	
		(0.0545)	
Materials		-0.0589	
		(0.0603)	
Telecoms		0.00322	
		(0.0734)	
Utilities		0.0368	
		(0.0847)	
lambda			0.592***
			(0.213)
Constant	1.193	-0.0593	
	(1.068)	(0.0623)	
Industry Dummies		Yes	
Year Dummies		Yes	
Country Dummies		Yes	
Observations		37591	
Censored obs		19774	
Uncensored obs		17817	

Table A4 Heckman Selection Model to Estimate Multiples

This table shows the results of a Heckman selection model used to create the imputed multiples for deals without complete transaction value information. The dependent variable is the log of the deal sell value divided by its buy value. See Table A1 for independent variable definitions. The outcome equation includes deal buy and sell year dummies, hold year dummies, where hold year is the number of years the deal is held, and industry dummies, where industries are defined using the 10 Global Industry Classification Standard (GICS) sectors (for the selection regression) and 157 GICS sub-industries (for the outcome regression). Standard errors are reported in parentheses and the symbols ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) ln_multiple	(2) select	(3) mills
LBO (Buy)	-0.183	-0.180	
	(0.170)	(0.112)	
Going-private (Buy)	-0.511	0.753***	
	(0.331)	(0.0841)	
Divisional (Buy)	-0.0706	0.282***	
	(0.134)	(0.0452)	
SBO (Buy)	-0.276*	0.336***	
	(0.164)	(0.0624)	
Distressed (Buy)	-0.0274	-0.0176	
	(0.194)	(0.138)	
MBO (Buy)	-0.0156	0.101**	
	(0.0763)	(0.0442)	
Sponsor>20 deals (Buy)	-0.0889	0.142*	
	(0.121)	(0.0800)	
Solo	0.396	-0.109**	
	(0.549)	(0.0524)	
Cross-border(Buy)	-0.0844	0.120***	
	(0.0885)	(0.0451)	
Bankrupt (Sell)	-2.191***	0.0429	
	(0.145)	(0.105)	
SBO (Sell)	0.114	0.176**	
	(0.140)	(0.0786)	
MBO (Sell)	-0.0241	0.0286	
	(0.103)	(0.0731)	
Sponsor>20 deals (Sell)	0.000689	-0.0882	
	(0.127)	(0.0916)	
IPO (Sell)	0.512*	0.326**	
	(0.278)	(0.146)	
Cross-border(Sell)	-0.0348	0.134***	
	(0.0822)	(0.0454)	
LBO (Sell)	0.173	-0.515***	
	(0.252)	(0.0766)	
Cash Merger (Sell)	-0.0151	0.873***	
	(0.394)	(0.0444)	
Stock Merger (Sell)	-0.0907	0.539***	
	(0.316)	(0.149)	
Buyer=Seller	-0.233***		

VARIABLES	(1) ln_multiple	(2) select	(3) mills
Public Inv Firm	-0.301**		
	(0.137)		
LPE GP	0.535**		
	(0.214)		
LPE Permanent	0.318*		
	(0.181)		
UK-Ireland		0.338***	
		(0.116)	
US		-0.382***	
		(0.111)	
France-Benelux		-0.420***	
		(0.120)	
Germany-Austria-Switz		-0.630***	
		(0.132)	
Scandinavia		-0.439***	
		(0.136)	
Southern Europe		0.116	
		(0.130)	
Eastern Europe		0.0750	
		(0.197)	
Korea-Japan		0.249	
		(0.196)	
Australia-New Zealand		0.212	
		(0.161)	
Canada		-0.306*	
		(0.165)	
Hold years <2		0.299***	
		(0.0933)	
Hold years >=2 <4		0.321***	
		(0.0809)	
Hold years >=4 <6		0.231***	
		(0.0793)	
Hold years >=6 <8		0.154*	
		(0.0808)	

VARIABLES	(1) ln_multiple	(2) select	(3) mills
Consumer staples		-0.206	
		(0.311)	
Consumer discretionary		-0.326	
		(0.317)	
Energy		0.331	
		(0.338)	
Health		-0.133	
		(0.315)	
Industrials		-0.175	
		(0.311)	
IT		-0.170	
		(0.313)	
Materials		-0.155	
		(0.315)	
Telecoms		-0.281	
		(0.351)	
Utilities		-0.0755	
		(0.369)	
lambda			-0.361
			(0.595)
Constant	-1.864	-0.768**	
	(2.055)	(0.349)	
Industry Dummies	Yes		
Buy Year Dummies	Yes		
Sell Year Dummies	Yes		
Hold Year Dummies	Yes		
Observations	7030		
Censored obs	5686		
Uncensored obs	1344		
Standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Table A5 Alternative Approaches to Estimating Imputed Multiple

This table presents a comparison of 2 ways of estimating the imputed multiple. In Panel A, the imputed multiple is estimated by first estimating the imputed buy and sell values - the Heckman procedure is applied to the values, not to the multiple. In Panel B, the imputed multiple is estimated by first estimating the actual multiple (actual buy value divided by actual sell value), and then applying the Heckman procedure to the multiple. Each row in the table represents a regression of a dependent variable (first column) on an independent variable (second column) which is usually the predicted value of the dependent variable, and the alpha, the coeffcient on the independent variable, the adjusted R^2, and the number of observations for the regression. As can be seen from the table, the imputed multiples using the second approach have much better explanatory power when the actual multiples are regressed on them (adjusted R^2 of 0.2) than those estimated using the first approach (adjusted R^2 of 0.02). Throughout this study we use imputed multiples estimated using the second approach.

dependent variable (actual values)	independent variable (p(x) = predicted value of x)	alpha	beta	Adj R-Square	N
	Panel A - multiple estimated using imputed buy and sell values				
ln(buyValue)	p(ln(buyValue))	0.00	1.00	0.26	11322
		(0.00)	(62.70)		
buyValue	exp(p(ln(buyValue)))	60.17	1.04	0.16	11322
		(27.45)	(47.27)		
ln(sellValue)	p(ln(sellValue))	0.00	1.00	0.22	16207
		(0.00)	(69.34)		
sellValue	exp(p(ln(sellValue)))	78.86	0.95	0.12	16207
		(39.99)	(47.70)		
sellValue/buyValue	exp(p(ln(sellValue)))/exp(p(ln(buyValue)))	2.34	0.51	0.02	1209
		(9.96)	(4.98)		
	Panel B - multiple imputed using actual buy and sell values				
ln(sellValue/buyValue)	p(ln(sellValue/buyValue))	0	1	0.38	1366
		(0.00)	(29.09)		
sellValue/buyValue	exp(p(ln(sellValue/buyValue)))	-0.08	1.40	0.20	1366
		(-0.43)	(18.49)		