Fund Managers under Pressure:
Rationale and Determinants of Secondary Buyouts

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Abstract

The fastest growing segment of private equity deals are secondary buyouts - sales from one PE fund to another. Using a comprehensive sample of leveraged buyouts we investigate whether SBOs are value-maximizing, or reflect opportunistic behavior. To proxy for adverse incentives, we develop buy and sell pressure indexes based on how close PE funds are to the end of their investment period or lifetime, their unused capital, reputation, deal activity, and fundraising frequency. We report that funds under pressure engage more in SBOs. Pressured buyers pay higher multiples, use less leverage, and syndicate less suggesting that their motive is to spend equity. Pressured sellers exit at lower multiples and have shorter holding periods. When pressured counterparties meet, deal multiples depend on differential bargaining power. Moreover, funds that invested under pressure underperform.

1. Introduction

> *Deal intermediaries in London now use a not very flattering label for fund managers facing pressure to invest their capital promptly: 'desperate housewives'. […] If you are a banker shopping a company, you track down those managers with unspent capital in their aging funds, struggling to extend their investment period and, crucially, who can't raise new money until the tail is gone. They are basically dying to do a deal, at almost any price. Given this flurry of activity [in secondary buyouts], it is hard to resist the conclusion that desperate housewives are indeed at large.*
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> Private Equity International, June 10, 2010

After three decades of tremendous growth, private equity (PE) is now an established industry with more than 13,000 funds and around 3 trillion dollars of assets under management, mostly dedicated to leveraged buyouts (LBO).[1] Among all PE transactions, the highest rate of growth in recent years was realized in secondary buyouts (SBOs), deals in which one PE fund sells a portfolio company to a competitor fund. SBOs now constitute more than one-third of observed LBO exits.

Both efficiency and opportunistic motives can potentially explain why so many PE funds choose to invest or exit this way. According to Jensen (1986) PE funds have superior governance structures and incentive mechanisms. It follows that when they engage in secondary transactions, it is likely to be in the best interest of their investors. If, for example, PE funds specialize in different stages of restructuring, then funds specializing in the first stage would sell to those with expertise in the second stage and each fund would create value for its own investors along the way. Alternatively, some general partners (GP) may have unique skills that others do not possess and when their funds acquire firms from other funds, they generate additional returns. For example, more reputable funds may have better access to deal financing.

A second view, in contrast, suggests that part of the growth in secondary deals might be due to self-serving GPs who place their own interest ahead of their investors.[2] On the buy side, when a PE fund has been unsuccessful to invest in traditional deals, it may resort to SBOs that are quicker to complete, fill the fund's investment record, reduce non-invested capital in anticipation of a new round of fundraising, and accrue additional management fees even if the transaction is not in the best interest of the buyer's limited partners (LPs). On the sell side, SBOs offer a quick exit for GPs who cannot sell via trade sale or IPO and that need to liquidate an existing fund or show activity to their LPs ahead of fundraising. Hence, secondary buyouts could be the preferred option for GPs with adverse incentives who wish to conclude a deal quickly.

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[1] Source: Preqin, *Private Equity Spotlight* August 2012.

[2] See e.g. The Economist, "*Private-equity companies look to each other to solve their problems*", February 23 2010.

The objective of this paper is to investigate the impact of PE fund incentives on the decisions to invest and exit via a secondary deal. Using a combination of fund characteristics, we create a Buy Pressure index and a Sell Pressure index to detect PE funds prone to opportunistic behavior. We then analyze in a large buyout sample the investment and exit choices of funds under pressure, as well as transaction multiples, use of leverage, syndication, and performance.

To identify PE funds which are more likely to face conflicts of interest, we consider the typical contractual provisions in partnership agreements between GPs and LPs. The former are expected to invest during the first five years of the fund's life, called the investment period. The management fees are set to provide incentives to invest early, with GPs being paid a percentage of committed capital during the investment period, and a percentage of net invested capital during the subsequent period, the harvesting period.[3] However, for PE funds with substantial "dry powder" (unspent capital) close to the end of their investment period, this provision creates adverse incentives to invest in deals that GPs would otherwise have rejected at the start of the fund. This intuition has been formalized in the optimal contracting model of Axelson, Stromberg and Weisbach (2009).

PE sponsors aim to raise a new fund every 3-5 years, and their reputation and track record are critical for their ability to do so (Kaplan and Schoar, 2005; Chung, Sensoy, Stern and Weisbach, 2012). The pressure of being evaluated during each fundraising cycle is part of the GPs' implicit incentive mechanism. As Chung, Sensoy, Stern, and Weisbach (2012) show, a major part of GPs' lifetime compensation is the expected income from subsequent funds. Prospective LPs not only look at past performance but also at the investment track record of the sponsor's recent funds. If the most recent fund still has a substantial amount of unspent capital near the end of its investment period, the LPs are unlikely to commit capital to a new fund. This puts further pressure on PE funds to invest their dry powder in order to boost their investment record. Funds with little reputational capital have more to gain from doing so, and hence have a potentially stronger incentive distortion.

For funds in their harvesting period, the closer the end of their lifetime (typically 10 years) or the more time has passed since their last exit, the more exit pressure they face. GPs with substantial non-exited investments will be tempted to sell quickly to another PE fund, in order to improve their chances to raise new capital. Funds may also strategically delay exits with modest proceeds in order to collect management fees (Robinson and Sensoy, 2013a) and those that do so would presumably find themselves more frequently under selling pressure. Hence one would expect to see lower multiples on exits by pressured sellers. Again, GPs with lesser reputation would have more to gain from engaging in such exits.

For our identification strategy it is crucial that there is a dynamic incentive provision story at play over the fund's lifetime. For funds early in their investment period, the pressure from the PE

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[3] Net invested capital is calculated as the cost basis of all investments less the cost basis of realized investments.

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contract is most likely positive and value-enhancing. However, for funds late in the investment period with substantial dry powder, the same contract may potentially create adverse incentives to window dress. As the two-period optimal contracting model of Axelson, Stromberg and Weisbach (2009) demonstrates, funds that invest early invest exclusively in positive NPV projects and will continue to do so late in their investment period (in the second period of the model). In contrast, PE funds that have not found good investments early are willing to lower their investment threshold late in their investment period to keep management fees and improve their fundraising prospects. Axelson, Stromberg, and Weisbach (2009) predict that it is the combination of fund age and dry powder that makes a fund more likely to invest opportunistically, not one or the other alone.

To test these ideas, we extract from S&P's Capital IQ a comprehensive sample of all closed LBO transactions from 1980 to 2010 with targets located in the U.S. and in 12 European countries. Our sample contains 9,575 LBO transactions involving 8,658 target firms and 957 different PE acquirers. We complement this data with an "event history" of known corporate events (bankruptcies, equity private placements, and mergers) for each LBO company using information from Capital IQ and on Initial Public Offerings (IPOs) from Thomson-Reuters' SDC database. This allows us to identify the type and date of exit of the initial fund for 4,139 exits, of which 1,219 are SBOs.

The Buy Pressure and Sell Pressure indexes are constructed from characteristics that jointly identify funds most likely to face adverse incentives. Our Buy Pressure index includes proxies for the end of a fund's investment period and for its unspent capital (following Axelson, Stromberg and Weisbach, 2009). We also include proxies for the lack of fund's reputation and the infrequency of the family's fundraising, because opportunistic investment motives are more of a concern for funds without a stellar reputation or that are more uncertain about the outcome of fund raising (Kaplan and Schoar, 2005; Chung, Sensoy, Stern and Weisbach, 2012). Similarly, our Sell Pressure index captures how close the fund is to the end of its life, its lack of exit activity, its lack of reputation, and whether its sponsors are infrequent fundraisers. Our tests are conducted against the alternative hypothesis that SBOs are more likely to be driven by investor value maximization, i.e. buy and sell pressure would not have any bearing on deal outcomes.

Our findings lend support to the view that agency conflicts help explain the behavior of funds under pressure. We find that secondary deals are more likely to involve buyers under pressure. The regression coefficients indicate that a one standard deviation change in our Buy Pressure index increases the likelihood of SBO from 16.6% to 18%, or about 8.4% of the unconditional probability. We do not find evidence that fund specialization is related to the likelihood of secondary deals, as the alternative hypothesis of investor value maximization would predict. Moreover, funds under pressure pay more in secondary deals: a one standard-deviation shock in the Buy Pressure index increases the purchase multiple (relative to comparable M&A transactions) by about 10.8%. These results are consistent with the prediction of Axelson, Stromberg and Weisbach (2009) that PE funds with

substantial dry powder late in their investment period are more likely to invest in less attractive projects.

A similar pattern emerges when we look at exit decisions. Selling to another PE fund is more likely if the seller fund is under pressure: an increase of a one standard deviation in our Sell Pressure index increases the likelihood of exit via an SBO from 29.5% to 31.6%, a 7.1% increase. In terms of prices, seller funds under pressure sell at lower transaction multiples in secondary deals. A one standard deviation shock in the Sell Pressure index decreases the sales purchase multiple by about 13.7 percentage points. We also investigate the relation between sell pressure and the timing of SBO exit decisions. Using a competing hazard model with a dynamic sell pressure index that varies over a deal's holding period, we find that sell pressure is associated with a higher likelihood of exit through an SBO and therefore a lower expected conditional holding period for these exits. On the whole, these findings indicate that funds under exit pressure are anxious to sell their portfolio companies even at less attractive prices.

Whenever pressured sellers meet pressured buyers, it is relative pressure that determines the transaction multiple. Restricting ourselves to the sample of deals with two PE funds as counterparties, we find that less pressured buyers pay lower prices to more pressured sellers and more pressured buyers pay higher prices to less pressured sellers. Thus the difference in the Buy and Sell Pressure indexes is associated with the two parties' relative bargaining power and the acquisition price. When the two sides face the same pressure, then buy/sell pressure does not matter for pricing the deal.

We also document a negative relation between the Buy Pressure index and deal leverage. We find that pressured funds use significantly less leverage (as a fraction of Enterprise Value, EBITDA and Total Assets) and thus more equity in SBOs. We further document that, in SBOs where the lead buyer fund is under pressure to invest, syndicates are smaller and have a higher deal value per syndicate member. These findings, coupled with the fact that pressured buyers pay higher multiples, support the agency story. If pressured buyers pay more for SBOs because (say) such deals are less risky, one should find that value-maximizing GPs would use more leverage in those deals, and not less.[4] Overall, our findings on deal leverage, syndication and transaction multiples seem to suggest that SBOs involving buyers under pressure are driven more by the buyer funds' desire to spend equity than to maximize LP returns.

When GPs use less leverage and pay higher multiples for acquisitions, then LPs are likely to get lower returns on their investment. Using data on internal rates of return (IRRs) and on money multiples for a subsample of completed funds, we find that those funds that on average have higher levels of pressure during their lifetime and invest relatively more in secondary deals exhibit lower

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[4] In a similar spirit, Officer, Ozbas and Sensoy (2010) argue that the pattern they uncover in PE club deals that transactions with lower multiples obtain more favorable debt financing terms is difficult to reconcile with an information or risk story.

performance. This evidence is consistent with higher SBO acquisition multiples paid by pressured funds. While this explanation is the most likely interpretation of our findings, this test leaves open the possibility that the underperformance is due to the non-SBO investments of the same funds. Therefore, to investigate the relation further, we look at the deal-level performance of SBOs by computing the growth rate in the target's enterprise value from entry to exit as an approximation for deal-level IRR. Consistent with our fund performance evidence, SBO deals made or exited under pressure are associated with lower value creation for both buyers and sellers, and particularly so for the latter. We get similar results when we use relative measures of performance such as the deal's rank within all deals of the same time cohort and geographic region, or within all investments done by the same PE firm.[5] Overall, our performance tests show that portfolio firms acquired or sold under pressure yield lower returns than deals that were not done under pressure.

Our findings indicate that agency problems in private equity between GPs and LPs are not completely eliminated by the partnership agreements in place. This fact can seem surprising at first sight, given that PE is considered a sophisticated contractual environment. However, the existence of agency costs does not imply that contractual arrangements are suboptimal. In the presence of moral hazard and information problems, optimal contracts can only be second best: the incentives of principals and agents will not be perfectly aligned, resulting in residual losses (Jensen and Meckling, 1976).[6] In fact, we draw on Axelson, Stromberg and Weisbach's (2009) optimal contracting model to make clear how positive incentives early in a fund's life can turn into adverse incentives later, and how contractual provisions originally meant to protect LPs may induce self-serving behavior from GPs in certain circumstances. The contribution of our paper is to provide new evidence on the nature and significance of these agency costs and to identify fund characteristics and transaction types which are associated with economically significant agency costs in private equity investments.

Like in many studies on financial intermediation, there is a possibility that unobserved fund or firm characteristics may drive our results. Our analysis addresses these endogeneity concerns in several ways. Our pressure indexes exhibit ample cross-section and time-series variation because the same GP might sponsor different funds and invest in different deals with or without pressure. We present throughout the paper robustness checks using GP fixed effects to control for time-invariant fund-level characteristics. Since we find no evidence of assortative matching between sellers and buyers according to pressure status, we use deals with two counterparties as a source of exogenous variation for pressure on each side of the deal, and confirm our results. Finally, we approach the issue from multiple directions by studying the impact of pressure on investment and exit decisions, deal prices, leverage, syndication choices, and holding period determinants. All the different parts of the

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[5] In unreported regressions we also analyze pressured funds' choice of exit routes for their SBO acquisitions. We find that pressured sellers are less likely to exit via M&A or IPO (exits typically used as indicators of deal success).
[6] See Robinson and Sensoy (2013a) for a discussion of these issues in the PE context.

analysis point towards the existence of agency costs. Nevertheless, we acknowledge that we cannot completely rule out the possibility that our findings are driven by unobservable variables. Like many papers in this area, we lack a suitable instrument and for this reason we cannot convincingly establish causality between pressure and observed fund decisions.

The remainder of the paper is organized as follows. We discuss the literature in Section 2 and develop our hypotheses in Section 3. Section 4 describes the data and variables. Sections 5 and 6 analyze the impact of the Buy and Sell Pressure indexes on the likelihood, valuation, and the holding period of SBOs. Section 7 explores how differences in pressure between buyer and seller funds lead to different bargaining outcomes. Section 8 investigates the relation between buy pressure and deal leverage and syndication. Section 9 presents evidence on the relation between pressure and performance. Section 10 discusses endogeneity issues. Section 11 concludes.

2. Related literature

Research on private equity has addressed a wide variety of questions, including issues related to performance, productivity, growth, employment, and financial distress.[7] Within this literature, our paper is most related to theoretical and empirical studies of contracting issues in PE. Metrick and Yasuda (2010) and Chung, Sensoy, Stern, and Weisbach (2012) investigate the role of explicit and implicit incentives in fund behavior. Kandel, Leshchinskii and Yuklea (2011) and Barrot (2012) address agency conflicts between GPs and LPs linked to the limited investment horizon in venture capital and PE, while Cornelli and Yosha (2003) highlight window-dressing issues. Axelson, Stromberg and Weisbach (2009) build an optimal contracting model in which the financial structure of PE 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, as argued by Robinson and Sensoy (2013a). Robinson and Sensoy (2013a) also report that GP behavior in booms and around certain contractual triggers seems consistent with the existence of agency conflicts. Jenkinson, Sousa and Stucke (2013) and Brown, Gredil and Kaplan (2013) document manipulation of NAVs by PE funds during the fundraising cycle. Our paper contributes to this literature by documenting a different type of agency problem faced by funds under pressure at the time of making or exiting investments. Similar to Brown, Gredil and Kaplan (2013), we also find that top-performing funds are less likely to be driven by adverse incentives than less reputable funds.

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[7] See among many others, Kaplan (1989a, 1989b), Smith (1990), Kaplan and Schoar (2005), Stromberg (2008), Acharya, Gottschalg, Hahn and Kehoe (2013), Demiroglu and James (2010), Boucly, Sraer and Thesmar (2011), Guo, Hotchkiss and Song (2011), and Hotchkiss, Smith and Stromberg (2012).

Our findings regarding deal leverage also complement existing work. Axelson, Jenkinson, Stromberg and Weisbach (2012) report that leverage in buyouts is mostly explained by availability to credit, a finding that the authors link to potential agency problems. Officer, Ozbas and Sensoy's (2010) analysis of club deals finds that deals with lower multiples obtain more favorable debt financing terms, providing support for strategic motives in club formation. Similarly, we document another kind of strategic motive: the finding that pressured buyers pay higher multiples in SBOs while using less leverage and smaller syndicates suggests that these deals are driven more by pressured funds' desire to spend equity capital rather than maximize LP returns.

Our paper also contributes to a growing literature on SBOs. Wang (2012) reports that SBOs are priced higher than primary deals due to favorable credit market conditions. This finding is corroborated by Jenkinson and Sousa (2012) and Achleitner et al. (2012). Wang also reports that there is no pattern of collusion among PE funds that engage in secondary deals. Our paper shows that, in addition to market conditions, buy and sell pressure not only induces PE funds to choose SBOs, but is also related to deal prices and deal terms. Regarding performance, Bonini (2010), Jenkinson and Sousa (2011), and Wang (2012) find lower operating performance improvement in SBOs, but Achleitner and Figge (2012) and Achleitner et al. (2012) find no differences in IRR between primary and secondary deals. In a contemporaneous paper, Degeorge, Martin and Phalippou (2013) report that SBOs made at the end of a fund's investment period underperform. We differ from their paper by introducing buy and sell pressure indexes as a powerful metric for the likely occurrence of incentive distortions and by showing the joint effect of these distortions on the occurrence, pricing, and terms of SBO deals, on the buy side as well as on the sell side. We find that fund specialization is uncorrelated with SBO outcomes, consistent with agency-based explanations.

Finally, our study also relates to the literature on PE fund performance. Recent papers on this issue respond mostly positively to the question of whether PE funds invest efficiently. Robinson and Sensoy (2013b) and Harris, Jenkinson and Kaplan (2013) find that the average buyout fund outperforms public market returns. Robinson and Sensoy (2013b) also show that even funds raised in boom periods do not underperform relative to public markets once the cyclicality of PE flows is accounted for. Using data on LP investments, Sensoy, Wang and Weisbach (2013) report that LPs' stakes in buyout funds similarly outperform public markets. All these findings are consistent with appropriate contracting, although measurement issues remain.[8]

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[8] See e.g. Phalippou and Gottschalg (2009) and Franzoni, Nowak, and Phalippou (2012).

3. Hypothesis development

3.1. The PE contract and fund incentives

It is useful to begin with a brief description of how PE funds are organized. The management company, or the GP, sets up the fund and makes all investment (buy) and exit (sell) decisions. Their LPs commit to transfer capital to the fund whenever the GP finds an investment opportunity. The LPs play no active role in the fund's management, and have no specific information upfront of the investments the GP will make (i.e., PE funds are "blind-pool" vehicles). The partnership has a lifetime of 10 years (extendable by one or two more), divided into two distinct periods. During the first 5 years, the investment period, the GP selects investments; during the remaining years, the management or harvesting period, the GP manages and eventually exits from those investments.[9]

GPs are compensated by a fixed management fee, typically 1.5% to 2% of committed or net invested capital, and a variable component known as carried interest (or carry), corresponding in most cases to 20% of the fund's profits (often a pre-specified hurdle rate must be reached before the GP can receive carry). This convex claim held by the GP aligns the incentives of both parties. Incentives are critically important because LPs are locked in for ten years once the fund closes and have no say in investment and exit decisions. Apart from eventual distributions from exits, the LPs' stake is illiquid: selling it is extremely costly and usually subject to GP approval. The only 'stick' that the LPs possess is the threat not to invest in subsequent funds by the same GPs. This is a strong threat, since the GPs will be out of a job by the end of the current fund's life if future fundraising is unsuccessful.

Based on these contractual features, we develop the following hypotheses regarding the GPs' incentives and investment behavior:

(*i*) *Fund incentives and fund activity*. The GP-LP relationship can be viewed as a principal-agent problem in which an uninformed principal (the LP) hires a potentially skilled agent (the GP) to trade on his behalf.[10] Investors learn about the GP's ability by observing his past and current deal activity. The agent might therefore engage in self-serving actions in an attempt to influence their beliefs. In Dow and Gorton (1997), for example, the agent trades too much in order to show activity to his employer.[11] In the PE context, this leads to the prediction that GPs with substantial amounts of unspent capital ("dry powder") will more likely engage in suboptimal acquisitions, to create investment record and use up capital. This theory also implies that funds in the harvesting period

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[9] So called follow-on investments, usually acquisitions made by companies in the fund's portfolio, are allowed during the harvesting period, but typically limited to at most 10% to 15% of the fund and often require LP authorization.

[10] See e.g. Berk and Green (2004).

[11] This 'excessive trade' equilibrium holds because the LPs cannot distinguish between a situation in which the GP exerts effort but finds no suitable investment opportunities, and an alternative scenario in which the GP shirks and simply consumes the fixed fee.

which have not shown exit activity for some time will be tempted to engage in suboptimal sales transactions to improve their exit record.

One might argue that the incentives implicit in the partnership agreement should be sufficient to alleviate the agency problem. However, as Axelson, Stromberg and Weisbach's (2009) show, these incentives may not work equally well for all funds. The contract, which provides correct incentives to most GPs, exacerbates distortions for GPs unable to invest early and makes them willing to spend their capital on mediocre projects late in their investment period.

(*ii*) *Fund incentives and stage of fund lifecycle*. The management fee structure may create incentives to overinvest. Metrick and Yasuda (2010) report that for 84% of buyout funds, the management fee is paid as a percentage of committed capital during the investment period but as a percentage of net invested capital during the harvesting period. They simulate data based on observed PE contracts and find that the fixed compensation represents a large portion (roughly 60%) of the NPV of the GP's income. Therefore, GPs close to the end of the investment period face a trade-off. On one hand, by passing up the deal, the GP loses the management fee as their basis shifts from committed capital to net invested capital. On the other hand, if a potential target is somewhat overvalued and the GP invests, the fund's IRR is likely to suffer. Based on Metrick and Yasuda's findings, one would expect that funds close to the end of their investment period are more likely to resolve this trade-off in favor of overinvesting.

For funds in the harvesting period, sell pressure accumulates as the end of the fund's life approaches. Robinson and Sensoy (2013a) show that funds whose fees are computed on the basis of net investment capital are more likely to delay exiting less attractive investments. This probably adds to pressure because, although sometimes investors allow so-called 'zombie' funds to continue, the GP's reputation suffers when one of its funds operates beyond its expected lifetime.

(*iii*) *Fund incentives and fund reputation*. The temptation to engage in suboptimal deals discussed above is likely to be more severe for managers that still need to build their reputation. First, the incentive to gamble is highest for funds with little reputational capital (Ljungqvist, Richardson, and Wolfenzon, 2008; Gompers, 1996). Second, high-reputation GPs presumably also have higher skills (e.g. Kaplan and Schoar, 2005), and are able to spot good investment opportunities early in the fund's life. Third, LPs' beliefs about GP ability are less (more) likely to be influenced by a single bad deal or a temporary bout of inactivity if the GP's reputation is strong (weak). We therefore predict that funds with less reputation are more likely to engage in suboptimal transactions, both as buyers or sellers.

(*iv*) *Fund incentives and fund raising frequency*. Chung, Sensoy, Stern and Weisbach (2012) argue that GPs have strong incentives to maximize the prospects of successful future fundraising, as the flow of fees associated with the future assets under management can be a substantial part of the

GPs wealth. The fund raising process for the typical fund lasts between 12 to 24 months, and requires a substantial GP effort in terms of time, monetary outlays, and management attention. Arguably, the expected likelihood of success in raising a future fund is a function of the GP's experience in the fund-raising process. GPs that have completed the process more frequently are more likely to have a large pool of potential investors, a more professional approach to fund raising, and access to intermediaries such as placement agents. Conversely, GPs with infrequent fundraising experience are more likely to be dependent on their track record to woe investors and therefore more tempted to window dress their current performance. This leads to the prediction that infrequent fund raisers are more likely to engage in suboptimal deals, both as buyers and as sellers.

3.2. Fund incentives and SBOs

One important feature of SBOs relative to primary deals is that they are easier and quicker to execute. First, a secondary buyer saves on search costs, because the target has already been pre-screened by the primary investor. Second, SBOs are faster to complete relative to divisional deals (in which the decision by the corporate parent might be more convoluted or involve intermediaries), delistings of public firms (in which the buyer has to comply with regulations and possible hold-out by minority shareholders), or sales of stand-alone private firms (often family firms in which the emotional attachment or conflicts within the family can delay the sale). Third, SBOs are probably easier to finance since a substantial amount of information is available from the primary deal (debt documentation, due diligence, financial reporting systems). Furthermore, lenders are likely to be familiar with the target and the same banks may be willing to continue to fund it after the secondary transaction. Exactly the same arguments hold for sellers, making SBOs probably the quickest way to exit a portfolio investment.

In general, SBOs could be done for opportunistic motives or for efficiency reasons.

On one hand, secondary buyouts are attractive for funds that wish to conclude a deal quickly and therefore a prime choice for GPs with misaligned incentives. We hypothesize that GPs are more likely to engage in secondary deals for agency reasons: (*i.a*) as buyers if they have more dry powder, and (*i.b*) as sellers if they haven't shown recent exit activity; (*ii.a*) as buyers if the end of their investment period is close, and (*ii.b*) as sellers if the end of the harvesting period is close; (*iii*) if they have not established a strong reputation of a "top quartile" fund for which performance persistence is frequently assumed; (*iv*) if the GP is an irregular or infrequent fundraiser. In terms of deal pricing we would expect buyers (sellers) doing acquisitions because of distorted incentives to be willing to pay higher (receive lower) transaction multiples. We further predict that, in case two pressured GPs are counterparties in an SBO, their relative opportunism determines the excess multiple of the deal.

On the other hand, SBOs could be efficient transactions for GPs who maximize investor value. First, PE funds might have different skills that are adapted to different target types. For example, organic strategies based on professionalization of business practices are frequent in smaller primary targets, while M&A-driven internationalization strategies are more important for restructuring larger secondary targets (e.g. Acharya et al., 2013). Similarly, PE funds might specialize in certain industries. This suggests that fund specialization might impact the likelihood of SBO. Second, more reputable funds may have access to more leverage at cheaper rates, so investing in secondary deals would create additional value for these funds. This view would predict that more reputable funds are more likely to invest in SBOs, the opposite to the prediction implied by the agency view. In terms of deal pricing, we would predict that investor-value-maximizing GPs would pay (receive) no excess multiples in secondary deals relative to primary deals.

4. Data and empirical testing issues

This section describes in general terms our sample and variables. Appendix A provides the details about the sample construction and Appendix B the full list of variables and their definitions.

4.1. Sample construction

We extract from S&P's Capital IQ database all closed LBO transactions with targets located in the U.S. and in 12 European countries (Belgium, Denmark, Finland, France, Germany, Italy, Luxembourg, Netherlands, Spain, Sweden, Switzerland, and U.K.) for the period ranging from January 1st, 1980 to December 31st, 2010. As a first set of filters we exclude targets in financial industries, acquisitions of minority stakes or of remaining interest, deals involving targets with reported negative sales or negative enterprise value, and misclassified non-PE related transactions such as corporate acquisitions, purchases of stakes by hedge funds, and venture capital deals. On this initial sample of 23,032 deals we implement Stromberg's (2008) methodology to obtain an imputed Enterprise Value for transactions without deal value information (roughly 60% of the sample).[12] This involves running a Heckman regression model with the likelihood of a deal having its value disclosed in the first stage, and the determinants of target Enterprise Value in the second stage (see Table A-1 in the Appendix for results and details). This imputed value is used to compute market shares and activity measures of PE fund families required in the analysis.

We then apply a second set of filters excluding: deals without Capital IQ identifiers of buyers and sellers; acquisitions by management teams (management buy-outs) with no evidence of

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[12] Results are unchanged if we run all our regressions on the subsample of LBOs with actual (and not imputed) deal value information.

involvement by a PE sponsor; deals in which the target firm is bankrupt or in financial distress; and transactions with a deal value lower than one million dollars.[13] When an acquisition involves multiple stages or transactions, we keep the one in which the buyer acquired most of its stake (typically the first transaction). We also require that we can reasonably trace the purchase to a given fund within a PE fund family under mild assumptions (see below). The final sample contains 9,575 LBO deals involving 8,658 target firms and 957 different PE acquirers.

To obtain the exit of each LBO transaction, we download from Capital IQ data on corporate events related to each target firm (bankruptcies, equity private placements, and mergers) using each firm's unique identifier. We complement this data with information on Initial Public Offerings (IPOs) from ThomsonReuters' Securities Data Corporation (SDC) database. We then construct an "event history" of known corporate actions for each firm after the LBO, allowing us to identify the type and date of exit of the initial LBO investor. We say that an exit takes place if there is evidence of a change in control (e.g., sale of a majority stake) even if the original buyer funds remain minority shareholders. The final sample contains 4,139 exits, of which 1,219 are secondary LBOs.

4.2. Buy Pressure index and related variables

We extract from Capital IQ buyer and seller information that we use to create a unique PE fund family identifier to group fund-level information (again see the Appendix A for details). We identify the "leading buyer" in a multi-buyer transaction as the PE fund family with the highest reputation among the deal's buyers, measured as the dollar market share across all LBO deals made up to that year.[14] For single-buyer transactions, the "leading buyer" (henceforth, the buyer) is the PE fund family of the acquiring fund. We then match each LBO with information on the buyer's existing funds. We check if the acquisition date is within the investment period (e.g., years 1 through 6) of at least one fund in the PE fund family. If it is not the case, we discard the LBO transaction because this is a sign that fund-level information in Capital IQ about the family is incomplete. If the condition is fulfilled, we assume that the deal is executed by the fund family's youngest fund still investing at the time of the deal. The value of the variable *Stage* equals the number of years between the start of the buyer's fund and the date of the LBO deal.

To capture buy pressure, we create an index from characteristics that are likely to identify funds desperate to invest. The first element of the index is the variable *Late Buyer*, an indicator

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[13]All monetary amounts in this paper are in real December 2010 dollars, values in European currency having been converted to U.S. dollars at historical exchange rates.

[14] We also compute market shares of PE fund families using three other backward-looking horizons, 3, 5, and 10 years. In the overwhelming majority of cases the ranking of fund families, and thus the leading buyer, is the same. In a very small number of cases in which the different horizons produce different results, we take the buyer with the highest average among the all horizons.

variable equal to 1 if the buyer's fund is at the end of its investment period (that is, 4 to 6 years after inception) at the time of the deal, and zero otherwise. The second element is the variable *Dry Powder*. For each PE fund family and year, we calculate: (i) the aggregate amount that was raised in the past 3 years and the corresponding median that was raised across fund families in that year; (2) the aggregate dollar value of all investments made during the past three years, and its corresponding median. Using these two quantities, we define *Dry Powder*, a dummy variable equal to 1 if the buyer's PE fund family is above median in terms of fund raising and below median in terms of deal activity. Third, we define *Lack of Reputation*, an indicator variable equal to 1 if the buyer is not in the top quartile of funds in terms of deal volume market share. Fourth, we define *Infrequent Fundraiser*, an indicator variable equal to 1 if the average fundraising frequency of the PE firm until the year of the deal is in the bottom quartile of all PE firms.

The index variable *Buy Pressure* is the sum of the four dummy variables Dry Powder, Late Buyer Lack of Reputation, and Infrequent Fundraiser. To identify buyers under particularly acute pressure, we define *High Buy Pressure,* an indicator variable equal to 1 if at least two of the four components of our Buy Pressure index are equal to 1. The indicator variable Low Buy Pressure takes the value 1 if the reverse holds.

Finally, to control for fund family characteristics, we introduce two variables: *Affiliated*, a dummy variable equal to 1 if the fund family is affiliated to a financial institution or government agency, and zero otherwise; and *Novice*, an indicator variable equal to 1 if the buyer is from a PE fund family with 3 funds or less under management at the time of the LBO deal, and zero otherwise.

4.3. Sell Pressure index and related variables

As mentioned before, we extract from Capital IQ buyer and seller information that we use to create a unique PE fund family identifier to group fund-level information. The "leading seller" at exit is the PE fund family initially identified as leading buyer, and for consistency we assume that the seller (within the family) is the same fund that made the investment at the time of the initial transaction.[15]

To capture sell pressure, we create an index from characteristics likely to identify funds desperate to exit. Our Sell Pressure index is comprised of four binary variables: *Last Exit* is an indicator variable equal to 1 if three years or more elapsed since the PE fund family last exited an LBO deal; *Late Seller* is a dummy variable that takes the value of 1 if the exit takes place in year 9 or

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[15] In a few cases LBOs are marked as secondary deals in Capital IQ but no information related to the primary deal exists. In such cases we replicate the process described above for the buyer, that is, we compute market shares among sellers in a deal to select the leading seller, and require that the sale take place during the lifecycle (i.e. years 1 through 10) of at least one fund in the selling family to compute seller-related variables. The selling fund is then defined as the oldest active fund (i.e. less than 11 years old) in the selling fund family.

10 of the life of the selling fund, and zero otherwise; *Lack of Reputation*, an indicator variable equal to 1 if the buyer is not in the top quartile in terms of deal volume market share; *Infrequent Fundraiser*, an indicator variable equal to 1 if the average fundraising frequency of the PE firm until the year of the deal is in the bottom quartile of all PE firms. We then define our index of *Sell Pressure* as the sum of Last Exit, Late Seller, Lack of Reputation and Infrequent Fundraiser. To isolate sellers under acute pressure, we define the indicator variable *High Sell Pressure*, equal to 1 if at least two of the four Sell Pressure index components are equal to one. Similarly, the variable *Low Sell Pressure* takes the value of 1 if at most one of the four Sell Pressure index components is equal to 1. For completeness, we also compute *Novice at Exit*, an indicator variable equal to 1 if at the time of exit from the LBO deal the buyer is a PE fund family with 3 funds or less under management and zero otherwise.

4.4. Other variables

The set of controls in our regression specifications includes several variables. *Imputed TEV* is the target's enterprise value, that is, the sum of equity market value (valued at the offer price) and the target's pre-deal net debt (financial debt minus cash and marketable securities). Enterprise value, like all monetary amounts in this paper, is measured in real December 2010 U.S. dollars after conversion at historical exchange rates (exchange rates and inflation rates are obtained from the FRED Economic data of the Federal Reserve Bank of St. Louis). *Management Participation*, *U.S. dummy*, and *Syndicated* are dummy variables that indicate, respectively, that management is a shareholder of the acquiring group, the target is a U.S. firm, and there is more than one buyer. To proxy for capital market conditions we include *HY Spread*, the difference between interest rates on leveraged loans and on AAA-rated bonds, and *Cold IPO Market*, an indicator variable equal to 1 if the geography-, industry-adjusted IPO dollar volumes are below their time series average.

The dependent variable in the tests for valuations of acquisitions, *Excess Sales Multiple*, is constructed as follows. We first compute for each LBO deal the *Sales Multiple* as the ratio between Enterprise Value (TEV) and latest available yearly sales for the target firm at the time of the LBO. Multiples are constructed only when the deal value is non-missing, that is, Imputed TEVs are not used in this calculation. To obtain the benchmarked variables, we subtract from each multiple the median sales multiple by geography (U.S. versus Europe), industry (Fama-French 12-industry classification), and public status (public or private), of all merger transactions from ThomsonReuters' SDC over the previous two years relative to the date of the LBO. [16]

For tests involving exit, we construct similar variables but as of the time of exit (*Exit HY Spread*, *Exit Cold IPO Market*, and *Exit Excess Sales Multiple*). One additional variable specific to

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[16] A second valuation measure, calculated in a similar way but using the target's EBITDA, was also used in a previous version of the paper. Results are exactly similar and unreported for the sake of brevity.

exit regressions is *Add-ons*, a dummy variable equal to one if there were significant acquisitions during the time that the buyer held the target firm in its portfolio.

4.5. Summary statistics

Table 1 presents the main characteristics of our LBO sample. Panel A shows that the average (imputed) Enterprise Value is $277 million (M) (USD), while the median is $87M. Management is part of the acquiring group 44.1% of the time, and slightly more than half of our deals refer to U.S. targets. Our proxy for "dry powder" indicates that buyers have significant capital available 22.9% of the time. About 21.5% of LBO deals are made by Late Buyers (in the last years of the investment period), 69.5% by fund families outside the top quartile in deal volume, and 25.2% by Infrequent Fundraisers. For the average (median) fund the value of our Buy Pressure index is 1.39(1), while 41.1% of the LBO deals are executed by funds under High Buy Pressure. For completeness, Panel A displays the proportions of other LBO types present in the sample: 53.5% of deals involve private sellers ("private-to-private") and 19.4% are corporate divestitures ("divisional" buyouts).

Panel B of Table 1 presents summary statistics for our valuation variables (recall that valuation measures are only available if the deal value is known and the accounting item entering the multiple is also available). The average Sales Multiple for LBOs in our sample is 1.36 and its Excess equivalent net of median transaction multiples is 0.25.

Finally, Panels C and D of Table 1 present statistics for exits. Note that 29.5% of the LBOs in our sample are exited through a secondary deal, the second most frequent form of exit after trade sales (48%). About 11% of exited deals involved large add-on acquisitions. About 10% of the sellers last exited a deal three or more years ago, 12.5% sold at the end of the fund's lifetime, 76.7% of exits involved sellers lacking reputation, and 20.8% were infrequent fund raisers. Our Sell Pressure index shows a mean (median) value of 1.20 (1), and 29.9% of the sellers exited under High Sell Pressure. Turning to valuations, the average Sales Multiple at exit is 1.82, somewhat higher than the corresponding entry valuation. The same holds for the excess sales multiple that reaches 0.73.

5. Secondary buyouts and the pressure to invest

5.1. Secondary buyouts: univariate comparisons

To highlight the systematic differences between primary and secondary LBOs, Table 2 displays univariate comparisons of means and medians of our variables between these deals. Panel A shows that relative to non-secondary LBOs, SBOs are larger both in mean and in median and

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management participates more often as equity holder (all differences statistically significant at 1%). Secondary buyouts are more likely when credit spreads are relatively lower, and when IPO markets are cold (all differences again statistically significant at 1%).

Panel A of Table 2 also presents a preview of the results for our main variables of interest. We report that secondary LBOs more often involve (1) buyers with dry powder (26.2% of the time versus 22.3% for non-secondary deals, statistically significant at 1%), (2) buyers late in their investment cycle (23.9% versus 21.0%, statistically significant at 1%), (3) infrequent fund raisers (27.1% versus 24.8%, statistically significant at 5%). By contrast, there is no perceptible difference in the lack of reputation (69.8% versus 69.5%, which is not statistically significant). The Buy Pressure index is therefore higher for SBOs (1.470 versus 1.375, statistically significant at 1%). The table also shows that affiliated buyers do secondary deals relatively more often, and novice funds less often, than other deals. This shows the importance of controlling for fund characteristics in our analysis.

Panel B reports the differences in valuation between the two types of deals. The table shows that secondary deals are more expensive than other LBOs. For example, the average secondary transaction in our sample was priced at a sales multiple of 1.589, about 22.9% higher than for other deals. The result for the benchmarked excess multiple is similar (all differences statistically significant at the 1% level).

5.2. Secondary buyouts: multivariate analysis

We run a multivariate logit regression to test the hypothesis that PE fund characteristics proxy for investment incentives and predict secondary transactions:

$$y_{1,i} = \alpha_1 + \beta_1 \times \text{Buy Pressure}_i + \gamma_1 X_i + \varepsilon_i \qquad\qquad y_{1,i} = \begin{cases} 0 \, \text{if } y_{1,i}^* \leq 0 \\ 1 \, \text{if } y_{1,i}^* > 0 \end{cases} \qquad (1)$$

The dependent variable, y_i, is an indicator that takes value 1 if deal i is a secondary buyout and 0 if it is a primary deal. **X** represents the matrix of control variables defined in Section 4.4. All regression specifications include industry and year dummies, and we cluster standard errors by deal year.[17]

Column 1 of Panel A in Table 3 presents the results from estimating the logistic model for our basic specification. The coefficient of Buy Pressure is positive and highly significant (*t*-statistic 3.04). This suggests that pressured buyers do proportionally more secondary deals. The marginal effect of Buy Pressure is 0.014, also significant at 1%, implying that an increase of one standard deviation in Buy Pressure represents an increase in the probability of doing a secondary exit of about 0.014× 0.98 = 1.4%. This is an 8.4% increase relative to the unconditional mean of the likelihood of a secondary

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[17] We replicate all tables using double clustering by deal year and PE firm. Significance levels are basically unchanged.

buyout (equal to 16.6% from Table 1). Column 2 of Panel A presents results for High Buy Pressure which has a virtually identical level of significance (t-statistic 3.31). Column 3 decomposes the Buy Pressure index into three dummy variables, representing the index being equal to 1, 2, or at least 3. The coefficients are monotonically increasing as expected, and all three dummies are significant at 1%, 5% or 10%, respectively. Column 4 introduces PE firm fixed effects to account for any unobserved GP heterogeneity that is not controlled for in our specification. The coefficient of Buy Pressure is significant at the 5% level, and slightly larger than the coefficient of column 1.[18] Regarding control variables, the table shows that targets of secondary LBOs are larger than primary deals (with t-statistics between 10 and 20) and have management equity participation more often (t-statistics ranging between 4 and 6).

Panel B of Table 3 presents results for the individual components of our Buy Pressure index as the main independent variables. All coefficients show a positive loading, with statistically significant t-statistics ranging from 1.7 (Late Buyer), significant at 10%, to 2 (Infrequent Fundraiser), 2.06 (Dry Powder) and 2.3 (Lack of Reputation), the latter three significant at the 5% level.

5.3. Likelihood of secondary deals and buyer specialization

Our findings so far suggest that buy pressure plays a role in funds' investment decisions but at least two alternative stories can explain why some funds might prefer to engage in secondary deals. The first story relates to fund specialization. Practitioners argue that PE funds have different skills that are adapted to different target types. Compared to primary targets, secondary targets are larger, more mature, and have survived the first leveraging up. Funds might specialize in different types of targets leveraging their specific skills, and this matching could partially explain our results. Similarly, PE funds might specialize in certain industries as industry-specific knowledge of operations and technology might be critical for successfully growing or turning around target companies.

To test this hypothesis, we add two proxies for buyer specialization to our model. The first proxy is a set of three indicator variables related to Size Specialization that take the value 1 if the buyer's past deals are focused (more than two thirds) in a particular LBO size category.[19] The second proxy is Industry Specialization, an indicator variable equal to 1 if a significant percentage of the buyer's past deals (33%) are in the same industry as the target.

Table 4 presents the estimation of the logit model with the specialization variables in columns 1 through 3. The specification includes the same set of control variables as well as industry and year

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[18] Marginal effects are not shown in column 4 because they cannot be computed in a fixed-effects logit regression. The reason is that the marginal effects depend on the value of the fixed effects, which are not estimated.

[19] We define a deal as small (medium) [large] if the deal has an imputed enterprise value lower than 50 million (between 50 and 250 million) [more than 250 million] in real 2010 U.S. dollars. These cutoffs roughly correspond to standard practitioner categorizations used by PE trade associations.

dummies. The results do not support the specialization hypothesis. All the coefficients of the specialization variables are statistically insignificant with signs opposite to what one would expect. The first two columns show that funds specialized in an industry are not more likely to make a secondary deal, whether measured by a dummy (Column 1) or the percentage of their deals (Column 2) in their specialist industry, and that funds specialized in large deals are less, rather than more, likely to purchase a secondary target (but the coefficients are not statistically significant). Notably, the coefficient of the Buy Pressure index is positive and statistically significant throughout. Column 3 shows that the coefficients on size specialization are also insignificant.

The second alternative story suggests that the likelihood of secondary deals is determined by industry- or market-specific conditions. Although we control for industry and time effects, some within-industry time varying factors could potentially impact our results. We focus on two possible explanations. The first possibility is that anti-trust concerns might be associated with the frequency of secondary deals. Secondary LBOs are relatively larger firms, which might face anti-trust hurdles if bought by a trade buyer, while simultaneously not being large enough to be sold through an IPO. Hence in the presence of substantial industry concentration, the only exit route for a seller would be to exit through a secondary LBO. We therefore use as a control Industry Concentration, the geography- and year-adjusted Hirschman-Herfindahl concentration index in the target's industry. The second possibility is that changes in industry capital asset liquidity might explain the likelihood of secondary deals, by changing the pool of available trade buyers over time. We therefore use as control the Asset Liquidity measure proposed by Schlingemann, Stulz and Walkling (2002), defined as the target industry's ratio of the value of corporate transactions (excluding LBOs) to the value of the total assets of public firms in that industry. Column 4 of Table 4 presents these alternative stories. The coefficients of Industry Concentration and Asset Liquidity are indistinguishable from zero, and the coefficient on the Buy Pressure index is unchanged in statistical and economic magnitude. The result is the same if we include Industry Concentration and Asset Liquidity separately in our regressions, or alter the definition of the concentration or asset liquidity variables (not reported in tables).

5.4. Valuation of secondary buyouts

Our empirical analysis documented that the Buy Pressure index predicts the likelihood of SBOs. Next we focus on deal pricing. To gauge valuation effects, we run the following least-squares regression in the sample of deals with valuation information:

$$XSMULT_i = \alpha_2 + \delta_2 \times \text{Buy Pressure}_i + \beta_2 \times \text{Buy Pressure}_i \times D_i^{SEC} + \phi_2 \times D_i^{SEC} + \gamma_2 X_i + \varepsilon_i \qquad (2)$$

where *XSMULT*, the dependent variable, is our measure of deal valuation (Excess Sales Multiple) and D^{SEC} is an indicator variable that takes the value 1 if the deal is a secondary transaction and 0

otherwise. We focus our attention on β_2, the coefficient on the interaction term Buy Pressure $\times$ D^{SEC} that measures the impact of our Buy Pressure index for secondary deals. As before, **X** represents the matrix of control variables, but with one exception: we replace TEV (which is part of our Sales Multiple definition) with an instrument for deal size, represented by Buyer Size, the log value of all deals made by the buyer in the last 5 years.[20] All specifications include industry and year dummies and year-clustered standard errors.

Panel A of Table 5 presents results. The coefficient δ_2 that measures the impact of our Buy Pressure index on deal value is negative but not statistically significant (coefficient -0.05, t-statistic 1.45) in all specifications. This implies that buyers under pressure do not pay more for primary targets. In contrast, our coefficient of interest β_2, on the interaction of Buy Pressure index and secondary transaction, is positive and statistically significant throughout. In Column 1, we find significance at the 5% level for the Buy Pressure index (coefficient 0.200, t-statistic 2.61), indicating that PE funds under buy pressure pay higher multiples for SBOs. Taking the difference between these coefficients and multiplying by a one-standard deviation shock of 0.98 in Buy Pressure, we obtain a change of 0.147 in Excess Sales Multiple, equivalent to an increase of 10.8% with respect to the sample average of Sales Multiple (1.36 from Table 1).

Column 2 shows virtually identical results for buyers under acute pressure, the High Buy Pressure variable. Column 3 displays coefficients for the Buy Pressure index in three level groups, for values 1, 2, or 3 and higher, showing that the last two are statistically significant. Column 4 includes PE firm fixed effects and shows unchanged results (coefficient of Buy Pressure equal to 0.161, t-statistic 2.04).

In Panel B of Table 5, we show regression results for each of the four individual components of our Buy Pressure index. Late buyers tend to pay less for primary acquisitions (t-statistic -1.74); all other components are not significant. Again, the focus of our analysis is on the interaction terms. While the results are weaker than those for the composite index, the interaction terms Dry Powder $\times$ D^{SEC}, Lack of Reputation $\times$ D^{SEC} and Infrequent Fund Raiser $\times$ D^{SEC} are positive and statistically significant at the 5% and 10% level, respectively, while the interaction Late Buyer $\times$ D^{SEC} is not statistically distinguishable from zero.[21]

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[20] Another reason is that TEV contains the impact of both target size and the deal premium. Nonetheless our results are unchanged if we use TEV or even Target Sales (also part of the Sales Multiple definition) as a control instead of Buyer Size.
[21] Results using Excess EBITDA Multiple as dependent variable in the valuation regression are exactly similar to those reported here and are available upon request.

6. Exits via secondary buyouts and the pressure to sell

6.1. Determinants of the secondary buyout exit route

We run a multivariate logistic model to test the hypothesis that PE fund characteristics proxy for investment incentives and predict secondary exits:

$$y_{3,i} = \alpha_3 + \beta_3 \times \text{Sell Pressure}_i + \gamma_3 X_i + \varepsilon_i \qquad\qquad y_{3,i} = \begin{cases} 0 \text{ if } y_{3,i}^* \leq 0 \\ 1 \text{ if } y_{3,i}^* > 0 \end{cases} \qquad (3)$$

The dependent variable, y_3 is an indicator variable that takes value 1 if deal i is exited via SBO and 0 for other types of exits. We modify the control variable matrix **X** by adding as controls: Stage, the time in the fund's life when the target was originally bought; Add-On, an indicator of significant build-ups under the seller's control; and dummy variables identifying the original deal's source, that is, whether it was a secondary deal, a divisional buyout, a public-to-private deal, or a sale by a financial institution (the missing category is that of a private-to-private deal). In addition, some of our variables, like Novice, HY Spread, and Cold IPO Market, are now calculated as of the date of exit.

The results are presented in Panel A of Table 6. Column 1 shows that pressured sellers are more likely to exit through SBO (coefficient 0.133, t-statistic 3.99). The marginal effect of the Sell Pressure index is 0.026. Given that the standard deviation of the Sell Pressure index in the exit sample is 0.795, a one standard-deviation shock in Sell Pressure increases the likelihood of exit via SBO by 2.1%, or about 7.1% of the average sample frequency of secondary exits. Column 2 shows similar results, significant at 1%, for the High Sell Pressure index, and Column 3 shows that the coefficients monotonically increase when the Sell Pressure index is separated into 3 dummies for levels equal to 1, 2, or 3 and higher (the omitted base category refers to the case when Sell Pressure equals zero). Column 4 introduces PE firm fixed effects. Although the coefficient of Sell Pressure has the same sign and order of magnitude, it is no longer statistically significant. One possible explanation is that some GPs persistently find themselves in sell pressure situations.

Turning to our control variables, the results in Table 6 show that the initial deal source is a strong determinant of exit type, with SBOs highly likely to follow secondary deals (t-statistics in the range of 2.8, for all but one specification) while targets originally divested by corporate sellers or in public-to-private transactions are less likely to be sold to another PE fund. In addition, market conditions matter: the variable HY Spread is negative and statistically significant (t-statistic -4.97), indicating that at times of high credit spreads exit via SBO is more difficult.

Panel B reports evidence for the four components of the Sell Pressure index separately. Three of the components Late Seller, Last Exit, Lack of Reputation increase the sales price, at 1% and 10% level of significance, respectively, with t-statistics ranging from 1.75 (Last Exit) to 2.60 (Late Seller).

Infrequent Fundraiser is insignificant with a positive sign. The control variables exhibit unchanged coefficients and *t*-statistics (unreported).

6.2. Holding period of secondary exits

Strategic considerations of seller funds are likely to influence several aspects of the exit: the route (sale in SBO versus an alternative), the sale price and the timing. In this subsection we investigate the timing of the decision to exit via an SBO and how it depends on the Sell Pressure index. Exit timing can be synonymously understood as the duration, or holding period, of each deal in the portfolio. We hypothesize that, if selling pressure increases, the probability of an exit through SBO should increase, or, equivalently, the observed holding period of these deals should decrease.

Let τ represent the time elapsed in years since the PE fund's purchase of portfolio company i, and $k \in \{SBO, OTHER\}$ denote the available exit routes.[22] The hazard rate $h_k(\tau)$ is the probability that an exit of type k occurs at time τ, conditional on the fact that no exit occurred before τ. Our aim is to understand how our explanatory variables impact the hazard $h_k(\tau)$, but the latter is an unobserved latent variable that must be estimated using observed deal durations. We therefore create a panel of deal-year observations with the duration τ of each deal up to the current year. Deals remain in the dataset until an observed exit k^* occurs (as in the sample used in the previous subsection), or until the end of the sample period (for unexited deals by the time we stop collecting data). The latter correspond to right-censored observations, but estimating the model including those observations is important because they contain information about implicit choices of exit timing.[23]

Our estimation procedure employs a competing risks proportional-hazard duration model (Fine and Gray, 1999), which models the behavior of the hazard rate for our event of interest (an exit via SBO) in the presence of other possible 'competing' events such as trade sales, IPOs, etc. The following model is fitted using maximum likelihood:

$$h_{SBO}(\tau) = h_{SBO}^0(\tau) \times \exp\left(\delta_4 \times \text{Sell Pressure}_{i,\tau} + \gamma_4 X_{i,\tau}\right) \tag{4}$$

Several remarks about the model are in order. First, the set of explanatory variables includes both static controls (e.g., deal characteristics at the time of entry) and time-varying variables (e.g., the pressure indexes and variables related to market conditions). In particular, the Sell Pressure index changes over the life of the deal, making the model truly dynamic. As a portfolio company stays longer in the portfolio of a PE fund, the Sell Pressure index evolves according to the fund's history, dropping if the fund exits another portfolio company or manages to raise a new fund, and rising

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[22] The shorthand notation *OTHER* refers to non-SBO exits such as trade sales, IPOs, etc.
[23] Censoring is a common feature of duration analyses. Estimation is straightforward under the assumption that the censoring event is independent of the exit events (as it is the case here).

otherwise. Second, the quantity $h^0_{SBO}(\tau)$, which is not estimated, denotes the baseline hazard when all explanatory variables are set to zero. The interpretation of the model is thus made in terms of hazard ratios: a positive coefficient indicates that a one-unit change in a given variable increases the hazard rate relative to its baseline level, therefore making exit more likely (i.e., making the holding period shorter). Conversely, a negative coefficient indicates that a one-unit change in the explanatory variable decreases the hazard ratio and makes exit less likely (i.e., makes the holding period longer). Third, the model incorporates the presence of multiple exit choices, making it particularly adapted to our setting.[24]

Table 7 presents the estimated coefficients of the model. Column 1 of Table 7 shows that the probability of an SBO exit increases with our Sell Pressure index. A one-unit change in Sell Pressure increases the hazard rate by 8.9% relative to the baseline hazard, a statistically significant change at the 1% level (*t*-statistic 4.50).[25] Column 2 reports a coefficient with the same sign and strong significance (*t*-statistic 3.8) for the High Sell Pressure dummy. The coefficient implies that for funds with High Sell Pressure the hazard rate increases by 12.3%. Regarding other control variables, we find that deal size and recent LBO activity increase the likelihood of exit and lead to shorter expected conditional holding periods, while adverse market conditions (i.e. high credit spreads, low IPO activity) and public-to-private deals are associated with longer expected conditional holding periods (all coefficients significant at the 5% level).

In column 3, we address the history dependence of Sell Pressure. At the time of investment funds might differ in Sell Pressure, and Sell Pressure may rise or fall during the holding period. Although both the initial and final pressure matter for our story, a more stringent test of our theory would focus on the relation between changes in sell pressure and fund behavior. We therefore create two new variables. The first, *Sell Pressure at Entry*, is the value of the fund's Sell Pressure index at the time of the investment (that is, when $\tau = 0$). This variable is static in our regression model. The second variable, *Increase in Sell Pressure*, is a dummy variable that takes the value 1 if the value of Sell Pressure at time τ is higher than the value of Sell Pressure at Entry. This variable is dynamic because it changes over the lifetime of the deal. The results in column 3 show that both the initial value of Sell Pressure and its subsequent increase during the holding period increase the probability of

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[24] The competing risks model is most adapted to our setting for two reasons. First, standard duration analyses such as Kaplan-Meier assume that observations exited through competing events are censored observations. But this is incorrect, because if these observations were really censored, the event of interest *k* could presumably still occur in the future (it is just not observed). In reality the event of interest will never occur, because the exit occurred via a competing event. Second, although the Cox (1972) duration model can accommodate multiple exit types, the interpretation of its coefficients is rendered very difficult because the impact of an explanatory variable on the hazard rate of a given exit type *k* is a highly non-linear function of its impact on the hazard rates for all exit types, as well as of their respective baseline hazards. The competing risks model uses a concept known as a subhazard to overcome this issue and provides easily interpretable coefficients. See Cleves et al. (2010) for a discussion.

[25] The computation of comparative statics uses the fact that one unit of change in the independent variable changes the hazard ratio by $100 \times (e^{\beta} - 1)$ in percentage terms.

an SBO exit. Both coefficients are statistically significant at the 1% level. Results are, statistically speaking, slightly stronger for Increase in Sell Pressure, indicating that funds become more anxious to exit via SBO when their sell pressure increases.

Finally, one might wonder if the buy pressure faced by the GP at entry also plays a role in divesting the company faster. We therefore replace Sell Pressure at Entry with the value of the Buy Pressure index at the time of the purchase that we call *Buy Pressure at Entry*. The results in column 4 show that, although higher levels of Buy Pressure at Entry are associated with an increase in the hazard rate (coefficient 3%, *t*-stat. 1.75) and a decrease in holding periods, the coefficient of Increase in Sell Pressure is still positive and significant at the 1% level. We conclude that there is a strong relation between sell pressure of PE funds and the holding period of investments exited via SBOs, consistent with our hypotheses.

6.3. Valuation of secondary buyout exits

Our empirical analysis provides evidence that the Sell Pressure index is associated with higher likelihood for secondary deals by PE funds. Next we investigate the relation between sell pressure of PE funds and deal pricing. We run the following regression model:

$$XSMULT_i^{EXIT} = \alpha_5 + \delta_5 \times \text{Sell Pressure}_i + \beta_5 \times \text{Sell Pressure}_i \times D_i^{SECEXIT} + \phi_5 \times D_i^{SECEXIT} + \gamma_5 X_i + \varepsilon_i$$

(5)

The dependent variable $XSMULT^{EXIT}$ is a measure of valuation at the time of the exit using Sales as the basis of the excess multiple. $D^{SECEXIT}$ is an indicator variable that takes value 1 if the LBO is exited through a sale to another PE fund and 0 otherwise. The matrix **X** includes control variables measured at the time of exit, as in Section 6.1, and we also replace TEV (part of the multiple) with an instrument for deal size, represented by Buyer Size. All specifications include industry dummies, year dummies, and year-clustered standard errors.

The regression results are reported in Table 8. As before, the variable of interest is the interaction term Sell Pressure $\times D^{SECEXIT}$. In Column 1 the coefficient β_5 of this interaction is negative and clearly significant at 1% in Panel A (coefficient -0.324, *t*-statistic -4.22). These findings highlight that Sell Pressure has a negative impact on the transaction price as stipulated in our theoretical argument. Taking the difference between coefficients and multiplying by a one standard deviation shock of 0.795 in Sell Pressure, we obtain a change of 0.249 in Excess Sales Multiple, equivalent to a decrease of 13.7% of the sample average of Sales Multiple at exit (1.82 from Table 1). Column 2 shows comparable results for the High Sell Pressure index. In Column 3, the Sell Pressure index is decomposed into three level dummy variables demonstrating a monotonic increase in coefficients

throughout. Finally, column 4 shows that our results are robust to the inclusion of PE firm fixed effects.

In Panel B of Table 8 we analyze the four individual components of the Sell Pressure index in columns 1 through 4. The interaction terms of interest are statistically significant for each component in the panel. This is important to alleviate the possible concern that our result would be mostly due to aging sellers that receive lower multiples in late SBO exits due to strategic delay of low-value exits (Robinson and Sensoy, 2013a). Although this effect is probably present, the overall results regarding pressure and its components indicate a more complex story consistent with our hypotheses.

We conclude that within the set of secondary exits the pressure to exit depresses valuations in secondary deals. An increase of the Sell Pressure index helps to explain a change in the deal price of similar magnitude but opposite sign to that of the Buy Pressure index.[26]

7. Buy pressure and sell pressure: which effect dominates?

Our empirical analysis documents that buyers under pressure are more likely to engage in SBOs and pay higher prices for such deals. We also find that sellers under pressure are more likely to exit at lower multiples via secondary sale. The adverse price effect of both buy and sell pressure in SBOs raises two interesting questions. The first question is whether the same PE firms repeatedly transact with one another to relieve each other's pressure, which would be a form of collusion among PE firms.[27] The second question is about what happens to transaction prices if equally pressured parties meet. Would the pressure on each side offset each other, or would one side of the trade systematically have the upper hand?

To answer the first question, we check for evidence of assortative matching between buyers and sellers according to their pressure. In the set of transactions for which we can identify both buyer and seller, the correlation between the Buy and Sell Pressure indexes is -1% and statistically indistinguishable from zero. High-pressured sellers match with high-pressured buyers in only 8% of deals, and these matches represent about 16% of deals made by High Buy Pressure buyers and less than a third of the deals made by High Sell Pressure sellers.

The lack of evidence for deliberate matching extends to matches between any two pair of funds, independent of pressure. Following Wang (2012), we look at "two-way" SBOs involving a buyer and a seller that previously did a deal in reverse roles. In our sample 5.2% out of the 1,593 SBOs are two-way deals, compared with 2.4% in Wang's sample (which is restricted to the U.K.

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[26] Results using Excess EBITDA Multiple are similar to those reported here and are available upon request. Results are also unchanged if we use TEV or Target Sales as a control for size.

[27] See also Officer, Ozbas, and Sensoy (2010). Quid-pro-quo deals can be seen as a form of fund cross-subsidization which has been found in other settings (e.g., Gaspar, Massa, and Matos, 2006).

market and to a shorter time interval). Moreover, a dummy variable indicating a two-way SBO is uncorrelated with our measures of deal pressure and is never significant in any of our regressions (results not reported). We therefore corroborate Wang's conclusion about the absence of collusion among PE funds involved in SBOs. While the lack of evidence of quid pro quo among PE funds does not imply that such transactions do not occur, it is unlikely that they are an important driver of SBO activity or SBO outcomes.

To answer the second question, we estimate a model for the valuation of secondary LBOs within the subsample of exits for which we have information about buyers' status, sellers' status, and deal valuations. We include as explanatory variables our Buy Pressure and Selling Pressure indexes simultaneously, as well as the control variables used in Section 6.2 above.

The results are displayed in Table 9. In column 1, we include the Buy Pressure and Sell Pressure indexes on the sample of SBO deals in which we can identify both parties. There is a positive relation between the Buy Pressure index and the deal price, statistically significant at the 1% level, and a negative relation between the Sell Pressure index and the deal price, albeit only at 10% of significance. In columns 2 and 3, we interact each pressure index (for buyers in column 2 and for sellers in column 3) with the dummy variables of high and low pressure of the counterparty (respectively, sellers in column 2 and buyers in column 3). We find that when a highly pressured PE fund is matched with a less pressured counterparty, the low-pressure counterparty has the bargaining power and moves the price in its favor. For example, the interaction Buyer Pressure × Low Sell Pressure has a positive and significant coefficient (0.219, t-statistic 4.30) indicating that the highly pressured buyers trade at higher prices particularly when the GP faces a low pressure seller. The converse is also true (coefficient of Seller Pressure × Low Buy Pressure negative and significant coefficient at the 1% level). When both parties face high pressure, their bargaining power is equal and neither has an impact on the transaction multiple.

These results are confirmed in column 4 where the high/low pressure dummies are interacted for each of the counterparties to represent all possible pressure outcome pairs (High Buy Pressure × High Sell Pressure, High Buy Pressure × Low Sell Pressure, etc.). The base omitted category is Low Buy Pressure × Low Sell Pressure. Again, we find that the difference in the relative bargaining power of the parties determines the relation between buy/sell pressure and deal prices. The magnitude of the coefficients and the relatively weaker statistical significance of Sell Pressure in column 1 indicate that seller funds are in somewhat stronger bargaining position relative to buyer funds.

8. Buy pressure, leverage, and syndication

8.1. Buy pressure and leverage in secondary deals

We document that PE funds under buy pressure are more likely to engage in SBOs and when they do, they pay higher valuation multiples. To further investigate the motives of these funds, we now focus on the relation between buy pressure and deal leverage in secondary transactions.

Concerning secondary deals, on the supply side lenders face lower information costs for companies that are already LBO targets, and are presumably willing to lend more to firms that were able to carry more debt than in their first LBO. Moreover, secondary deals are often considered less risky, and as such, they can support a higher debt load. On the demand side, as shown in Axelson et al. (2012), Bonini (2012), Wang (2012), and Achleitner et al. (2012), SBO activity is generally high when debt financing costs are low. In addition, if secondary deals demand higher multiples because they are less risky, these deals would be expected to have even higher debt capacity. For these reasons, one would predict that secondary deals would be more levered on average. Interestingly, however, existing evidence on deal leverage of SBOs is at best mixed. Among the previous papers investigating SBOs, only Achleitner and Figge (2011) document higher leverage in SBOs whereas Bonini (2012) and Wang (2012) report lower leverage.

If, however, the motive for engaging in secondary deals is the buy pressure of PE funds, then one would expect to find a negative relation between buy pressure and deal leverage. Pressured buyer funds would be eager to put their capital to use and prefer to execute a deal with spending more of their equity than other PE buyers. For these funds, the opportunity cost of doing so is lower because their primary motive for completing the deal is to use their dry powder and secure management fees.

To decide between these competing hypotheses, we investigate the relation between deal pressure and deal leverage for secondary deals. We use three different leverage metrics: the ratio of senior debt to enterprise value at the onset of an LBO deal, the ratio of debt to EBITDA, and the ratio of debt to total assets. Information on senior debt, defined as the sum of all term debt facilities used in the deal, is obtained from multiple sources including Capital IQ, DealScan, Dealogic, and company filings in the case of public-to-private deals.

Columns 1 to 3 in Table 10 report the results for each of the three different leverage ratios. Our main variable of interest is the interaction term Secondary × Buy Pressure. It is negative and statistically significant for all three leverage variables, with t-statistics ranging from -1.69 to -2.12. This evidence provides support for the agency view that secondary deals by pressured buyers are aimed at spending the fund's dry powder rather than maximize their LP returns. By contrast, our Buy Pressure index alone is not significant in the regressions suggesting that in primary deals Buy Pressure

does not have significant explanatory power for deal leverage. In our sample, secondary LBOs have somewhat higher debt levels than other deals (the coefficient for Secondary is positive and statistically significant in two of the three equations), as expected from the supply side forces at play.

8.2. Buy pressure and syndication in secondary deals

After documenting that buy-pressured funds are more likely to engage in SBOs and when they do, pay higher prices and use less leverage, we focus on the relation between buy pressure and deal syndication. If pressured PE funds invest to lock in management fees and reduce their unspent capital, they should prefer to spend more of their own equity in the SBOs rather than share the deal. Funds under buy pressure should be less likely to syndicate their SBOs, or be inclined to form smaller syndicates with higher deal value per syndicate members. On the other hand, if PE funds are motivated by efficiency considerations, then the equity that they commit to individual deals should be determined by deal and firm characteristics, or other industry or macro-level variables. Since secondary deals are typically larger than primary deals, one would expect in this case that SBO syndicates are not significantly smaller than syndicates for other deal types.

Our empirical analysis utilizes three measures of syndication: an indicator variable if the deal is syndicated (involves more than one buyer); the size of the syndicate, that is, the number of syndicate members involved in the acquisition; and the deal value per syndicate member, that is, the imputed equity value of the deal divided by the number of buyers. Columns 1 to 3 in Table 11 report the results for each of the three different measures of syndication. Regarding the control variables, larger deals and deals with management participation are positively related to all measures of syndication. Affiliated funds also seem to engage in syndicated deals more often.

Our main variable of interest is the interaction term Secondary × Buy Pressure. It is negative and statistically significant for syndicate size at the 5% level (with *t*-statistics -2.3), positive and statistically significant for value per syndicate member at the 5% level (with *t*-statistics 2.31), and negative but not statistically significant for likelihood of syndication. The signs of all three coefficients are in line with the agency view that PE funds under pressure are motivated primarily by spending their own equity in SBOs.

9. Performance results

9.1. Buy pressure and fund performance

Our analysis provides strong evidence that funds under buy pressure are more likely to invest in SBOs, pay higher valuation multiples, use lower leverage and rely less on syndicate finance. However, we cannot yet assess the value of these transactions for investors. Deals would ultimately benefit investors if pressured funds pay higher multiples in secondary buyouts but are able to sell these companies at even higher multiples when they exit. Therefore, we investigate the effect of SBO activity under buy pressure on fund performance.

We explore this issue by collecting fund-level performance data from Preqin. After making sure we can obtain the variables required for our analysis, we are left with a sample of 281 funds. We use two metrics for PE fund performance, both commonly used in the industry: the fund's internal rate of return (IRR); and the Multiple (the money-on-money multiple of the fund's equity distributed upon deal exits relative to the equity committed when the fund made investments). To avoid the influence of extreme winners or losers, we compute the percentile rank of each fund in terms of IRR and Multiple, and also use those as dependent variables. Our specification and set of controls originate in the literature on PE performance (e.g., Kaplan and Schoar, 2005). We control for, among other things: the fund's size and sequence; whether the fund family is highly reputable, that is, it appears in the Top 50 list of the Private Equity International magazine (e.g. Demiroglu and James, 2010); and whether the firm is specialized in deals of a certain size or industry as in Section 5.3. The specification also uses vintage dummies to control for differences in performance across fund vintages.

Table 12 presents our findings, with each column showing results using a different performance metric as dependent variable. In Panel A, the main explanatory variable of interest is Average Buy Pressure, the mean value of the PE fund's Buy Pressure index over the life of the fund. The table shows that in all cases this variable is negatively related to fund performance, statistically significant in 3 out of 4 cases: at the 5% level (IRR and Multiple) and at the 10% level (Multiple rank). In terms of comparative statics, the coefficients indicate that a one standard-deviation increase in Average Buy Pressure (0.8 in this sample) explains a decrease in IRR of about 2%. This indicates that investment decisions under pressure seem to be associated with weaker fund performance.

However, our story is not about pressure per se but specifically whether SBOs under pressure and their frequency is associated with inferior investments and lower performance. To address this issue, we introduce two further variables in the analysis: the value-weighted percentage of secondary deals made by the buyer, denoted *Percentage SBOs*; and an interaction term of our two variables of interest, Percentage SBOs×Average Buy Pressure. Panel B of Table 12 shows the results. First, we find that Percentage SBOs has a positive and statistically significant loading in 3 out of our 4

specifications. This indicates that SBOs seem to be associated with positive rather than negative fund performance.

Secondly, and more importantly for our purposes, we find that the interaction term Percentage SBOs×Average Buy Pressure is negative and significant in all specifications, while the coefficient of Average Buy Pressure is negative but no longer significant at conventional levels. This result indicates that the negative effect of pressure is mostly associated with SBO investments. To gauge the magnitude of the effect, if we take the sample average of secondary deals made by these buyers (14.9%) and compute the marginal effect of Average Buy Pressure using the interaction specification, we find that the effect of Average Buy Pressure on performance roughly doubles.[28] In other words, SBOs explain around 50% of the negative relation between Buy Pressure and performance, and this fraction is the one that seems statistically most significant.

While we cannot exclude the possibility that some unobservable factors influence these results, these findings, along with those reported in the rest of the paper, provide joint evidence that funds taking decisions under pressure and choosing the path of least resistance by doing SBO deals exhibit weaker performance than other funds.

9.2. Pressure and deal-level performance

To further investigate the relation between fund pressure and performance, we perform a deal-level analysis of the value created by SBOs under pressure. As a proxy for a deal's IRR we compute the growth rate in the target's enterprise value from entry to exit as follows:

$$\text{Growth rate of TEV} = (\text{TEV}_T / \text{TEV}_0)^{(1/T)} - 1,$$

where T denotes the holding period of the deal, and TEV_T (TEV_0) is the total enterprise value at the time of exit (entry). This measure is obviously only an approximation for the investor IRR, since we do not observe the fund's equity contribution, the exit equity value, or any intermediate cash flows.[29] The number of observations in this test is lower than in other regression specifications because of the need for enterprise values at both ends of the deal.

In addition to absolute performance, we measure relative performance in two distinct ways. First, we measure a deal's relative performance by computing its percentile rank in terms of Growth Rate of TEV among all deals made in the same decade and in the same geographical area (we use decade and not year to create our benchmarks due to the relatively small sample size). We call this

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[28] The marginal effect of Average Buy Pressure for (say) IRR for the average buyer in terms of percentage of SBOs in its portfolio would be -1.473 + (-8.744×0.149) = -2.775, or roughly the double of the base coefficient Average Buy Pressure.

[29] We focus on the IRR of enterprise value rather than of equity return because of a lack of suitable capital structure data for a majority of deals. Since deal leverage is lower in SBOs under pressure, the wedge between the growth rate of TEV and the investor IRR is likely to be smaller for SBOs under pressure than for other SBOs.

variable Deal Rank. Secondly, we measure relative performance with respect to deals made by the same buyer. This variable, which we call Within-Buyer Deal Rank, is the percentile rank of a deal among all deals made by the same fund family in the same decade. We then replicate our deal pricing regressions using these three measures of performance as dependent variables.

Results are shown in Panel A and B of Table 13. Across both panels, column 1 uses the Growth Rate of TEV as dependent variable, while columns 2 and 3 show results using the overall Deal Rank and the Within-Buyer Deal Rank, respectively, as dependent variable.

Panel A displays results for the specification in which the secondary and buy pressure variables are measured at the time of entry by the fund. Column 1 shows that the interaction of Secondary $\times$ Buy Pressure is negative and significant at the 10% level (coefficient -.09, t-statistic -1.79). The same coefficient is negative but not statistically significant in column 2 (t-statistic -0.78), while it is negative and significant for the Within-Buyer Deal Rank regression (t-statistic -1.79). Across all specifications, neither the Secondary variable, nor the Buy Pressure Index is significant, indicating that it is the conjunction of pressure and the secondary nature of the deal that is associated with lower performance. We also find that Buyer Size is negatively related to value creation.

Panel B displays the results for the specification with variables measured at the time of the exit of the fund. The panel shows that secondary *exits* made under Sell Pressure have lower growth rate in TEV, both on an absolute and a relative basis. The interaction of Secondary Exit $\times$ Sell Pressure is negative and significant at the 5% level in columns 1 and 3, and negative and significant at the 10% level in column 2. It is worth noting that in this regression the dummy variable Secondary Exit is positive and significant, indicating that secondary exits are generally associated with higher TEV growth. The Secondary dummy (indicating that the deal itself, not the exit, is an SBO) is statistically insignificant.

Taken together, our evidence suggests that, for both buyers (Panel A) and sellers (Panel B), SBOs executed under pressure underperform. Note that exit through an SBO seems to be associated with higher returns, so at least for a seller fund that manages to pass on the company to another fund, an SBO exit makes sense. Nevertheless, SBO deals *under pressure* appear to be associated with lower value creation for both buyers and sellers.

One noteworthy aspect of our deal-level evidence is that the results for Sell Pressure are statistically stronger than the results for Buy Pressure. One possible explanation could be that funds buying firms under pressure still have time to "undo", or "turn around" the effects of possible overpayment. For sellers, the IRR of the deal is determined solely by the exit type and exit price, so there is no recourse once the sale is concluded.

In unreported results, we look at the impact of deal pressure on the likelihood of exit routes that are typically considered as indicators of success, such as an IPO or a trade sale. We find that Buy

Pressure does not seem to have an impact on the likelihood of a successful exit, while Sell Pressure has a negative and statistically significant loading on both the joint and the individual likelihood of exiting through IPO or M&A. This result confirms that pressured sellers are more likely to follow less successful exit routes. Since our evidence shows that they receive a lower price from SBO exits, these effects explain the negative impact on deal-level performance of selling pressure. These findings further suggest that in the case of pressured buyers, the reasons for deal underperformance seem related to overvaluation at the time of the SBO acquisition (and possibly the use of lower leverage), rather than due to a less successful exit route at the time of the sale.

In conclusion, our deal-level performance results suggest that deals done under pressure generate less value than deals without pressure, using both absolute and relative measures of performance available in our data. This is true both when buyers are under pressure and when sellers are under pressure, and particularly so in the case of the latter.

10. Endogeneity issues

In most studies on the behavior of PE funds or financial intermediaries, endogeneity is an important concern as the econometric relations might be driven by unobserved hidden variables. For example, regarding the result that secondary buyouts typically have higher valuations (Wang, 2012), a potential concern is that some funds could have a simultaneous preference for secondary buyouts and for relatively expensive deals, and hence be spuriously identified as willing to invest in SBOs and pay relatively high prices. As another example, suppose that secondary buyouts involve companies that are less risky, and hence command higher prices. Then the link between value and SBO would not be causal but would reflect unobserved GP or company characteristics.

We cannot rule out this scenario, but we point out that our research design addresses many of these concerns. First, we do not explain SBO activity per se, but only its relation to our measures of incentive distortions. Our Buy Pressure and Sell Pressure indexes are time-varying and in our data the same GP is typically present in deals with and without pressure. This reduces the possible impact of unobservable fund-level characteristics on our relation of interest. Similarly, even though certain companies might be preferred in SBOs, there is little reason to believe that they are systematically different in SBOs under pressure compared with SBOs without pressure. We also use in our specifications a large number of control variables capturing a wide array of portfolio company characteristics, fund characteristics, and market conditions. We find that these covariates, while often significant, do not alter the relation between our variables of interest.

Second, and more importantly, throughout the analysis we include PE firm fixed effects, taking advantage of the panel nature of our data. These fixed effects should be able to pick up any

endogeneity that arises from underlying unobservable firm-level characteristics jointly generating the relations explored in this paper. Our findings are robust to the inclusion of these fixed effects and the significance level of our covariates of interest rarely weakens.[30]

Third, the analysis of Section 7 exploits the fact that each SBO has two PE equity funds as counterparties, both of which could potentially be under pressure. Focusing on our valuation relations (this analysis cannot be done for the logit regressions), we look at the pressure index "on the other side" of the deal by controlling for the pressure index "on this side" of deal. We find no evidence in favor of assortative matching between sellers and buyers according to their pressure status, or between any particular buyer and seller that might be colluding with each other. This makes the test a valid test in the sense that the match with a pressured counterparty is a reasonably exogenous event. In other words, in an SBO the probability that a buyer is under pressure seems to be orthogonal to the probability that the seller is under pressure. Therefore, we isolate the impact of the pressure index of the deal counterparty as a reasonably exogenous variation that should be orthogonal to the characteristics of the PE firm and the portfolio company. Our results are confirmed when the pressure index is considered on the counterparty side (Table 9, columns 2 and 3). Thus, the impact of the randomly drawn pressure index of the counterparty should be much less concern for endogeneity.

Finally, the results of our multi-pronged investigation systematically point at the presence of agency costs in PE contracting and investments. Our joint results on investment and exit decisions, deal valuation, and deal terms are difficult to rationalize by possible hidden unobservables.

11. Conclusion

This paper investigates the private equity contract's impact on the investment decisions and exit outcomes of funds. We focus on secondary buyouts, an increasingly important and growing segment of the LBO market. We investigate to what extent these deals are motivated by efficiency considerations or opportunistic behavior induced by the PE contract. We stipulate that contract incentives induce some PE funds' to engage in secondary deals, and impact valuation multiples, deal leverage, and syndicate size. We develop Buy Pressure and Sell Pressure indexes that reflect the end of a fund's investment period/life, its unspent capital/deal inactivity, its reputation, and how often its fund family raises funds from investors.

Using a sample of 9,575 U.S. and European LBO deals, we find strong evidence that pressured buyers and sellers are more likely to engage in SBOs. Participation of a pressured seller (buyer) moves the transaction multiple significantly lower (higher) even after controlling for market

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[30] Note that fixed effects in some of our specifications drastically reduce the degrees of freedom. In the valuation regressions, the ratio of the number of observations to the number of GPs is rather low (less than two). The use of GP fixed effects might thus represent a case of over fitting. Nevertheless we choose to document it to address endogeneity issues.

conditions and firm characteristics. We document that the difference in pressure between buyers and sellers in secondary deals is associated with the two parties' relative bargaining power and the acquisition price.

We also find that pressured buyers use less leverage and rely on smaller deal financing syndicates. Finally, we report that funds with higher average buy pressure that engage in secondary activity have lower IRR and return multiple over the life of the fund. The available deal-level evidence also supports the notion that SBO deals made or exited under pressure are associated with lower value creation.

By providing an in-depth analysis of the relation between incentives given by PE contractual provisions and deal types, deal prices, and deal terms, our paper contributes to the literature on PE investments, as well as to the literature on agency conflicts between fund managers and investors. We show how positive incentives early in a fund's life turn into adverse incentives later, corroborating the notion that agency costs are inevitable even in a sophisticated contractual environment like private equity (Robinson and Sensoy, 2013a). Our findings should also have implications for investment and exit decisions in other segments of the ever-growing fund management industry. The more illiquid the asset base of a fund, the more likely should be the occurrence of the agency-driven effects that we document for the case of secondary buyouts.

References

Acharya, V., O. Gottschalg, M. Hahn and C. Kehoe, 2013. Corporate governance and value creation: evidence from private equity. Review of Financial Studies, 26, 368-402.

Achleitner, A., O. Bauer, C. Figge and E. Lutz., 2012. Exit of last resort? Empirical evidence on the returns and drivers of secondary buyouts as private equity exit. Mimeo, Center for Entrepreneurial and Financial Studies (CEFS), TUM Business School.

Achleitner, A. and C. Figge, 2011. Private equity lemons? Evidence on value creation in secondary buyouts. Mimeo, Center for Entrepreneurial and Financial Studies (CEFS), TUM Business School.

Axelson, U., T. Jenkinson, P. Strömberg, and M. Weisbach, 2013. Borrow cheaply, buy high? Determinants of leverage and pricing in buyouts. Journal of Finance 68, 2221-2265.

Axelson, U., P. Strömberg, and M. Weisbach, 2009. Why are buyouts levered? The financial structure of private equity funds. Journal of Finance, 64, 1549-1582.

Barrot, J.-N., 2012. Investor horizon and innovation: evidence from private equity funds. Mimeo, MIT Sloan.

Berk, J.B. and R.C. Green, 2004. Mutual fund flows and performance in rational markets. Journal of Political Economy, 112(6), 1269-1295.

Boucly, Q., D. Sraer and D. Thesmar, 2011. Growth LBOs. Journal of Financial Economics, 102, 432-453.

Bonini, S., 2012. Secondary buyouts. Mimeo, Department of Finance, Bocconi University.

Brown, G. W., O. R. Gredil and S. N. Kaplan, 2013. Do private equity funds game returns? Mimeo.

Chung, J.-W., 2010. Leveraged buyouts of private companies. Ohio State University working paper.

Chung, J.-W., B. Sensoy, L. Stern and M. Weisbach, 2012. Pay for Performance from Future Fund Flows: The Case of Private Equity. Review of Financial Studies 25, 3259-3304.

Cleves, M., W. Gould, R. Gutierrez, and Y. Marchenko, 2010. An introduction to survival analysis using Stata (3rd ed.). College Station, TX: Stata Press.

Cornelli, F., and O. Yosha, 2003. Stage financing and the role of convertible securities. Review of Economic Studies 70, 1-32.

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

Cox, D., 1972. Regression models and life-tables. Journal of the Royal Statistical Society, Series B 34: 187–220.

Degeorge, F., J. Martin and L. Phalippou, 2013. Is the rise of secondary buyouts good news for investors? Mimeo, University of Lugano.

Demiroglu C., and C. James, 2010. The role of private equity group reputation in LBO financing. Journal of Financial Economics, 96, 306-330.

Dow, J. and G. Gorton, 1997. Noise trading, delegated portfolio management, and economic welfare. Journal of Political Economy, 105, 1024-1050.

Fine J. and R. Gray, 1999. A proportional hazards model for the subdistribution of a competing risk. Journal of the American Statistical Association 94, 496-509.

Franzoni, F., E. Nowak, and L. Phalippou, 2012. Private equity performance and liquidity risk. Journal of Finance 67, 2341-2373.

Gaspar, J.-M., M. Massa and P. Matos, 2006. Favoritism in mutual fund families? Evidence on strategic cross-fund subsidization. Journal of Finance 61, 73-104.

Gompers, P., 1996. Grandstanding in the venture capital industry. Journal of Financial Economics 42, 133-156.

Guo, S., E. S. Hotchkiss, and W. Song, 2011. Do buyouts (still) create value? Journal of Finance 66, 479-517.

Harris, R.S., T. Jenkinson and S. N. Kaplan, 2013. Private equity performance: what do we know? Journal of Finance, forthcoming.

Hotchkiss, E., D. Smith and P. Stromberg, 2012. Private equity and the resolution of financial distress. ECGI working paper.

Jenkinson, T., M. Sousa, and R. Stucke, 2013. How fair are the valuations of private equity funds? Oxford University Working Paper.

Jensen, M., 1986. Agency costs of free cash-flow, corporate finance and takeovers. American Economic Review, 76, 323-329.

Jensen, M., and W. Meckling, 1976. Theory of the firm: managerial behavior, agency costs and ownership structure. Journal of Financial Economics 3, 305-360.

Jenkinson, T., and M. Sousa, 2011. Keep taking the private equity medicine? Mimeo, Said Business School, University of Oxford.

Jenkinson, T., and M. Sousa, 2012. Why do private equity firms sell to each other? Mimeo, Said Business School, University of Oxford.

Kandel, E., D. Leshchinskii and H. Yuklea, 2011. VC funds: aging brings myopia. Journal of Financial and Quantitative Analysis, 46, 431-457.

Kaplan S. N., 1989a. The effects of management buyouts on operating performance and value. Journal of Financial Economics 24 217-254.

Kaplan S. N., 1989b. Management buyouts: Evidence on taxes as source of value. Journal of Finance 44, 611-632.

Kaplan, S. N., and A. Schoar, 2005. Private equity returns: persistence and capital flows. Journal of Finance 60, 1791-1823.

Kaplan S., and J. Stein, 1993. The evolution of buyout pricing and financial structure in the 1980s. Quarterly Journal of Economics 108, 313-357.

Ljungqvist, A., M. Richardson, and D. Wolfenzon, 2008. The investment behavior of buyout funds: theory and evidence. NBER Working Paper No. W14180.

Metrick, A., and A. Yasuda, 2010. The economics of private equity funds. Review of Financial Studies 23, 2303-2341.

Officer, M., O. Ozbas and B. Sensoy, 2010. Club deals in leveraged buyouts. Journal of Financial Economics, 98, 214-240.

Phalippou, L. and O. Gottschalg, 2009. The performance of private equity funds. Review of Financial Studies, 22, 1747-1776.

Robinson, D. T. and B. A. Sensoy, 2013a. Do private equity fund managers earn their fees? Compensation, ownership and cash flow performance. Review of Financial Studies, 26, 2760-2797.

Robinson, D. T. and B. A. Sensoy, 2013b. Cyclicality, performance measurement, and cash flow liquidity in Private Equity. Working Paper, Ohio State University.

Schlingemann, F., R. Stulz, R. Walkling, 2002. Divestitures and the liquidity of the market for corporate assets. Journal of Financial Economics 64, 117–144.

Sensoy, B., Y. Wang and M. Weisbach, 2013. Limited partner performance and the maturing of the private equity industry. Journal of Financial Economics, forthcoming.

Smith, A., 1990. Corporate ownership structure and performance: the case of management buyouts. Journal of Financial Economics 27 143-164.

Strömberg, P., 2008. The new demography of private equity. World Economic Forum: The Global Economic Impact of Private Equity Report.

Wang, Y., 2012. Secondary buyouts: why buy and at what price? Journal of Corporate Finance 18, 1306-1325.

Table 1
Summary Statistics

This table presents summary statistics for the sample used in this study. Panel A presents the summary statistics data for our deal-entry panel. Main variables are defined as follows (for other variables please see Appendix B). Secondary is an indicator variable with value 1 if the seller in a deal is a PE fund. Imputed TEV is the sum of the target's equity market value valued at the LBO offer price and the target's net debt. For transactions without deal value information, we compute an estimate of it using the methodology of Stromberg (2008). Buy Pressure is the sum of variables Dry Powder, Late Buyer, Lack of Reputation, and Infrequent Fund Raiser. Dry Powder equals 1 if the buyer is above median in terms of fund raising, and below median in terms of deal activity (see Appendix B for details). Late Buyer equals 1 if the buyer's most recent fund at the time of the deal is at the end of its investment period (4 to 6 years after inception). Lack of Reputation equals 1 if the buyer is below the 75th percentile in terms of rank of value-weighted market share, computed using all deals made from 1980 up to deal year. Infrequent Fund Raiser equals 1 if the buyer's average time between fund raisings is more than 3 years. Panel B presents variables related to measure valuation of the deal at the time of entry. Sales Multiple is the ratio between TEV and latest available yearly sales for the target firm at the time of the LBO. These variables only take non-missing values when deal value is known. Excess Sales Multiple is the difference between the target's Sales Multiple and a valuation benchmark constructed as a follows. For every year, geography (U.S. versus Europe), industry (Fama-French 12-industry classification) and public status (public or private), we compute the median sales multiple for all merger transactions with value larger than 1 million dollars involving a majority stake over the previous two years relative to the date of the LBO. Panel C describes characteristics at the time of exit. Secondary Exit is equal to 1 if the exit route of the LBO is a sale to another PE fund or group of PE funds. Add-ons equals 1 if there were significant acquisitions during the time that the buyer held the target firm in its portfolio. Stage is the number of years elapsed since fund raising for the youngest fund in the PE fund family whose investment period overlaps with the LBO deal date (that is, whose deal date falls within years 1 through 6 of the lifetime of the fund). Sell Pressure is the sum of variables Last Exit, Late Seller, Lack of Reputation, and Infrequent Fund Raiser. Last Exit equals 1 if three or more years have elapsed since the PE fund family last exited an LBO deal. Late Seller equals 1 if the sale takes place in years 9 or 10 of the PE fund family's oldest active fund (i.e. less than 11 years old). Panel D describes the valuation variables at the time of exit. All monetary values are measured in real December 2010 U.S. dollars, after conversion at historical exchange rates.

Panel A. LBO characteristics						
Variable	N	Mean	Std. Dev.	Q1	Median	Q3
Secondary	9,575	0.166	0.372	0	0	0
Imputed TEV	9,575	277.0	1280.4	41.7	87.1	184.9
Mgmt. participation	9,575	0.441	0.497	0	0	1
U.S. target	9,575	0.507	0.500	0	1	1
HY Spread	9,575	3.81	2.06	2.38	3.03	4.55
Cold IPO Market	9,575	0.520	0.500	0	1	1
Buy Pressure	9,575	1.391	0.980	1	1	2
High Buy Pressure	9,575	0.411	0.492	0	0	1
Dry Powder	9,575	0.229	0.420	0	0	0
Late Buyer	9,575	0.215	0.411	0	0	0
Lack of Reputation	9,575	0.695	0.460	0	1	1
Infrequent Fund Raiser	9,575	0.252	0.434	0	0	1
Affiliated	9,575	0.200	0.400	0	0	0
Novice	9,575	0.506	0.500	0	1	1
Divisional	9,575	0.194	0.396	0	0	0
Financial seller	9,575	0.055	0.228	0	0	0
Public to private	9,575	0.050	0.217	0	0	0
Private to private	9,575	0.535	0.499	0	1	1

Panel B. LBO Valuation at Entry						
Variable	N	Mean	Std. Dev.	Q1	Median	Q3
TEV	1,373	885.8	2790.5	59.7	207.5	689.2
Sales Multiple	1,373	1.36	1.16	0.59	1.02	1.73
Excess Sales Multiple	1,373	0.25	1.09	-0.40	0.02	0.65

Panel C. LBO characteristics at Exit						
Variable	N	Mean	Std. Dev.	Q1	Median	Q3
Secondary Exit	4,139	0.295	0.456	0	0	1
Add-ons	4,139	0.112	0.316	0	0	0
Stage	4,139	2.309	1.344	1	2	3
HY Spread	4,139	3.76	2.18	2.35	2.92	4.55
Cold IPO Market	4,139	0.560	0.496	0	1	1
Sell Pressure	4,139	1.202	0.795	1	1	2
High Sell Pressure	4,139	0.299	0.458	0	0	1
Last Exit	4,139	0.125	0.331	0	0	0
Late Seller	4,139	0.101	0.302	0	0	0
Lack of Reputation	4,139	0.767	0.423	1	1	1
Infrequent Fund Raiser	4,139	0.208	0.406	0	0	0
Affiliated	4,139	0.185	0.388	0	0	0
Novice	4,139	0.375	0.484	0	0	1
Down Exit	4,139	0.101	0.301	0	0	0
M&A Exit	4,139	0.477	0.500	0	0	1
IPO Exit	4,139	0.128	0.334	0	0	0

Panel D. LBO Valuation at Exit						
Variable	N	Mean	Std. Dev.	Q1	Median	Q3
TEV	1,090	819.2	1680.0	106.3	316.4	832.6
Sales Multiple	1,090	1.82	1.47	0.83	1.44	2.36
Excess Sales Multiple	1,090	0.73	1.33	-0.13	0.41	1.24

Table 2
Univariate Comparisons: Secondary Deals vs. Non-Secondary Deals

This table presents univariate tests of significance of LBO characteristics and valuation between Secondary and Non-secondary deals. A LBO deal is defined as Secondary if the seller in the deal is a PE fund and non-secondary otherwise. Panel A presents the tests for our entry panel. Panel B presents the variables used to measure valuation of the deal at the time of entry. All variables are defined in Appendix B. All monetary values are measured in real December 2010 U.S. dollars, after conversion at historical exchange, rates. *t*-tests for differences in means and medians are reported (where applicable), and the symbols ***, **, * denote significance at 1%, 5% and 10% respectively.

Panel A. Univariate Comparisons: LBO characteristics								
	Secondary Deals			Non-secondary Deals				
Variable	N	Mean	Median	N	Mean		Median	
Imputed TEV	1,593	362.1	212.0	7,982	260.0	***	74.2	***
Mgmt. participation	1,593	0.504	1	7,982	0.429	***	0	
U.S. target	1,593	0.471	0	7,982	0.514	***	1	
HY Spread	1,593	3.49	2.83	7,982	3.87	***	3.21	***
Cold IPO Market	1,593	0.587	1	7,982	0.506	***	1	
Dry Powder	1,593	0.262	0	7,982	0.223	***	0	
Late Buyer	1,593	0.239	0	7,982	0.210	***	0	
Lack of Reputation	1,593	0.698	1	7,982	0.695		1	
Infrequent Fund Raiser	1,593	0.271	0	7,982	0.248	**	0	
Buy Pressure	1,593	1.470	1	7,982	1.375	***	1	
High Buy Pressure	1,593	0.451	0	7,982	0.403	***	0	
Affiliated	1,593	0.234	0	7,982	0.193	***	0	
Novice	1,593	0.401	0	7,982	0.527	***	1	

Panel B. Univariate Comparisons: LBO Valuation at Entry								
	Secondary Deals			Non-secondary Deals				
Variable	N	Mean	Median	N	Mean		Median	
TEV	333	652.4	332.6	1,039	960.6	*	180.3	***
Sales Multiple	333	1.589	1.333	1,039	1.293	***	0.958	***
Excess Sales Multiple	333	0.589	0.325	1,039	0.140	***	-0.067	***

Table 3
Likelihood of a Secondary Deal

This table presents results of a logistic regression in which the dependent variable is an indicator variable equal to 1 if the seller in a deal is a PE firm. The explanatory variable of interest is the Buy Pressure index, the sum of variables Dry Powder, Late Buyer, Lack of Reputation, and Infrequent Fund Raiser. Panel A presents results for Buy Pressure and its variants. Panel B presents results for the individual components of the Buy Pressure index. All variables are defined in Appendix B. Standard errors are clustered by deal year. *t*-statistics are reported in parentheses. Numbers in square brackets indicate marginal effects (shown for the explanatory variables of interest). The symbols ***, **, * denote significance at 1%, 5% and 10%.

	Panel A. Buy Pressure Index							
	Dependent variable: Secondary Deal Indicator							
	(1)		(2)		(3)		(4)	
Buy Pressure	0.097	***					0.127	**
	[0.014]						(2.50)	
	(3.04)							
High Buy Pressure			0.205	***				
			[0.025]					
			(3.31)					
Pressure = 1					0.195	*		
					[0.022]			
					(1.75)			
Pressure = 2					0.321	***		
					[0.037]			
					(2.64)			
Pressure >=3					0.393	**		
					[0.046]			
					(2.53)			
Imputed TEV	0.673	***	0.674	***	0.672	***	0.771	***
	(19.70)		(19.60)		(19.45)		(20.23)	
Mgmt. Participation	0.453	***	0.454	***	0.453	***	0.336	***
	(5.77)		(5.73)		(5.75)		(4.55)	
U.S. Target	-0.158		-0.150		-0.157		-0.504	***
	(-1.58)		(-1.51)		(-1.57)		(-3.00)	
Novice	0.051		0.050		0.057		-0.039	
	(0.70)		(0.67)		(0.74)		(-0.30)	
Affiliated	0.242	***	0.207	***	0.259	***	0.427	
	(2.86)		(2.64)		(3.05)		(1.45)	
Past LBO activity	0.934	**	0.93	**	0.935	**	0.949	***
	(2.57)		(2.53)		(2.56)		(3.21)	
HY Spread	-0.036	**	-0.036	**	-0.036	**	-0.026	
	(-2.31)		(-2.32)		(-2.35)		(-0.90)	
Cold IPO Market	-0.021		-0.021		-0.022		0.069	
	(-0.15)		(-0.15)		(-0.16)		(0.64)	
Intercept	-9.716	***	-9.635	***	-9.775	***		
	(-10.13)		(-9.88)		(-9.89)			
Industry & year dummies	Yes		Yes		Yes		Yes	
PE firm fixed effects	No		No		No		Yes	
R-squared	0.15		0.15		0.15		0.17	
N	9,575		9,575		9,575		7,731	

Table 3
Likelihood of a Secondary Deal (cont.)

	(1)		(2)		(3)		(4)	
Panel B. Buy Pressure Index Individual Components								
Dependent variable: Secondary Deal Indicator								
Dry Powder	0.155	**						
	[0.019]							
	(2.06)							
Late Buyer			0.123	*				
			[0.015]					
			(1.70)					
Lack of Reputation					0.19	**		
					[0.022]			
					(2.30)			
Infrequent Fund Raiser							0.167	**
							[0.02]	
							(2.00)	
Imputed TEV	0.673	***	0.676	***	0.671	***	0.678	***
	(19.18)		(19.48)		(19.19)		(19.84)	
Mgmt. Participation	0.463	***	0.461	***	0.46	***	0.455	***
	(5.74)		(5.74)		(5.74)		(5.65)	
U.S. Target	-0.139		-0.146		-0.149		-0.145	
	(-1.39)		(-1.49)		(-1.47)		(-1.44)	
Novice	0.074		0.047		0.083		0.028	
	(1.04)		(0.65)		(1.09)		(0.41)	
Affiliated	0.166	**	0.159	**	0.252	***	0.179	**
	(2.37)		(2.30)		(2.83)		(2.33)	
Past LBO activity	0.913	**	0.92	**	0.942	**	0.948	***
	(2.48)		(2.50)		(2.56)		(2.61)	
HY Spread	-0.035	**	-0.035	**	-0.035	**	-0.035	**
	(-2.22)		(-2.28)		(-2.26)		(-2.21)	
Cold IPO Market	-0.021		-0.019		-0.031		-0.028	
	(-0.15)		(-0.14)		(-0.22)		(-0.20)	
Intercept	-9.604	***	-9.596	***	-9.794	***	-9.668	***
	(-9.84)		(-9.76)		(-9.99)		(-10.00)	
Industry & year dummies	Yes		Yes		Yes		Yes	
R-squared	0.15		0.15		0.15		0.15	
N	9,575		9,575		9,575		9,575	

Table 4
Likelihood of a Secondary Deal: Fund Specialization

This table presents a logistic regression in which the dependent variable is an indicator variable equal to 1 if the seller in a deal is a PE firm. The explanatory variables of interest are: the Buy Pressure index; an indicator variable equal to 1 if the PE fund family has done more than one-third of its past deals in the same industry group as the target's industry (Industry Specialization); the percentage of the PE fund family's past deals in the same industry group as the target's industry (Industry Specialization %); a set of three indicator variables equal to 1 if the PE fund family has done more than two-thirds of its deals in the small/medium/large size category, defined as deals with an imputed enterprise value < 50 million / between 50 and 250 million / more than 250 million real 2010 U.S. dollars (in column 3 the base omitted category is the group of PE funds that are not size-focused in a particular size category); the target industry's Hirschman-Herfindahl index of Concentration and Asset Liquidity (Schlingemann, Stulz and Walkling, 2002).. All variables are defined in Appendix B. Standard errors are clustered by deal years. *t*-statistics are reported in parentheses and ***, **, * denote significance at 1%, 5% and 10%.

	Dependent variable: Secondary Deal Indicator							
	(1)		(2)		(3)		(4)	
Buy Pressure	0.122	***	0.124	***	0.128	***	0.121	***
	(3.01)		(3.12)		(3.34)		(3.01)	
Industry Specializ. Dummy	-0.022							
	(-0.20)							
Industry Specializ. (%)			-0.231					
			(-1.01)					
Small Size Specialization					0.028			
					(0.13)			
Medium Size Specialization					-0.08			
					(-1.21)			
Large Size Specialization					-0.121			
					(-1.24)			
Industry Concentration							0.429	
							(0.89)	
Industry Asset Liquidity							1.067	
							(0.99)	
Buyer Size	0.673	***	0.674	***	0.649	***	0.672	***
	(19.84)		(19.68)		(14.82)		(19.56)	
Mgmt. Participation	0.453	***	0.451	***	0.47	***	0.453	***
	(5.83)		(5.76)		(5.88)		(5.82)	
U.S. Target	-0.157		-0.156		-0.065		-0.165	*
	(-1.53)		(-1.56)		(-0.68)		(-1.65)	
Novice	0.241	***	0.242	***	0.252	***	0.241	***
	(2.86)		(2.84)		(3.34)		(2.85)	
Affiliated	0.052		0.053		0.034		0.053	
	(0.71)		(0.73)		(0.40)		(0.73)	
Past LBO Activity	0.935	***	0.936	***	1.055	***	0.904	**
	(2.59)		(2.58)		(3.22)		(2.47)	
HY Spread	-0.036	**	-0.036	**	-0.033	*	-0.036	**
	(-2.32)		(-2.28)		(-1.72)		(-2.26)	
Cold IPO Market	-0.021		-0.021		-0.072		-0.008	
	(-0.15)		(-0.16)		(-0.48)		(-0.06)	
Intercept	-9.721	***	-9.708	***	-9.478	***	-9.684	***
	(-10.16)		(-10.10)		(-11.62)		(-10.07)	
Industry & year dummies	Yes		Yes		Yes		Yes	
R-squared	0.15		0.15		0.14		0.15	
N	9,575		9,575		8,139		9,564	

Table 5
Valuation of Secondary Deals

This table presents regression results of the relation between LBO valuation multiples and Buy Pressure. Panel A shows results for Excess Sales Multiples using the Buy Pressure index and its variants, while Panel B does the same using the individual components of the Buy Pressure index. All variables are defined in Appendix B. Standard errors are clustered by deal year. *t*-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

	Panel A. Buy Pressure Index							
	Dependent variable: Excess Sales Multiple							
	(1)		(2)		(3)		(4)	
Buy Pressure	-0.050						-0.093	
	(-1.45)						(-1.60)	
Secondary*Buy Pressure	0.200	**					0.161	**
	(2.61)						(2.04)	
High Buy Pressure			-0.066					
			(-1.05)					
Secondary*High Buy Pressure			0.414	**				
			(2.60)					
Pressure = 1					-0.088			
					(-0.78)			
Pressure = 2					-0.096			
					(-0.83)			
Pressure >=3					-0.199			
					(-1.51)			
Secondary*(Pressure = 1)					0.273			
					(1.41)			
Secondary*(Pressure = 2)					0.666	***		
					(2.83)			
Secondary*(Pressure >= 3)					0.482	*		
					(1.73)			
Secondary	0.083		0.190	*	0.002		0.068	
	(0.54)		(1.85)		(0.01)		(0.49)	
Buyer Size	0.078	***	0.078	***	0.077	***	0.033	
	(4.19)		(4.17)		(4.11)		(0.67)	
Mgmt. Participation	-0.049		-0.048		-0.049		-0.051	
	(-1.34)		(-1.35)		(-1.30)		(-0.65)	
U.S. Target	-0.109	*	-0.11	*	-0.111	*	-0.177	
	(-1.86)		(-1.90)		(-1.91)		(-1.24)	
Novice	0.062		0.065		0.061		0.163	
	(0.75)		(0.80)		(0.74)		(1.14)	
Affiliated	-0.107	**	-0.099	**	-0.115	**	0.195	
	(-2.37)		(-2.28)		(-2.40)		(0.74)	
Past LBO activity	0.361	*	0.353	*	0.321		0.400	
	(1.79)		(1.74)		(1.52)		(1.33)	
HY Spread	-0.014		-0.015		-0.015		0.009	
	(-0.97)		(-1.09)		(-1.11)		(0.30)	
Cold IPO Market	-0.011		-0.01		-0.014		-0.056	
	(-0.15)		(-0.13)		(-0.18)		(-0.51)	
Intercept	-0.883		-0.908		-0.755		-2.170	
	(-1.53)		(-1.55)		(-1.29)		(-1.45)	
Industry & year dummies	Yes		Yes		Yes		Yes	
PE firm fixed effects	No		No		No		Yes	
R-squared	0.11		0.11		0.11		0.12	
N	1,373		1,373		1,373		1,065	

Table 5
Valuation of Secondary Deals (cont.)

	Panel B. Buy Pressure Index Components							
	Dependent variable: Excess Sales Multiple							
	(1)		(2)		(3)		(4)	
Dry Powder	-0.004							
	(-0.06)							
Secondary*Dry Powder	0.280	**						
	(2.27)							
Late buyer			-0.162	*				
			(-1.74)					
Secondary*Late Buyer			0.246					
			(1.49)					
Lack of Reputation					0.039			
					(0.43)			
Secondary*Lack of Reputation					0.217	*		
					(1.78)			
Infrequent Fund Raiser							-0.131	**
							(-2.21)	
Secondary*Irreg. Fund Raiser							0.283	**
							(2.11)	
Secondary	0.290	***	0.312	***	0.219	*	0.302	***
	(2.89)		(2.93)		(1.74)		(2.84)	
All other controls	Yes		Yes		Yes		Yes	
Industry & year dummies	Yes		Yes		Yes		Yes	
R-squared	0.11		0.11		0.11		0.12	
N	1,373		1,373		1,373		1,373	

Table 6
Likelihood of Secondary Exits

This table presents results of a logistic regression in which the dependent variable is Secondary Exit, an indicator variable equal to 1 if the exit route of the LBO is an SBO. The main explanatory variable is the Sell Pressure index. All variables are defined in Appendix B. Standard errors are clustered by year. *t*-statistics are reported in parentheses and marginal effects in square brackets (shown for the variables of interest). The symbols ***, **, * denote significance at 1%, 5% and 10%.

	Panel A. Sell Pressure Index			
	Dependent variable: Secondary Exit Indicator			
	(1)	(2)	(3)	(4)
Sell Pressure	0.133 ***			0.097
	[0.026]			(1.26)
	(3.99)			
High Sell Pressure		0.190 ***		
		[0.037]		
		(2.74)		
Sell Pressure = 1			0.168	
			[0.032]	
			(1.44)	
Sell Pressure = 2			0.313 **	
			[0.06]	
			(2.48)	
Sell Pressure >= 3			0.395 ***	
			[0.076]	
			(3.88)	
Imputed TEV	0.016	0.017	0.015	-0.012
	(0.55)	(0.58)	(0.50)	(-0.27)
Mgmt. Participation	0.034	0.038	0.033	-0.041
	(0.47)	(0.51)	(0.45)	(-0.46)
U.S. Target	-0.417 ***	-0.416 ***	-0.416 ***	-0.542 ***
	(-4.38)	(-4.40)	(-4.35)	(-2.71)
Exit Novice	-0.074	-0.078	-0.072	-0.317 **
	(-1.08)	(-1.14)	(-1.03)	(-1.98)
Affiliated	0.129	0.074	0.144	0.141
	(1.22)	(0.72)	(1.09)	(0.40)
Past LBO activity	0.344	0.34	0.35	0.498 *
	(1.20)	(1.19)	(1.22)	(1.62)
Exit HY Spread	-0.09 ***	-0.089 ***	-0.091 ***	-0.086 ***
	(-4.98)	(-4.95)	(-5.09)	(-4.21)
Exit Cold IPO Market	0.08	0.081	0.082	0.033
	(0.73)	(0.74)	(0.76)	(0.33)
Stage	-0.035	-0.031	-0.035	-0.021
	(-0.92)	(-0.80)	(-0.92)	(-0.61)
Add-On	0.124	0.122	0.124	0.278 **
	(1.39)	(1.35)	(1.39)	(2.17)
Secondary (Entry)	0.318 ***	0.321 ***	0.318 ***	0.283 **
	(2.78)	(2.77)	(2.81)	(2.27)
Divisional	-0.228 ***	-0.225 ***	-0.229 ***	-0.077
	(-3.44)	(-3.42)	(-3.39)	(-0.72)
Public to private	-0.374 *	-0.37 *	-0.373 *	-0.1
	(-1.78)	(-1.77)	(-1.78)	(-0.50)
Financial seller	-0.118	-0.113	-0.116	-0.149
	(-0.85)	(-0.81)	(-0.83)	(-0.74)
Intercept	-2.281 ***	-2.182 **	-2.327 ***	
	(-2.65)	(-2.53)	(-2.65)	
Industry & year dummies	Yes	Yes	Yes	Yes
PE firm fixed effects	No	No	No	Yes
R-squared	0.06	0.06	0.06	0.05
N	4,139	4,139	4,139	3,525

Table 6
Likelihood of Secondary Exits (cont.)

	Panel B. Sell Pressure Index Components			
	Dependent variable: Secondary Exit Indicator			
	(1)	(2)	(3)	(4)
Late Seller	0.283 ***			
	[0.055]			
	(2.60)			
Last Exit		0.154 *		
		[0.03]		
		(1.75)		
Lack of Reputation at Exit			0.188 *	
			[0.036]	
			(1.87)	
Infrequent Fund Raiser at Exit				0.022
				[0.004]
				(0.24)
All other controls	Yes	Yes	Yes	Yes
Industry & year dummies	Yes	Yes	Yes	Yes
R-squared	0.06	0.06	0.06	0.06
N	4,139	4,139	4,139	4,139

Table 7
Holding Period of Secondary Exits

This table presents results of a competing risks regression model having as latent dependent variable the hazard rate of an exit through a SBO. The sample includes both deals with known exit and those not yet exited at the end of the sample period. Competing events are exits though any other form (trade sale, IPO, or down exits). The main explanatory variables are: Sell Pressure; Sell Pressure at Entry, the value of the Sell Pressure index of the buyer at the time of the investment; Increase in Sell Pressure, an indicator equal to 1 if the Sell Pressure index increases during the holding period (relative to "Sell Pressure at Entry"); Buy Pressure at Entry, the value of the Buy Pressure index for the buyer at the date of the LBO. All other variables are defined in Appendix B. Standard errors are clustered by buyer. t-statistics are reported in parentheses. The symbols ***, **, * denote significance at 1%, 5% and 10%.

	Dependent variable: Hazard Rate of Exit via SBO							
	(1)		(2)		(3)		(4)	
Sell Pressure	0.085	***						
	(4.50)							
Sell High Pressure			0.116	***				
			(3.80)					
Sell Pressure at entry					0.057	***		
					(2.93)			
Buy Pressure at entry							0.030	*
							(1.75)	
Increase in Sell Pressure					0.135	***	0.125	***
					(3.78)		(3.51)	
Imputed TEV	0.050	***	0.052	***	0.050	***	0.049	***
	(4.15)		(4.29)		(4.15)		(4.11)	
Mgmt. Participation	0.051	*	0.051	**	0.052	**	0.053	**
	(1.96)		(1.98)		(1.97)		(2.01)	
U.S. Target	-0.064	**	-0.063	**	-0.061	*	-0.058	*
	(-2.02)		(-1.99)		(-1.94)		(-1.82)	
Exit Novice	0.015		0.017		0.007		0.015	
	(0.47)		(0.55)		(0.23)		(0.48)	
Affiliated	0.048		0.017		0.029		0.013	
	(1.16)		(0.44)		(0.71)		(0.31)	
Past LBO activity	0.201	***	0.195	***	0.200	***	0.200	***
	(9.41)		(9.32)		(9.45)		(9.44)	
Exit HY Spread	-0.036	***	-0.036	***	-0.036	***	-0.036	***
	(-8.15)		(-8.16)		(-8.15)		(-8.20)	
Exit Cold IPO Market	-0.190	***	-0.187	***	-0.190	***	-0.190	***
	(-6.27)		(-6.23)		(-6.27)		(-6.28)	
Stage	-0.020	**	-0.018	**	-0.019	**	-0.022	**
	(2.22)		(1.98)		(2.08)		(2.29)	
Add-On	0.010		0.012		0.010		0.009	
	(0.26)		(0.32)		(0.26)		(0.23)	
Secondary (Entry)	0.102	**	0.103	**	0.101	***	0.101	***
	(2.48)		(2.49)		(2.47)		(2.48)	
Divisional	-0.028		-0.027		-0.028		-0.029	
	(-0.76)		(-0.73)		(-0.77)		(-0.80)	
Public to private	-0.171	**	-0.171	**	-0.173	**	-0.174	**
	(-2.47)		(-2.47)		(-2.50)		(-2.52)	
Financial seller	0.001		-0.003		0.000		-0.001	
	(0.02)		(-0.04)		(0.00)		(-0.02)	
Vintage dummies	Yes		Yes		Yes		Yes	
Industry dummies	Yes		Yes		Yes		Yes	
P-value Wald test	0.00		0.00		0.00		0.00	
N	42,893		42,893		42,893		42,893	

Table 8
Valuation of Secondary Exits

This table presents regression results of the relation between LBO exit valuation multiples and Sell Pressure. Panel A shows results for Excess Sales Multiples using the Sell Pressure index and its variants. Panel B uses the individual components of the Sell Pressure index. All variables are defined in Appendix B. Standard errors are clustered by deal year. *t*-statistics are reported in parentheses. Symbols ***, **, * denote significance at 1%, 5% and 10%.

	Panel A. Sell Pressure Index							
	Dependent variable: Exit Excess Sales Multiple							
	(1)		(2)		(3)		(4)	
Sell Pressure	0.01						-0.016	
	(0.25)						(-0.13)	
Sec. Exit*Sell Pressure	-0.324	***					-0.412	**
	(-4.22)						(-2.41)	
High Sell Pressure			0.015					
			(0.15)					
Sec. Exit*High Sell Pressure			-0.466	***				
			(-3.10)					
Sell Pressure = 1					0.028			
					(0.25)			
Sell Pressure = 2					0.022			
					(0.18)			
Sell Pressure >= 3					0.104			
					(0.66)			
Sec. Exit*Sell Pressure = 1					-0.322			
					(-1.31)			
Sec. Exit*Sell Pressure = 2					-0.613	**		
					(-2.63)			
Sec. Exit*Sell Pressure >= 3					-1.08	***		
					(-4.37)			
Secondary Exit	0.462	***	0.223	**	0.457	**	0.508	**
	(3.47)		(2.16)		(2.12)		(2.05)	
Buyer Size	0.048	***	0.048	***	0.048	***	0.056	
	(3.02)		(2.92)		(2.82)		(1.11)	
Mgmt. Participation	-0.084		-0.086		-0.084		-0.063	
	(-1.16)		(-1.15)		(-1.16)		(-0.54)	
U.S. Target	0.083		0.088		0.081		-0.068	
	(0.75)		(0.80)		(0.73)		(-0.29)	
Affiliated	-0.072		-0.072		-0.07		-0.117	
	(-0.95)		(-0.96)		(-0.93)		(-0.54)	
Past LBO Activity	-0.18		-0.148		-0.171		-0.32	
	(-1.46)		(-1.28)		(-1.36)		(-0.73)	
Novice	0.439		0.438		0.439		0.205	
	(1.47)		(1.48)		(1.49)		(0.41)	
HY Spread	-0.056	**	-0.055	**	-0.056	**	-0.049	
	(-2.30)		(-2.23)		(-2.27)		(-1.61)	
Cold IPO Market	-0.103		-0.103		-0.102		-0.004	
	(-0.85)		(-0.85)		(-0.84)		(-0.03)	
Stage	0.038	*	0.035		0.037		0.041	
	(1.73)		(1.53)		(1.64)		(0.90)	
Add-On	0.141		0.14		0.14		0.238	
	(1.16)		(1.16)		(1.14)		(1.64)	
Entry Type dummies	Yes		Yes		Yes		Yes	
Industry & year dummies	Yes		Yes		Yes		Yes	
PE firm fixed effects	No		No		No		Yes	
R-squared	0.06		0.06		0.05		0.06	
N	1090		1090		1090		827	

Table 8
Valuation of Secondary Exits (cont.)

	Panel B. Sell Pressure Index Components							
	Dependent variable: Exit Excess Sales Multiple							
	(1)		(2)		(3)		(4)	
Late seller	-0.269	**						
	(-2.50)							
Sec. Exit*Late Seller	-0.328	**						
	(-2.17)							
Last Exit			0.184	**				
			(2.29)					
Sec. Exit*Last Exit			-0.379	*				
			(-1.84)					
Lack of Reputation					0.089			
					(0.93)			
Sec. Exit*Lack of Reputation					-0.432	*		
					(-2.00)			
Infrequent Fund Raiser							0.015	
							(0.15)	
Sec. Exit*Irreg. Fund Raiser							-0.466	***
							(-3.10)	
Secondary Exit	0.137		0.255		0.163		0.223	**
	-1.33		(1.57)		(1.46)		(2.16)	
All other controls	Yes		Yes		Yes		Yes	
Industry & year dummies	Yes		Yes		Yes		Yes	
PE firm fixed effects	No		No		No		No	
R-squared	0.06		0.05		0.05		0.06	
N	1090		1090		1090		1090	

Table 9
Valuation of Secondary Deals: Buyer and Seller Pressure

This table presents regression results of the relation between the Excess Sales Multiple, measures of Buy Pressure and Sell Pressure, and the interaction between the two. Buy Pressure denotes the index variable used throughout the paper and Buy High Pressure is an indicator variable equal to 1 if Buy Pressure is equal or greater than 2. A similar denomination holds for Sell Pressure. All variables are defined in the caption in Appendix B. Standard errors clustered by deal year. *t*-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

	Dependent variable: Excess Sales Multiple							
	(1)		(2)		(3)		(4)	
Buy Pressure	0.193	***						
	(3.79)							
Sell Pressure	-0.084	*						
	(-1.71)							
Buy Pressure x High Sell Pressure			0.112					
			(1.31)					
Buy Pressure x Low Sell Pressure			0.219	***				
			(4.30)					
Sell Pressure x High Buy Pressure					-0.006			
					(-0.05)			
Sell Pressure x Low Buy Pressure					-0.145	***		
					(-3.75)			
High Buy Pressure x High Sell Pressure							0.165	
							(0.62)	
High Buy Pressure x Low Sell Pressure							0.385	**
							(2.15)	
Low Buy Pressure x High Sell Pressure							-0.243	**
							(-2.07)	
Buyer Size	0.084	*	0.08	*	0.076	*	0.076	*
	(1.75)		(1.76)		(1.70)		(1.69)	
Mgmt. Participation	-0.042		-0.055		-0.033		-0.042	
	(-0.47)		(-0.64)		(-0.37)		(-0.53)	
U.S. Target	-0.136		-0.145		-0.043		-0.089	
	(-0.69)		(-0.76)		(-0.21)		(-0.48)	
Past LBO Activity	0.900	*	0.929	*	0.98	*	0.905	*
	(1.85)		(1.86)		(2.01)		(1.91)	
HY Spread	-0.115		-0.117		-0.1		-0.125	
	(-1.57)		(-1.54)		(-1.42)		(-1.53)	
Cold IPO Market	0.504	***	0.51	***	0.473	***	0.472	***
	(3.96)		(4.08)		(3.28)		(3.42)	
Intercept	-3.032		-3.246		-3.242		-2.857	
	(-1.25)		(-1.29)		(-1.33)		(-1.21)	
Industry & year dummies	Yes		Yes		Yes		Yes	
R-squared	0.10		0.10		0.08		0.10	
N	294		294		294		294	

Table 10
Pressure and Leverage of Secondary Deals

This table presents regression results of the relation between Buy Pressure and deal leverage, using three measures of the latter: the ratio of Senior Debt to (*i*) Enterprise Value, (*ii*) EBITDA, and (*iii*) Assets. All variables are defined in Appendix B. Standard errors clustered by deal year. *t*-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

	Dependent variable: Leverage					
	Debt / Enterprise Value		Debt / EBITDA		Debt / Assets	
	(1)		(2)		(3)	
Buy Pressure	0.007		0.092		0.012	
	(0.77)		(0.42)		(0.11)	
Secondary*Buy Pressure	-0.031	**	-0.553	*	-0.259	**
	(-2.25)		(-1.69)		(-2.12)	
Secondary	0.056	**	0.854		0.737	***
	(2.03)		(1.22)		(4.00)	
Buyer Size	0.000		-0.246		-0.019	
	(0.11)		(-1.40)		(-0.55)	
Mgmt. Participation	-0.020		-0.620		0.008	
	(-0.86)		(-1.53)		(0.04)	
U.S. Target	0.005		-0.368		-0.468	
	(0.28)		(-0.84)		(-1.41)	
Novice	0.006		-0.002		0.288	*
	(0.61)		(-0.00)		(1.82)	
Affiliated	-0.011		0.072		0.419	
	(-0.44)		(0.22)		(1.34)	
Past LBO activity	0.010		3.622	**	-0.257	
	(0.24)		(2.58)		(-0.42)	
HY Spread	-0.012	***	-0.307	**	-0.069	
	(-3.63)		(-2.42)		(-0.75)	
Cold IPO Market	0.015		0.400		0.314	**
	(0.87)		(0.87)		(1.99)	
Intercept	0.719	***	-13.319	*	3.058	
	(7.88)		(-1.65)		(0.88)	
Industry & year dummies	Yes		Yes		Yes	
R-squared	0.09		0.03		0.05	
N	554		186		176	

Table 11
Pressure and Syndication in Secondary Deals

This table presents regression results of the relation between Buy Pressure and three measures of deal syndication: (*i*) an indicator variable if the deal is syndicated (involves more than one buyer); (*ii*) the number of buyers involved in the deal; (*iii*) the deal imputed equity value divided by the number of buyers. All variables are defined in Appendix B. Standard errors clustered by deal year. *t*-statistics are reported in parentheses and the symbols ***, **, * denote significance at 1%, 5% and 10%.

	Dependent variable: Syndication measures					
	Number of buyers		Deal Value per buyer		Deal is Syndicated	
	(1)		(2)		(3)	
Buy Pressure	0.005		-0.009		0.067	**
	(1.11)		(-1.50)		(2.27)	
Secondary	0.014		-0.006		0.017	
	(0.81)		(-0.24)		(0.21)	
Secondary*Buy Pressure	-0.022	**	0.032	**	-0.085	
	(-2.30)		(2.31)		(-1.49)	
Imputed TEV	0.048	***	0.894	***	0.261	***
	(12.84)		(147.18)		(11.46)	
Mgmt. Participation	0.065	***	-0.103	***	0.343	***
	(10.73)		(-11.71)		(7.40)	
U.S. Target	0.026		-0.045	*	0.270	**
	(1.45)		(-1.66)		(2.34)	
Novice	-0.030	***	0.029	**	-0.043	
	(-3.20)		(2.02)		(-0.66)	
Affiliated	0.087	***	-0.122	***	0.311	***
	(9.30)		(-8.39)		(3.24)	
Past LBO activity	-0.061		0.085		-0.279	
	(-1.58)		(1.43)		(-1.05)	
HY Spread	0.001		-0.002		-0.003	
	(0.32)		(-0.51)		(-0.21)	
Cold IPO Market	-0.008		0.012		-0.099	
	(-0.53)		(0.54)		(-1.08)	
Intercept	0.711	***	0.214		-1.745	**
	(7.41)		(1.46)		(-2.40)	
Industry & year dummies	Yes		Yes		Yes	
R-squared	0.07		0.86		0.04	
N	9,575		9,575		9,575	

Table 12
Pressure and Fund Performance

This table presents regression results of the relation between fund performance and Buy Pressure, using four measures of fund performance: (*i*) the fund's Internal Rate of Return; (*ii*) the IRR rank of a PE fund compared to funds with the same vintage (year of fund closing) and geography (U.S. vs. non-U.S.); (*iii*) the money-on-money fund multiple; (*iv*) the rank of Multiple compared to funds with the same vintage and geography. Rank is in ascending order (higher rank indicates higher performance). The main independent variable in is the average Buy Pressure index over the life of the fund (Panel A), the percentage of the total value of deals made by the buyer that are SBOs, and their interaction (Panel B). All variables are defined in Appendix B. Fund performance data is sourced from Preqin and is dated as of December 31 2010. Standard errors clustered by buyer fund family. *t*-statistics are reported in parentheses. Symbols ***, **, * denote significance at 1%, 5% and 10%.

		Panel A. Average Buy Pressure						
Dependent variable:	IRR		IRR rank		Multiple		Multiple rank	
	(1)		(2)		(3)		(4)	
Average Buy Pressure	-2.836	**	-2.070		-0.033	**	-2.327	*
	(-2.31)		(-1.53)		(-1.97)		(-1.77)	
Fund size	-0.001	**	-0.001		0.000	***	-0.001	
	(-2.08)		(-1.46)		(-3.30)		(-1.64)	
Fund sequence	-0.963	*	-1.023		-0.008		-0.706	
	(-1.69)		(-1.61)		(-0.87)		(-1.09)	
Affiliated	-1.074		-7.420	**	-0.018		-5.299	
	(-0.25)		(-2.07)		(-0.37)		(-1.39)	
Novice	1.313		-1.643		0.012		-2.128	
	(-0.64)		(-0.67)		(0.36)		(-0.79)	
Buyout Fund	0.869		2.645		0.021		3.255	
	(0.46)		(1.07)		(0.75)		(1.27)	
PEI Top 50	11.028	***	6.252	*	0.152	***	6.179	**
	(4.29)		(1.93)		(3.60)		(2.05)	
Size specialization	-1.222		0.562		0.006		1.031	
	(-0.69)		(0.33)		(0.19)		(0.57)	
Ind. Specialization	0.198		0.136		-0.006		0.074	
	(0.12)		(0.07)		(-0.24)		(0.04)	
Intercept	13.736	***	4.636		1.468	***	6.074	
	(-3.24)		(-0.79)		(-19.85)		(-1.00)	
Vintage dummies	Yes		Yes		Yes		Yes	
R-squared	0.41		0.26		0.52		0.25	
N	281		281		281		281	

Table 12
Pressure and Fund Performance (cont.)

Panel B. Interaction Between Average Buy Pressure and Percentage of SBOs							
Dependent variable:	IRR		IRR rank		Multiple		Multiple rank	
	(1)		(2)		(3)		(4)	
Average Buy Pressure	-1.473		-0.610		-0.014		-0.540	
	(-1.13)		(-0.40)		(-0.72)		(-0.37)	
Percentage SBOs	15.520		20.687	*	0.295	***	27.286	**
	(1.38)		(1.79)		(2.58)		(2.41)	
Avg. Buy Pressure x Pct. SBOs	-8.744	*	-9.564	**	-0.124	**	-11.796	**
	(-1.86)		(-2.03)		(-2.44)		(-2.50)	
Fund size	-0.001	*	0.000		0.000	***	0.000	
	(-1.86)		(-1.23)		(-3.00)		(-1.32)	
Fund sequence	-1.062	*	-1.113	*	-0.009		-0.808	
	(-1.84)		(-1.71)		(-0.97)		(-1.23)	
Affiliated	-1.540		-7.934	**	-0.025		-5.936	*
	(-0.38)		(-2.16)		(-0.57)		(-1.71)	
Novice	1.394		-1.268		0.019		-1.529	
	(0.65)		(-0.51)		(0.54)		(-0.55)	
Buyout Fund	1.554		3.138		0.026		3.740	
	(0.80)		(1.25)		(0.88)		(1.46)	
PEI Top 50	11.023	***	6.425	*	0.156	***	6.478	**
	(4.15)		(1.95)		(3.58)		(2.11)	
Size specialization	-1.217		0.462		0.003		0.859	
	(-0.68)		(0.27)		(0.12)		(0.49)	
Ind. Specialization	-0.101		-0.199		-0.010		-0.344	
	(-0.06)		(-0.11)		(-0.43)		(-0.18)	
Intercept	11.127	**	1.338		1.422	***	1.794	
	(2.36)		(0.22)		(17.63)		(0.29)	
Vintage dummies	Yes		Yes		Yes		Yes	
R-squared	0.42		0.27		0.53		0.27	
N	281		281		281		281	

Table 13
Pressure and deal-level performance

This table presents regression results of the relation between deal-level performance and pressure using three measures of deal-level performance. In column 1, the dependent variable is the geometric annual growth rate in total enterprise value (TEV) from date of entry to date of exit. This measure is an approximation of the deal's IRR. In column 2, the dependent variable is the percentile rank (normalized between 0 and 1) in terms of Growth Rate of TEV of a deal, computed across all deals within the same decade and geography (U.S. vs. non-U.S.). A rank of 1 indicates the deal with the highest rank. In column 3, the dependent variable is the percentile rank (normalized between 0 and 1) in terms of Growth Rate of TEV of a deal, computed across all deals within the same decade and buyer firm. A rank of 1 indicates the deal with the highest rank. The main independent variables are the Buy Pressure index and its interaction with the Secondary indicator (Panel A) and the Sell Pressure index and its interaction with the Secondary Exit indicator (Panel B). All variables are defined in Appendix B. Standard errors clustered by buyer fund family. t-statistics are reported in parentheses. Symbols ***, **, * denote significance at 1%, 5% and 10%.

	Panel A. Buy Pressure Index					
Dependent variable:	Growth rate of TEV		Deal Rank		Within-Buyer Deal Rank	
	(1)		(2)		(3)	
Buy Pressure	0.018		0.012		-0.004	
	(0.69)		(-0.96)		(-0.38)	
Secondary*Buy Pressure	-0.091	*	-0.024		-0.035	*
	(-1.79)		(-0.78)		(-1.79)	
Secondary	0.136		0.020		0.043	
	(1.40)		(0.35)		(1.19)	
Buyer Size	-0.031	*	0.002		-0.032	***
	(-1.91)		(0.27)		(-6.28)	
Mgmt. Participation	-0.013		-0.007		-0.028	
	(-0.42)		(-0.31)		(-1.37)	
U.S. Target	0.142	**	0.099	***	0.091	**
	(-2.11)		(3.22)		(2.67)	
Novice	-0.097	**	-0.018		0.027	
	(-2.12)		(-0.90)		(1.22)	
Affiliated	-0.006		-0.014		-0.004	
	(-0.10)		(-0.51)		(-0.17)	
Past LBO activity	0.067		0.007		-0.025	
	(0.31)		(0.09)		(-0.26)	
HY Spread	-0.003		-0.010		0.004	
	(-0.17)		(-0.84)		(0.38)	
Cold IPO Market	0.005		-0.034		-0.020	
	(0.05)		(-0.86)		(-0.51)	
Intercept	0.539		0.634		1.326	**
	(0.41)		(1.46)		(2.56)	
Industry & year dummies	Yes		Yes		Yes	
R-squared	0.08		0.08		0.13	
N	662		662		662	

Table 13
Pressure and deal-level performance (cont.)

Panel B. Sell Pressure Index

Dependent variable:	Growth rate of TEV		Deal Rank		Within- Buyer Deal Rank	
	(1)		(1)		(1)	
Sell Pressure	-0.021		-0.013		-0.032	**
	(-1.53)		(-1.13)		(-2.64)	
Sec. Exit*Sell Pressure	-0.053	**	-0.043	*	-0.049	**
	(-2.18)		(-1.91)		(-2.70)	
Secondary Exit	0.108	***	0.083	**	0.083	***
	(3.10)		(2.49)		(3.16)	
Buyer Size	0.001		0.009		-0.033	***
	(0.06)		(1.11)		(-4.51)	
Mgmt. Participation	-0.018		-0.012		-0.030	
	(-0.79)		(-0.51)		(-1.32)	
U.S. Target	0.044		0.079	**	0.058	
	(1.21)		(2.35)		(1.63)	
Affiliated	0.040		-0.046	**	-0.038	
	(1.16)		(-2.28)		(-1.46)	
Past LBO Activity	-0.056	***	0.002		-0.019	
	(-3.26)		(0.02)		(-0.14)	
Novice	-0.013		0.022		0.078	**
	(-0.15)		(0.73)		(2.38)	
HY Spread	-0.007		-0.010		0.003	
	(-0.82)		(-1.18)		(0.37)	
Cold IPO Market	-0.050		-0.074	*	-0.012	
	(-1.22)		(-2.02)		(-0.45)	
Stage	0.026	***	0.022	***	0.021	**
	(3.30)		(2.81)		(2.33)	
Add-On	0.055		0.059		0.043	
	(1.27)		(1.38)		(1.54)	
Secondary	-0.039		-0.024		-0.007	
	(-0.97)		(-0.55)		(-0.26)	
Divisional	0.053		0.055		0.066	*
	(1.46)		(1.53)		(2.00)	
Public to private	-0.026		0.003		0.009	
	(-0.86)		(0.09)		(0.20)	
Financial seller	-0.045		-0.016		0.003	
	(-1.10)		(-0.36)		(0.04)	
Intercept	0.468	***	0.610	***	0.572	**
	(2.60)		(3.25)		(2.24)	
Industry & year dummies	Yes		Yes		Yes	
R-squared	0.07		0.07		0.16	
N	567		567		567	

Appendix A

This appendix describes in detail the construction of the LBO sample. We extract from S&P's Capital IQ all closed merger transactions featuring the keywords "Going Private Transaction", "Leveraged Buy Out (LBO)", "Management Buyout" and "Secondary LBO" transactions with targets located in the U.S. and in 12 European countries (Belgium, Denmark, Finland, France, Germany, Italy, Luxembourg, Netherlands, Spain, Sweden, Switzerland, and United Kingdom) for the period from January 1st, 1980 to December 31st, 2010. We exclude targets in financial industries, acquisitions of remaining interest, acquisitions of minority stakes, targets with reported negative sales or negative enterprise value, Venture Capital deals misidentified as LBOs in Capital IQ; corporate acquisitions in which the acquirer is not associated with a PE owner; acquisitions by non-PE investors, such as hedge funds, groups of individual investors, corporate venture funds, and non-PE arms of financial institutions. This initial sample includes 23,032 deals. After conducting extensive individual checks using the textual deal commentary, we further exclude: deals without information on the identity of buyers and sellers, acquisitions by management teams (e.g. management buy-outs) with no evidence of involvement by a PE sponsor; and deals in which the target firm is bankrupt or in financial distress. When an acquisition involves multiple stages or transactions, we keep the one in which the buyer acquired most of its stake (typically the first transaction).

Although Capital IQ contains the unique identifier(s) of the PE buyer(s), this information is sometimes available at the fund level (e.g. "KKR EUROPEAN BUYOUT FUND II, L.P.") and sometimes at the fund family level (e.g. "KOHLBERG KRAVIS ROBERTS & CO."). Moreover, we found cases in Capital IQ of families that are considered distinct but actually belong to the same PE group (e.g. "BARCLAYS PRIVATE EQUITY LTD." and "BARCLAYS PRIVATE EQUITY FRANCE SAS"). We therefore create a unique PE fund family identifier to address such cases.

For each deal we identify a "leading buyer": In single-buyer deals the leading buyer is the family of the acquiring fund; in syndicated deals the leading buyer is the PE fund family with highest reputation among all buyers, where reputation is measured as the dollar market share of the PE fund family across all LBOs conducted up to that year. For each deal and each leading buyer, we require that the acquisition date is within the investment period range (years 1 through 6) of at least one of the funds in the PE fund family. The final sample contains 9,575 LBO deals, out of which we able to trace 4,319 exit routes and dates.

Appendix B

Deal Variables

Variable:	Definition:
Secondary	Indicator variable equal to 1 if the seller in an LBO is a PE fund, and zero otherwise.
Imputed TEV	Implied Total Enterprise Value (TEV) is the sum of the target's equity market value valued at the LBO offer price plus net debt (financial debt minus cash and marketable securities). For transactions without deal value information, we compute an estimate of deal value using the methodology of Stromberg (2008): see Table A-1 for details of this procedure. TEV is measured in real December 2010 U.S. dollars, after conversion at historical exchange rates.
Mgmt. Participation	Indicator variable equal to 1 if at least one member of the management team of the target is referenced as an investor in the LBO transaction, and zero otherwise.
U.S. Target	Indicator variable equal to 1 if the target is headquartered in the U.S., and zero otherwise.
Past LBO Activity	Log of moving average of the previous 6 quarters' LBO activity relative to deal date, adjusted for geography (U.S. vs. non-U.S.), and measured in billions of real 2010 U.S. dollars.
HY Spread	Difference, at the time of the LBO, between the Barclays High Yield Composite index and the Barclays average corporate AAA corporate bond rate. The index is only available after 1987.
Cold IPO Market	Indicator equal to 1 if the IPO market is 'cold' at the time of the LBO, and zero otherwise. To define a cold [hot] IPO market, we sum the deal value of IPOs taking place in the same geography (U.S. or Europe), same Fama-French 12-code industry, and year as the LBO, and check if this value is lower [higher] than the geography- and industry-level time series mean. IPO values are measured in real 2010 U.S. dollars, after conversion at historical exchange rates.
Stage	Number of years elapsed, relative to the deal date, since fund raising for the youngest fund in the PE fund family whose investment period overlaps with the LBO deal date (that is. whose deal date falls within years 1 through 6 of the lifetime of the fund).
Secondary (Entry)	Same as Secondary.
Divisional	Indicator variable equal to 1 if the seller is a corporate entity, and zero otherwise.
Financial seller	Indicator variable equal to 1 if the seller is a financial institution, and zero otherwise.
Public to private	Indicator variable equal to 1 if the target firm is a publicly listed company, and zero otherwise.
Private to private	Indicator equal to 1 if the seller is a non-PE investor group or individual, zero otherwise.
Sales Multiple	Ratio between TEV and latest available yearly sales for the target firm at the time of the LBO. This variable only takes non-missing values when deal value is known.
Excess Sales Multiple	Difference between the target's Sales Multiple and a valuation benchmark constructed as a follows. For every year, geography (U.S. versus Europe), industry (Fama-French 12-industry classification) and public status (public or private), we compute the median sales multiple for all merger transactions with value larger than 1 million dollars (at constant 2010 dollars) involving a majority stake over the previous two years relative to the date of the LBO.
Debt to Enterprise Value	Ratio of Senior Debt to Total Enterprise Value. This ratio is only computed for deals in which total enterprise value is observed. Senior Debt, defined as the sum of all term debt facilities used in the deal, is obtained from multiple sources including Capital IQ, DealScan, Dealogic, and company filings in the case of public-to-private deals.
Debt to EBITDA	Ratio of Senior Debt to EBITDA for the target firm at the time of the LBO. Senior Debt is defined as above (see "Debt to Enterprise Value").

Debt to Assets	Ratio of Senior Debt to Total Assets for the target firm at the time of the LBO. Senior Debt is defined as above (see "Debt to Enterprise Value").
Number of buyers	Number of buyers in the deal. Funds belonging to the same fund family are counted as a single buyer.
Deal value per buyer	Deal imputed equity value divided by the number of buyers.
Deal is syndicated	Indicator variable equal to 1 if there is more than one buyer, and zero otherwise. Fund belonging to the same fund family are counted as a single buyer.
Buyer Variables	
Variable:	**Definition:**
Buy Pressure	Sum of variables Dry Powder, Late Buyer, Lack of Reputation, and Infrequent Fund Raiser.
High Buy Pressure	Indicator variable equal to 1 if Buy Pressure is equal or greater than 2.
Dry Powder	Indicator variable equal to 1 if the buyer is above median in terms of fund raising and below median in terms of deal activity. These criteria are computed as follows. First, for each PE fund family and year, we calculate the aggregate funds raised in the past 3 years, and the corresponding median across fund families in that year. Second, for each PE fund family and year, we compute the aggregate dollar value of all investment made during the past three years, and its respective median across fund families in that year. All monetary values are measured in real December 2010 U.S. dollars, after conversion at historical exchange rates.
Late Buyer	Indicator variable equal to 1 if the buyer's most recent fund at the time of the deal is at the end of its investment period (4 to 6 years after inception), and zero otherwise.
Lack of Reputation	Indicator variable equal to 1 if the buyer is below the 75th percentile in terms of rank of value-weighted market share, computed using all deals made from 1980 up to deal year.
Infrequent Fund Raiser	Indicator variable equal to 1 if the buyer's average time between fund raisings is more than 3 years. Time between raisings is computed dividing the total number of funds raised by a firm up to the observation year by the age of the firm (time since the firm's first deal in the database).
Affiliated	Indicator variable equal to 1 if the buyer is affiliated to a financial institution or government agency, and zero otherwise.
Novice	Indicator variable equal to 1 if the buyer is a PE fund family with 3 funds or less under management at the time of the LBO deal, and zero otherwise.
Buyer Size	Log of the value of deals done by the buyer in the last five years.
Industry Specialization	Dummy variable that takes the value 1 if the PE fund family has done more than one-third of its past deals in the same industry group as the target's industry.
Industry Specializ. (%)	Percentage of the PE fund family's past deals in the same industry group as the target's industry.
Size Specialization	Set of three indicator variables equal to 1 if the PE fund family has done more than two-thirds of its deals in the small (medium) [large] size category, defined as deals with an imputed enterprise value < 50 million (between 50 and 250 million) [> 250 million] real 2010 U.S. dollars.
Industry Concentration	Hirschman-Herfindahl index, by geography (U.S. vs. Europe) and year, of public firms with the 48 Fama-French industry code as the target firm.
Asset Liquidity	Target industry's ratio of the value of corporate transactions (excluding LBOs) to the value of the total assets of public firms in that industry (Schlingemann, Stulz and Walkling, 2002).
Exit variables	
Variable:	**Definition:**
Secondary Exit	Exit route of the LBO is a sale to another PE fund or group of PE funds.
Down Exit	Exit route of the LBO is a sale to management, a distressed merger transaction, or bankruptcy.

Trade Sale Exit	Exit route of the LBO is a sale to a corporate buyer.
IPO Exit	Exit route of the LBO is an equity listing on public markets.
Sell Pressure	Sum of variables Last Exit, Late Seller, Lack of Reputation, and Infrequent Fund Raiser.
High Sell Pressure	Indicator variable equal to 1 if Sell Pressure is equal or greater than 2.
Last Exit	Indicator variable equal to 1 if the three or more years have elapsed since the PE fund family last exited an LBO deal.
Late Seller	Indicator variable equal to 1 if the sale takes place in years 9 or 10 of the PE fund family's oldest active fund (i.e. less than 11 years old), and zero otherwise.
Lack of Reputation at Exit	Indicator variable equal to 1 if the buyer is below the 75th percentile in terms of rank of value-weighted market share, computed using all deals made from 1980 up to the exit year.
Infrequent Fund Raiser at Exit	Indicator variable equal to 1 if the buyer's average time between fund raisings is more than 3 years. Time between raisings is computed dividing the total number of funds raised by a firm up to the observation year by the age of the firm (time since the firm's first deal in the database).
Exit HY Spread	Difference, at the time of the exit from LBO, between the Barclays High Yield Composite index and the Barclays average corporate AAA corporate bond rate. Only available after 1987.
Exit Cold IPO Market	Indicator equal to 1 if the IPO market is 'cold' at the time of the LBO exit, and zero otherwise.
Add-ons	Indicator variable equal to 1 if there were significant acquisitions during the time that the buyer held the target firm in its portfolio, and zero otherwise. We define acquisitions as significant if there are three or more acquisitions made by the target company during this period or if they represent a cumulative dollar value of 5% or more of the original LBO deal value.
Novice at Exit	Indicator variable equal to 1 if, at the time of exit from the LBO deal, the buyer is a PE fund family with 3 funds or less under management, and zero otherwise.
Exit Sales Multiple	Ratio between TEV and latest available yearly sales for the target firm at the time of the exit from the LBO. This variable only takes non-missing values when exit value is known.
Exit Excess Sales Multiple	Difference between the target's Sales Multiple and the valuation benchmark at the time of exit from the LBO (see "Excess Sales Multiple").
Holding Period variables	
Variable:	**Definition:**
Holding Period	Difference, in years, between the announcement date of the exit and the announcement date of the entry (effective dates are used whenever available).
Sell Pressure (time-varying)	Sum of variables Last Exit, Late Seller, Lack of Reputation, and Infrequent Fund Raiser at any given year during the holding period of a deal.
Sell Pressure at Entry	Sum of the values of variables Last Exit, Late Seller, Lack of Reputation, and Infrequent Fund Raiser prevailing for the buyer at the date of purchase of the LBO.
Increase in Sell Pressure	Indicator variable equal to 1 if the Sell Pressure index increases during the holding period (relative to "Sell Pressure at Entry"), and zero otherwise.
Buy Pressure at Entry	Sum of the values of variables Dry Powder, Late Buyer, Lack of Reputation, and Infrequent Fund Raiser prevailing for the buyer at the date of purchase of the LBO.
Fund Performance variables	
Variable:	**Definition:**
IRR	Internal rate of return of a PE fund, as of December 31 2010, reported by Preqin. Funds are identified as buyers using the following procedure: a PE fund is considered a buyer if Capital IQ indicates it as such, or if the fund is the youngest fund in the PE fund family whose investment period overlaps with the LBO deal date (that is, whose deal date falls within years 1 through 6

	of the lifetime of the fund). Only funds marked as "closed" or "liquidated" in Preqin are used.
IRR rank	Rank in terms of IRR of a PE fund, computed across funds with the same vintage (year of fund closing) and geography (U.S. vs. non-U.S.). A rank of 1 indicates the fund with the lowest rank.
Multiple	Money-on-money fund multiple, as of December 31 2010, reported by Preqin. See also "IRR".
Multiple rank	Rank of Multiple of a PE fund, computed across funds with the same vintage (year of fund closing) and geography (U.S. vs. non-U.S.). A rank of 1 indicates the fund with the lowest rank.
Average Buy Pressure	Mean value of the buyer fund's Buy Pressure index over the life of the fund.
Percentage of SBOs	Percentage of the total value of deals made by the buyer that are SBOs.
Fund size	Capital committed at the fund's closing measured in millions of real 2010 U.S. dollars.
Fund sequence	The sequence number of the fund with respect to other funds in the buyer fund family.
Affiliated	Indicator variable equal to 1 if the buyer is affiliated to a financial institution or government agency, and zero otherwise.
Novice	Indicator variable equal to 1 if the buyer is a PE fund family with 3 funds or less under management at the time of the LBO deal, and zero otherwise.
Buyout Fund	Indicator variable equal to 1 if the buyer is a buyout fund, and zero if the buyer is a balanced fund (no other fund types exist in the sample apart from these two).
PEI Top 50	Indicator variable equal to 1 if the buyer is among the PEI Media Top 50 PE firms, and zero otherwise.
Size specialization	Set of three indicator variables equal to 1 if the PE fund family has done more than two-thirds of its deals in the small (medium) [large] size category, defined as deals with an imputed enterprise value < 50 million (between 50 and 250 million) [> 250 million] real 2010 U.S. dollars.
Industry specialization	Dummy variable that takes the value 1 if the PE fund family has done more than one-third of its past deals in the same industry group as the target's industry.

Deal-level Performance variables

Variable:	Definition:
Growth Rate of TEV	Geometric annual growth rate in enterprise value from date of entry to date of exit. This measure is an approximation to the deal's IRR.
Deal rank	Percentile rank (normalized between 0 and 1) in terms of Growth Rate of TEV of a deal, computed across all deals within the same decade and geography (U.S. vs. non-U.S.). A rank of 1 indicates the fund with the highest rank.
Within-Buyer deal rank	Percentile rank (normalized between 0 and 1) in terms of Growth Rate of TEV of a deal, computed across all deals within the same decade and buyer firm. A rank of 1 indicates the fund with the highest rank.

Table A-1

This table shows the results of a Heckman selection model used to create the imputed Enterprise Values for transactions without deal value information, following Stromberg (2008).Variables specifically constructed for this regression include: Distress, an indicator variable equal to 1 if the LBO target deal is financially distressed; Financial sponsor, an indicator variable equal to 1 if there is at least one Financial Sponsor among buyers; Public Investment Fund, an indicator variable equal to 1 if at least one of the buyers is a listed fund; Independent Private Fund, an indicator variable equal to 1 if at least one of the buyers is an private fund not affiliated with a financial institution; MBO, an indicator variable equal to 1 if there is no evidence of PE involvement; Sponsor>20 deals, an indicator variable equal to 1 if the buyer is present in more than 20 deals within the sample period; dummies for geography, where Continental Europe is an indicator variable that takes the value 1 for targets in Belgium, France, Germany, Italy, Luxembourg, Netherlands, Spain, and Switzerland, and Scandinavia is an indicator variable that takes the value 1 for targets in Denmark, Finland, and Sweden; and time dummies for different yearly intervals. All other variables are as described in Appendix B. The outcome equation includes year and industry dummies, where industries are defined using the Fama and French 48-industry classification. t-statistics are reported in parentheses and the symbols ***, **, * denote statistical significance at respectively the 1%, 5% and 10% levels.

Dependent variable	Log of Enterprise Value (Censored obs.)			Deal Value is Disclosed (Uncensored obs.)		
	(1)			(2)		
Private-to-Private	-1.506	(11.69)	***	-2.061	(30.38)	***
Divisional	-1.335	(14.02)	***	-1.450	(21.02)	***
Financial-to-Private	-1.028	(7.00)	***	-1.921	(24.80)	***
Secondary	-0.382	(3.55)	***	-1.588	(22.21)	***
Distressed	-2.376	(17.87)	***	-1.490	(17.67)	***
Financial sponsor	0.100	(0.75)		0.563	(8.75)	***
Public Inv. Fund	-0.086	(1.23)		0.318	(8.03)	***
Indep. Private Fund	0.379	(5.62)	***	-0.146	(4.11)	***
MBO	-1.543	(13.09)	***	-0.069	(1.18)	
Sponsor > 20 deals	0.890	(19.82)	***			
Syndicated	0.126	(2.81)	**	0.204	(9.41)	***
U.S. dummy	0.543	(10.16)	***	-0.453	(18.84)	***
Continental Europe dummy	0.326	(4.74)	***	-0.606	(22.32)	***
Scandinavia dummy	0.084	(0.75)		-0.752	(16.59)	***
1970-1984 dummy				0.555	(5.55)	***
1985-1989 dummy				0.407	(7.21)	***
1990-1994 dummy				0.359	(7.70)	***
1995-1999 dummy				0.359	(12.89)	***
2000-2005 dummy				0.346	(16.40)	***
Heckman's Lambda	-1.459	(3.83)	***			
Intercept	4.777	(11.66)	***	1.206	(13.55)	
Industry dummies	Yes					
Year dummies	Yes					
N	8,535			23,032		