

Ownership, wealth, and risk-taking: Evidence on private equity fund managers*

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Abstract

We examine the incentive effects of private equity (PE) professionals' ownership in the funds they manage. In a simple model, we show that managers select less risky firms and use more debt the higher their ownership. We test these predictions for a sample of Norwegian PE funds and use the professionals' private wealth as a proxy for risk-aversion. Consistent with the model, portfolio company risk decreases with and leverage increases with the manager's ownership in the fund when scaled with her total wealth. Moreover, the higher the ownership, the smaller is each investment, increasing the fund's diversification.

Keywords: Private equity, incentives, fund manager, ownership, risk-taking, wealth

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1 Introduction

Following the 2008 financial crises, the widespread use of variable pay in the financial services industry came under fire. Critics claim that option awards and bonus payments induced short-termism, which led to excessive risk-taking at the expense of long-term value maximization (Blinder, 2009; Thanassoulis, 2012). In response, politicians imposed limits on bonus payments in financial institutions, requiring incentive pay to have clawback features and vest over several years (European Commission, 2013). Such deferral of payout is tantamount to a buildup of equity in the firm, effectively giving managers long-term “skin in the game”.

There is a large body of evidence on the relation between equity-based incentives and risk-taking in firms and financial institutions.¹ Using a unique sample of private equity (PE) investment professionals and portfolio companies in Norway, we contribute to this literature in several ways. First, PE funds are raised and managed by investment professionals of a general partner (GP), who are required to personally invest in the fund. We provide new evidence on the effect of GP ownership on the choice of portfolio company risk and leverage.

Second, it is commonly accepted that risk aversion is declining in wealth (Becker, 2006; Holt and Laury, 2002). The Norwegian setting allows us to scale GP ownership with the private wealth of its investment professionals, which we use as a proxy for the fund manager’s risk-aversion. We show that the effect of GP ownership on risk-taking is significant largely only after controlling for wealth.

Third, GP ownership is determined *ex ante*, when the fund is raised, while the actual acquisition decisions are made *ex post* as the committed capital is drawn down over the investment period covering the five first years of the fund’s life. This sequencing mitigates endogeneity concerns typically plaguing the literature, similar to the approach of Shue and Townsend (2017).² Such concerns are reduced further as we scale the GP ownership with the manager’s wealth at the time of investment, which is likely to have changed since fund inception.

¹See, e.g., Guay (1999), Knopf, Nam and John H. Thornton (2002), Rajgopal and Shevlin (2002), and Coles, Daniel and Naveen (2006) for effects of incentive-based pay on investment policy, Tchistyi, Yermack and Yun (2011) for effects on financial policies, Fahlenbrach and Stulz (2011) for effects on the stock-return volatility of banks, and Driessen, Cremers, Maenhout and Weinbaum (2009) for the performance of equity mutual funds.

²Shue and Townsend (2017) study effects of CEO option grants that vest over several years. See also Chava and Purnanandam (2010) and Coles, Lemmon and Meschke (2012) for other approaches to address similar endogeneity concerns.

GPs (also known as PE firms) are typically compensated with an annual management fee of two percent of the fund’s capital and 20% carried interest on the profits above a certain threshold (Metrick and Yasuda, 2010).³ The carry creates an option-like payoff, with little downside to the fund manager. Since the performance of the current fund also affects subsequent fundraising, the GP’s incentive to generate high returns is even stronger than that provided by the carry alone (Chung, Sensoy, Stern and Weisbach, 2012).

To mitigate potential adverse incentives for excessive risk-taking, GPs are required to invest their own money in the fund.⁴ Robinson and Sensoy (2013) report that US’ GPs on average contribute 2.4% (median 1.0%) of the buyout fund’s capital. However, they find no relation between the dollar amount of GP ownership and fund performance net of fees—as if the GP’s ownership in itself fails to systematically affect the incentives to take risk.

We start by developing a simple theoretical model, in which the GP simultaneously selects a target firm and decides how much debt to use in the acquisition, contributing equity from the fund. The GP can choose between firms with different risk, where high-risk firms have relatively high expected cash flow and high probability of default, and vice versa. The GP invests a fraction β of the equity and receives a performance-based carried interest α on the cash flow above a threshold. Because debt increases the payoff to equity in good states, managers use more debt the higher is the carry α .

The GP is risk averse and derives negative utility from downside risk. It follows that GP ownership has direct implications for the choice of portfolio company. In particular, the GP selects the target firm by trading off the expected cash flow against the downside risk. *Ceteris paribus*, managers with a relatively high β invest in less risky firms. Since lower-risk firms have greater debt capacity, GP ownership also has an indirect effect on leverage. That is, for a given α , the higher her ownership, the more debt the GP uses to finance the firm. Moreover, allowing risk aversion to be declining in wealth, the effect of β on firm risk and leverage is attenuated by the GP’s private wealth.

We then take these model predictions to the data, using a unique sample of 62 firms acquired

³Many GPs charge transaction fees and monitoring fees to their portfolio companies. Phalippou (2009) and Phalippou, Rauch and Umler (2018b) estimate that these fees average 6%-7% of invested capital.

⁴Institutional Limited Partner Association (ILPA) recommends that the GP commitment should be “substantial” and ideally paid in cash (<https://ilpa.org/wp-content/uploads/2019/06/ILPA-Principles-3.0-2019.pdf>).

by 20 Nordic PE funds between 2000 and 2010. We limit the analysis to Norway, where the investment professionals' taxable wealth is public, as are the portfolio companies' financial statements after going private. By hand-collecting private wealth data, we can estimate the incentive effects of GP ownership, not only in dollars and percent of fund value but also as a proportion of GP wealth. This is an important empirical contribution of our paper. As shown below, the effect of GP ownership on portfolio company risk and leverage is significant primarily after controlling for the wealth of the investment professionals.

The GP ownership varies substantially across the PE funds in our sample, with an average of 3.7% (median 1.5%), ranging from zero to 15% of the fund's capital.⁵ In contrast, there is little, if any, variation in carry across funds, so differences in risk-taking incentives can safely be attributed to the cross-sectional variation in GP ownership. Importantly, we show that investment professionals in Norway are required to invest a large fraction of their private wealth in the funds they manage. In our sample, the PE partners' ownership in the fund averages as much as 93% (median 48%) of their taxable net wealth.⁶

Our empirical tests confirm the model predictions. Funds with relatively high GP ownership tend to acquire target firms with low asset beta and return volatility, i.e., firms with low cash-flow risk. Moreover, these funds typically use more debt to finance their acquisitions. Axelson, Jenkinson, Stromberg and Weisbach (2013) document that debt levels in buyouts are determined by economy-wide credit conditions. We add to their evidence by showing that portfolio company leverage increases with GP ownership.⁷

We further show that the PE fund's overall risk is lower the higher the GP's ownership. Specifically, the average portfolio company equity beta declines in GP ownership, suggesting that the reduction in cash flow risk dominates the increased default risk from higher leverage. Moreover, as an alternative measure of portfolio risk, we introduce "ticket size", defined as the ratio of the fund's equity investment in the firm to the fund's total capital. The smaller this ratio, the greater the number of portfolio companies, and the more diversified is the PE

⁵GP commitments are generally substantial. In 2019, one-third of PE funds required a GP ownership of 3% or more (MJ Hudson research, <https://www.mjhudson.com/downloads/>).

⁶SoftBank executives were asked to take on large personal loans that sometimes exceeded 10 times their base salary to invest its \$97bn Vision Fund (Financial Times, 09/24/2019).

⁷See also Colla and Wagner (2012), who find that buyout leverage increases with firm profitability and decreases with cash flow volatility.

fund. Consistent with our results on target firm equity beta, we document that the average ticket size is decreasing in GP ownership. This evidence suggests that the incentive effect of the GP’s ownership is not limited to characteristics of the individual target firms, but has a broader impact on the overall design of the fund’s portfolio.

Importantly, the relation between GP ownership and portfolio company risk and leverage is significant primarily when the GP’s ownership in the fund is scaled by the private wealth of its investment professionals. Neither the ownership in percent of fund value nor the dollar amount invested, is related to portfolio company systematic risk and leverage, consistent with Robinson and Sensoy (2013). Thus, a central contribution of this paper is to show the importance of controlling for the investment professionals’ private wealth to properly assess the incentive effect of GP ownership. This complements the evidence in Pool *et al.* (2019) that mutual fund managers who experience a wealth shock from declining housing prices reduce the risk in their delegated funds and Faccio *et al.* (2011) that shareholder portfolio concentration affects corporate risk-taking.

In our model, the GP’s ownership is exogenously determined upfront, at fundraising, whereas the target companies are selected at a later point in time. We thus posit that GP ownership has a causal effect on the subsequent choice of portfolio company risk. While one potentially could be concerned with reverse causality and endogeneity, the data are inconsistent with the predictions of such equilibria. Thus, while we don’t have a direct identification strategy, the data support a causal effect of the incentives provided by GP ownership on risk-taking.

First, limited partners (LPs) often negotiate the partnership agreements and therefore influence the terms (Robinson and Sensoy, 2013). As a result, GP ownership could be an optimal contract designed by LPs to resolve moral hazard problems. Specifically, if LPs know the GP’s risk preferences *ex ante*, they can select a GP ownership that *ex post* counteracts her personal risk preferences. For example, LPs may require high ownership from a risk-loving GP to mitigate her appetite for risk and low ownership from a risk-averse GP to encourage further risk-taking. In this equilibrium, where GP ownership is set to counteract her risk preferences, there is no systematic relation between GP ownership and portfolio company risk—something our data rejects.

Second, the GP may set the ownership stake to signal her own risk aversion to the LPs. Specifically, a risk-loving GP would choose high ownership to separate herself from a risk-averse GP, who selects low ownership. As a result, in a signaling equilibrium, GP ownership is positively correlated with target company risk. The same empirical implication is obtained if unobservable fund manager characteristics, such as risk preference and ability, generate a spurious correlation between GP ownership and target firm risk. For example, a risk-averse GP could select both lower fund ownership and less risky target firms. Our empirical analysis instead shows that GP ownership is negatively related to risk-taking, rejecting the notion of a signaling equilibrium.

Overall, our evidence suggests that LPs effectively reduce PE fund managers' incentives to take risk by requiring them to invest in the fund. That notwithstanding, LPs ultimately care for the risk-adjusted return net of fees. Whether this reduction in risk appetite is optimal or not goes beyond the scope of this paper and is something we leave for future research.⁸

The paper proceeds as follows. Section 2 sets up and discusses our theoretical model and its predictions. Section 3 describes the data, while Section 4 presents the empirical results. Section 5 concludes.

2 Model

In this section, we develop a simple model showing how the GP's ownership and wealth affect her choice of target company risk and leverage. As discussed above, the data are consistent with a causal relationship from the GP's compensation scheme to target company selection, whereas they reject the implications from optimal contract equilibria. Our model, therefore, relies on an exogenous GP compensation scheme, similar to that typically observed in PE funds, and investigates the comparative statics of GP ownership on risk-taking.

⁸Gupta and Sachdeva (2019) and Ibert (2019) find that hedge funds and mutual funds with more inside investment outperform other funds. For evidence on PE fund returns, see, e.g., Kaplan and Schoar (2005), Phalippou and Gottschalg (2009), Groh and Gottschalg (2011), Driessen, Lin and Phalippou (2012), Harris, Jenkinson and Kaplan (2014), Higson and Stucke (2012), Phalippou (2014), Braun, Jenkinson and Stoff (2017), and Phalippou, Ang, Goetzmann and Chen (2018a).

2.1 Model set-up

The model has three agents: a GP raising and managing a PE fund, risk-neutral investors (LPs) contributing capital to the fund, and a bank providing debt. At time $t = 0$, the GP selects risk through the choice of a target company and the amount of debt financing. At time $t = 1$, the target firm realizes a cash flow that is shared by the bank, investors, and the GP.

The firm's realized cash flow x is $R + \Delta$ (high), R (medium), or $R - \rho$ (low) with probability $0.5q$, $1 - q$, and $0.5q$, respectively. Firms vary in the likelihood of the tail outcomes and hence in the risk q of their cash flows. We assume $\Delta > \rho$ and zero discount rate, so the expected value of the firm $V(q) = R + 0.5q(\Delta - \rho)$ is increasing in q .

After selecting a firm with a certain q , the GP approaches the bank for debt financing. The GP finances the purchase price I by borrowing D against the firm's cash flow, using equity from the PE fund for the remaining amount of $I - D$. The bank charges an interest rate r and receives $D(1 + r)$ at $t = 1$ as long as the realized cash flow $x > D(1 + r)$. We let $R > D(1 + r) > R - \rho$, so the firm defaults and the bank receives $R - \rho$ and investors zero in the low outcome.

We let cash flow risk be contractible and the bank sets the loan rate r accounting for q . With a competitive loan market, the bank will require a rate r that allows it to break even:

$$0.5qD(1 + r) + (1 - q)D(1 + r) + 0.5q(R - \rho) = D. \quad (1)$$

The cash flow to equity, left after the bank is paid off, is shared between investors and the GP. For tractability, we ignore potential benefits from leverage, such as tax shield (Modigliani and Miller, 1958) and reduced agency costs (Jensen, 1986), and let firm value $V(q)$ be independent of leverage.

2.2 The GP's compensation scheme

The GP is compensated through a performance-based carried interest α received at $t = 1$.⁹ Investors cannot observe GP risk-aversion and use a standard rate for $\alpha \in (0, 1)$. The carry

⁹In reality, GPs also charge a management fee, expressed as a percentage of the fund's capital. Such fixed fee has no impact on the GP's investment decision and is therefore ignored in the analysis below.

pays the GP a fraction of the cash flow to equity exceeding a return e . We assume that e is a non-risk adjusted exogenous rate, with $e > r$.¹⁰ The carried interest is thus $\alpha(x - C) > 0$, where C is the sum of the debt payments to the bank and the hurdle amount paid to investors:

$$C(D) = D(1 + r) + (I - D)(1 + e) = I(1 + e) - D(e - r). \quad (2)$$

Combining Eq. (2) with the bank's participation constraint in Eq. (1) yields

$$C(D) = I(1 + e) - De + \frac{0.5qD}{1 - 0.5q} - \frac{0.5q(R - \rho)}{1 - 0.5q}. \quad (3)$$

To make debt financing attractive, we assume that $\Delta + \rho - R > D(1 + e)$. That is, the difference in cash flow between the high and low outcome net of that of the medium outcome exceeds the reduction in the hurdle payout due to debt financing. For simplicity, we also let $R = I(1 + e)$, so the cash flow in the medium outcome equals the hurdle payout for an all-equity firm. These assumptions ensure that the all-equity firm has positive NPV.¹¹ Moreover, in the medium outcome and with debt financing, $x - C = D(e - r) > 0$ and the GP receives carry.

The carry is zero in the low state. Hence, it is option-like with no downside risk. To release this limited-liability constraint, investors require the GP to invest in the fund. The GP contributes a fraction $\beta \in (0, 1)$ of the fund's equity investment at $t = 0$ and receives β of the realized equity value $V(q)$ at $t = 1$. For a leveraged firm, the equity value is:

$$V^D(q, D) = 0.5q[R + \Delta - D(1 + r)] + (1 - q)[R - D(1 + r)] \quad (4)$$

While debt funding increases the payoff to equity in the high and medium outcomes, it comes with a cost to the GP in the low state. In case of default, the GP incurs a reputational loss that may hamper future fundraising efforts. We let the GP's personal cost of default B be increasing in the bank's loss and convex in D . Moreover, we assume that the failure of a low-risk firm causes greater reputational loss than that of a high-risk firm. This reflects the notion that bankruptcy of portfolio firms is perceived by LPs as a signal of the GPs' monitoring

¹⁰This maps industry practice, where the hurdle rate is set when the fund is raised, well before the fund manager starts select target companies.

¹¹The NPV of the all-equity firm is $V(q) - I$. With $R = I(1 + e)$, $V - I = Ie + 0.5q(\Delta - \rho) > 0$.

abilities. The bankruptcy of a low-risk firm is viewed as a more negative signal leading to higher reputational losses as compared to the bankruptcy of a low-risk firm. Dropping this assumption complicates our analysis but leaves the qualitative results unchanged. Hence, we let $B(q, D) = \lambda D^2/q$, where $\lambda \in (0, 1)$.

We further assume that the GP is risk-averse and derives negative utility from downside risk. This negative utility $k(q) = 0.5cq^2$, where $c \in (0, 1)$ captures the GP's risk aversion and $\partial k/\partial q > 0$. Since the GP is exposed to downside risk through her ownership in the firm, we let this cost be proportional to β (see Bolton, Mehran and Shapiro (2011) for a related approach). Moreover, we let c be decreasing in the GP's private wealth w (i.e., $c(w)$ with $\partial c/\partial w < 0$), implying that wealthier GPs are less risk-averse (Holt and Laury, 2002; Rabin, 2000).

2.3 GP ownership and risk-taking

Proposition 1 summarizes the effect of the GP's equity ownership on her choice of project risk and leverage.

Proposition 1: *The GP's incentive to select riskier firms and use less debt financing is decreasing in her ownership β .*

To see this, the objective function of the fund manager is:¹²

$$\begin{aligned} V^{GP}(q, D) = & \beta(V^D(q, D) - (I - D)) + \alpha(V^D(q, D) - C(D)|x > C) \\ & - 0.5qB(q, D) - \beta k(q). \end{aligned} \quad (5)$$

Combining Eq. (5) with the bank's participation constraint in Eq. (1) and the equity value of the leveraged firm in Eq. (4), and substituting for the functions of C in Eq. (3), B and k , the GP's objective function can be rewritten as:

$$\begin{aligned} V^{GP}(q, D) = & \beta(0.5q(R + \Delta) + (1 - q)R + 0.5q(R - \rho) - 0.5cq^2 - I) \\ & + \alpha[0.5q(R + \Delta - C + (1 - q)(R - C))] - 0.5\lambda D^2. \end{aligned} \quad (6)$$

¹²For tractability, we ignore the portion of the carry that the GP has to pay from his ownership stake β in the target firm. With $\alpha = 0.20$ and $\beta = 0.01$, this portion will be small in comparison with the other components of the GP's payoff and can safely be ignored without altering the results.

When choosing the level of project risk q and debt financing D , the GP faces two opposing effects that she has to trade off against each other. Higher q is associated with, on the one hand, larger expected cash flows and, on the other hand, greater negative utility k related to risk aversion. Similarly, higher debt D is accompanied by higher expected carry, as cheaper debt replaces more expensive equity, but also greater expected default cost B .

Since, from Eq. (2), $\partial C/\partial D = -(e - r)$, the first-order condition for the GP's choice of risk is:

$$\frac{dV^{GP}}{dq} = \beta(0.5(\Delta - \rho) - cq) + 0.5\alpha(\Delta + \rho - D(1 + e) - R) = 0 \quad (7)$$

and the first-order condition for her choice of debt is:

$$\frac{dV^{GP}}{dD} = -\lambda D + \alpha((1 - 0.5q)e - 0.5q) = 0. \quad (8)$$

Solving these two equations yields:

$$q(D, \beta, \alpha) = \frac{(\Delta - \rho)}{2c} + \frac{\alpha(\Delta + \rho - D(1 + e) - R)}{2c\beta} \quad (9)$$

and

$$D(q, \alpha) = \frac{\alpha((1 - 0.5q)e - 0.5q)}{\lambda}. \quad (10)$$

Note that project risk and leverage are complements to each other. That is, q is a function of D in Eq. (9) and D is a function of q in Eq. (10). Notice also that the two dimensions of risk, q and D , operate in opposite directions. Higher project risk leads the GP to optimally choose lower leverage and vice versa.¹³ Our two choice variables are in this sense risk-substitutes. This tradeoff between project risk and leverage, which can be seen in the first-order conditions, is a key mechanism in our model.

An important consequence of this complementarity is that exogenous parameters may affect the choice of risk and leverage directly, via the respective first-order condition, as well as indirectly, through the other choice variable. For example, the carry α affects both q and D directly, and therefore also indirectly. In contrast, the GP's equity ownership β has a direct

¹³This follows from $\frac{dD}{dq} = -\frac{\alpha e - 1}{2\lambda} < 0$ and $\frac{dq}{dD} = -\frac{\alpha(1+e)}{2c\beta} < 0$.

effect on q only and hence only an indirect effect on the leverage choice.

We derive the comparative static effects of the GP's ownership by totally differentiating the first-order conditions. From Eqs. (7) and (8), we get:

$$\frac{dq}{d\beta} = \frac{-\lambda(cq - 0.5(\Delta - \rho))}{\Gamma} < 0 \quad (11)$$

and

$$\frac{dD}{d\beta} = \frac{(cq - 0.5(\Delta - \rho))(0.5(1 + e))}{\Gamma} > 0, \quad (12)$$

where $\Gamma > 0$ is the determinant of the Hessian matrix of the two endogenous variables.¹⁴

Recall from above that we let $\Delta + \rho - R > D(1 + e)$, so debt financing increases the cash flow to equity in the good states. For the first-order condition of V^{GP} with respect to q in Eq. (7) to be satisfied, it follows that $cq > 0.5(\Delta - \rho)$. Consequently, at the optimum, from the risk-averse GP's point of view, the marginal cost of an increase in project risk is higher than the marginal benefit. Thus, an increase in β has a negative effect on q and a positive effect on D . The economic intuition is that the bigger equity stake (higher β) induces the risk-averse GP to select a less risky firm (lower q), which, in turn, is financed with more debt (higher D).

The impact of the GP's private wealth on the incentive effect of her equity ownership is summarized in our second proposition.

Proposition 2: *An increase in the GP's wealth w attenuates the incentive effect of the GP ownership on the choice of firm risk and leverage.*

To see this, we totally differentiate Eqs. (7) and (8) with respect to the two dimensions of risk (q and D), taking the negative relation between c and w into account:

$$\frac{dq}{dw} = \frac{-\beta q \lambda(\partial c / \partial w)}{\Gamma} > 0 \quad (13)$$

¹⁴ Γ is the determinant of the D-q matrix of the second derivatives stemming from Eqs. (9) and (10). Since the direct second-order conditions are negative, a positive Γ is a necessary and sufficient condition for the Hessian matrix to be negative definite, implying that the optimal solution D^* and q^* resulting from Eqs. (11) and (12) are maxima.

and

$$\frac{dD}{dw} = \frac{(0.5\beta q(1+e)(\partial c/\partial w))}{\Gamma} < 0. \quad (14)$$

An increase in wealth hence has opposite effects on the two risk measures. Wealthier GPs are less risk averse and therefore select riskier firms (Eq. 13), which they finance with less debt (Eq. 14).

In sum, our model generates three testable predictions. As stated in Proposition 1, the GP's incentive to select risky portfolio companies is declining in her ownership β . Moreover, having chosen a less risky firm, higher ownership β induces the GP to use more debt financing.¹⁵ Furthermore, as stated in Proposition 2, since wealth lowers the negative utility associated with risk, the incentive effects of GP ownership are attenuated by GP wealth. In the following, we test Propositions 1 and 2 by scaling the GP's ownership with the net wealth of its investment professionals and partners.

3 Sample selection and description

3.1 Sample selection and data sources

We start with a list of all buyout transactions in Norway between 1991 and 2010, provided by the Argentum Centre for Private Equity at the Norwegian School of Economics (NHH). Comparing this list with the web pages of Nordic PE funds, we can identify 142 acquisitions of 134 unique Norwegian firms. By manually matching on company name and year, we successfully identify 113 of the target firms in the Brønnøysund Register Centre database, provided by Mjøs, Berner and Olving (2016). We retrieve financial statements and ownership data for the period 1997–2012 for these firms.

Norwegian corporate law prevents acquirers from servicing acquisition debt with the target firm's cash flow.¹⁶ To circumvent this rule, buyout transactions are typically executed in two steps. First, the PE fund raises debt against an empty holding company used to acquire the target. Second, about a year later, the holding company merges with the portfolio company. To account for this practice, we consolidate the debt of the target firm and its Norwegian

¹⁵These comparative statics hold also if β is determined endogenously in an optimal contract.

¹⁶"Aksjeloven §8-10. Kreditt til erverv av aksjer mv".

holding companies in the year of the acquisition.¹⁷

Information on the GP’s ownership in the fund is typically confidential. However, from a large LP that wants to remain anonymous, we are able to get this information for 20 PE funds. The 20 funds, which are raised by 11 Nordic GPs, acquire 62 of the 113 target firms between 2000 and 2010. As shown in Appendix Table 1, the 62 firms in our final sample are on average acquired by a higher-sequence fund (3.6 vs. 2.7) and somewhat later in time (2007 vs. 2004) compared to the 51 firms with missing GP ownership information. All firm characteristics and other fund characteristics are, however, similar across the two groups.

To retrieve data on wealth, we first identify all investment professionals from the GPs’ websites. We drop professionals who join a GP after the fund’s investment phase and do Google searches for those that have left. Discussions with LPs and GPs confirm that local investment professionals typically are responsible for the local deals. Thus, we limit our analysis to the 120 investment professionals residing in Norway, eliminating 123 professionals that live elsewhere.

For the 120 investment professionals in the sample, we obtain the history of tax records from the Norwegian tax authorities. These records disclose their taxable net wealth, used below to adjust the GP’s ownership in the fund. The caveat with this wealth data is that, whereas listed securities are valued at 75% of their market value, real estate is valued at only 25% of its assessed value—substantially below its market value. Moreover, investments in private firms are typically listed at or below book value, while debt is deducted at face value. Thus, our wealth measure will underestimate the true wealth of investment professionals. That notwithstanding, it does allow us to control for differences in wealth in the cross-section, providing a proxy for their relative risk aversion.

We cannot identify the exact deal team and assume that the GP’s investment professionals in Norway share responsibility for the fund’s local investments. While this assumption introduces noise in the wealth estimate, such noise works against us finding any results and is therefore of limited concern. Moreover, because the wealth largely depends on the success of earlier funds, there is likely a high correlation in wealth between the investment professionals’ of a GP. Thus, averaging wealth within a GP may reduce some of the noise in the wealth esti-

¹⁷For tax reasons, it is attractive to domicile holding companies in Norway. In our sample, only 32% of the firms are owned directly by the PE fund.

mate. In Section 4.4 below, we exploit this notion in weighted least square (WLS) regressions that give more weight to observations where the wealth estimate is based on a larger number of investment professionals.

3.2 Sample description

Panel A of Table 1 presents summary statistics for the 20 PE funds in the sample. All variables are defined in Table 2. The average fund has committed capital of \$942 million (median \$325 million) and is number 3.6 (median 3) in sequence. Moreover, 3.1 (median 3) of its portfolio companies are in our sample. The average GP is 10 (median 8) years old when the fund acquires its first sample firm. It has 16.6 (median 10) investment professionals in Norway, of which 8.4 (median 7) are partners. Panel A further shows that the taxable wealth of the average investment professional and partner is \$1.9 million (median \$1.3 million) and \$3.2 million (median \$1.5 million), respectively, in the year of the sample firm acquisition.

For a subset of funds, we have information on the management fee (14 funds), carry (11 funds), and equity hurdle rate (12 funds).¹⁸ The average fund has a management fee of 2.0% (median 2.0%), carry of 18% (median 20%), and hurdle rate of 8.0% (median 8.0%). Since there is almost no variation in these rates across funds, we ignore them in the empirical analysis below. It is worth noting that, unlike US funds, Nordic PE funds do not charge transaction and management fees from their portfolio companies. Moreover, there is typically a clawback, requiring the GP to return any carry previously paid out if the fund subsequently underperforms.

In Panel B, we report summary statistics for the 62 portfolio companies in the sample. At the end of the fiscal year of the acquisition, the average firm has total assets of \$120 million (median \$67 million), sales of \$100 million (median \$54 million), and book leverage, defined as total liabilities/total assets, of 62% (median 64%). The return on assets (ROA, defined as EBITDA/total assets) averages 3% (median 7%) and asset tangibility (property, plant and equipment/total asset) averages 8% (median 0.4%). Most of the sample firms are in the services (42%), transportation (24%), and retail and wholesale (16%) industries, as defined by the European Nomenclature of Economic Activities (NACE) codes 70-75, 62-65, and 51-52,

¹⁸The fee information is from the LP providing GP ownership data.

respectively.

An empirical test of our model requires a measure for firm risk. Since the target firms are private, we estimate their asset betas from a matched sample of public firms. We run a propensity score estimator that finds the best fit among the approximately 250 firms listed on the Oslo Stock Exchange (OSE) in a given year. The estimator matches on total assets, sales, ROA, and asset tangibility. We use nearest neighbor matching with replacement and assign five matches to each sample firm.¹⁹ The matched firms are on average larger (in total assets and sales), but do not differ significantly in terms of ROA and asset tangibility.

We first estimate equity beta for each matched firm over a 24-month rolling window against the Oslo Main Index, ending in the month of the acquisition and using monthly stock return data from NHH’s “Børsprosjektet”.²⁰ We then delever the matched firm’s equity beta to obtain its asset beta, assuming a debt beta of zero. The sample firm’s asset beta is the average asset beta of the five public matches. We next compute sample firms’ equity beta by relevering the imputed asset beta at the target company’s actual post-transaction book leverage. Because the book value of assets is written up in connection with the acquisition under Norwegian Generally Accepted Accounting Principles (GAP), book leverage is a close approximation of the market leverage. As shown in Panel B, the average sample firm has an asset beta of 0.47 (median 0.46) and an equity beta of 0.69 (median 0.59). These betas are consistent with the relatively low betas estimated by Driessen, Lin and Phalippou (2012) for portfolio companies in US buyout funds.

As an alternative risk measure, we estimate the return volatility for the five matched firms. Specifically, *Volatility* is the standard deviation of the daily stock return over the eight months preceding the acquisition, averaged across the five matched firms. The average firm in our sample has a return volatility of 0.030, with a median of 0.031. The last row of the panel shows *Ticket size*, defined as the sample firm’s book value of equity (winsorized at zero) divided by the committed capital of the fund. As discussed above, because asset values are generally written up to reflect the purchase price, the book equity provides a fair approximation of the fund’s investment in the target company. We use this variable as a proxy

¹⁹That is, each sample firm has five unique matched listed firms, whereas a listed firm may be a matched firm for more than one sample firm (possibly in different years).

²⁰<http://mora.rente.nhh.no/borsprosjektet>.

for fund diversification. The larger the ticket size, the greater proportion of the fund’s capital is invested in a single firm, and the more concentrated is the fund’s portfolio. In our sample, the average ticket size is 0.10, with a median of 0.05.²¹

Finally, Panel C of Table 1 presents summary statistics for the GP ownership across the 62 sample firms. The average GP in our sample is required to invest 3.7% (median 1.5%) of the fund’s capital, ranging from a low of zero to a high of 15%. This GP ownership is somewhat higher than the average of 2.4% (median 1.0%) reported for US buyout funds (Robinson and Sensoy, 2013). To compute the total dollar amount owned by the investment professionals, we assume that the proportion of the fund invested in Norway equals the fraction of the GP’s professionals that reside in Norway. With this assumption, the GP ownership averages \$13.0 million (median \$5.9 million) per fund.

The relative ownership is defined as the ratio of the GP’s dollar ownership in the fund to the net wealth of the GP’s investment professionals or partners in Norway, averaged over the three years before the acquisition.²² We smooth wealth to avoid large variations in the wealth estimate from year to year. Since the GP’s risk aversion is determined by the total amount at risk, we use the GP’s ownership in the fund—and not in the individual target firm—in the empirical analysis below. As shown in Panel C, the GP professionals invest on average 89% (median 43%) of their taxable wealth in the fund. It is possible, however, that the requirement to invest is limited to the PE firm’s partners. Restricting the GP’s investment in the fund to its partners, the average GP ownership is 93% (median 48%) of the partners’ net wealth. In the empirical analysis below, we scale the GP ownership with the taxable wealth of all investment professionals as well as that of partners for robustness.

One might argue that, if management fees are sufficiently large, the investment professionals could finance their equity contribution with the fee income, rendering their private wealth largely irrelevant. We address this argument by comparing the estimated management fee of the fund with industry average office and staff cost estimates. While not tabulated, this analysis shows that the fee income net of costs falls substantially short of the required GP equity investment, also for the larger funds in the sample. Thus, we do not consider the

²¹This suggests that our sample firms make up one-third of the average PE fund’s portfolio. We set ticket size to zero for three firms with negative book equity.

²²We winsorize two observations with a ratio above five.

management fee to be a substitute for wealth as far as the GP commitment is concerned.

4 Empirical analysis

4.1 GP ownership and target firm cash flow risk

In this section, we perform cross-sectional tests of our model predictions. According to Proposition 1, the incentive to invest in risky firms is decreasing in GP ownership. We first use the target firm’s asset beta as a proxy for portfolio company cash flow risk. Table 3 shows the coefficient estimates from ordinary least squares (OLS) regressions of asset beta. Standard errors are clustered by GP to account for the correlation in risk-taking within a GP. While not tabulated, using robust standard errors yields similar inferences (results available upon request).

The regressions control for fund and firm characteristics that may capture past success and drive portfolio company risk. The fund characteristics are *GP_age* (number of years since the GP was founded when the firm is acquired), *Fund_size* (log of the fund’s committed capital) and *Fund_sequence*. The firm characteristics are (log of) total sales, *Tangibility*, and *ROA* (return on assets). The even-numbered columns include dummies for the three largest industry groups (services, transportation, and retail and wholesale), examining GP risk-taking within a given target industry, whereas the odd-numbered columns do not, allowing the GP to select portfolio company risk through the industry choice. All regression models include deal year dummies to control for time-varying economy-wide conditions, such as the credit market spread.

As shown in Table 3, of the control variables, GP age and fund sequence generate significant coefficients. Specifically, portfolio company asset beta is decreasing in GP age and increasing in fund sequence. Since only successful managers are able to raise new funds, *Fund_sequence* might capture past success. The positive coefficient may therefore imply that managers select more risky firms after having accumulated more wealth, consistent with wealth being a proxy for risk aversion. Moreover, for a given fund sequence, it has taken an older GP longer time than a younger GP to raise new funds, indicating that GP age is inversely related to success after controlling for fund sequence. Since success is tantamount to wealth accumulation, this could explain why younger (and more successful) GPs on average choose more risky firms.

Our main variable of interest is GP ownership. The regressions include the percent (columns 1-2) and dollar amount (columns 3-4) of GP ownership in the fund. As shown in the table, however, the coefficient estimates for *%_ownership* and *\$_ownership* are all insignificant. That is, GP ownership measured neither in percent of the fund’s capital nor in absolute dollar amount can explain the GP’s choice of portfolio company systematic cash flow risk.

Proposition 2 states that the incentive effect of GP ownership is attenuated by wealth. To test this, we scale the GP’s ownership with the wealth of its investment professionals and partners. This variable, which we label *Rel_ownership*, allows us to control for relative risk aversion captured by wealth in examining the incentive effect of the GP’s ownership. Importantly, as shown in the last four columns of Table 3, asset beta is decreasing in *Rel_ownership*. That is, GPs with a relatively high proportion of their private wealth invested in the fund tend to select less risky firms, as predicted by our model.

The coefficient estimates for *Rel_ownership* are negative and significant at the 5% level when adjusting with the wealth of all the GP’s investment professionals (columns 5-6). Adjusting for the partners’ wealth only, the coefficient is significant at the 5% level when including industry dummies (column 8) and otherwise at the 10% level (column 7). Thus, if anything, it appears that the selection of lower systematic cash flow risk is more pronounced within the target firm’s industry. To gauge the economic impact of GP ownership on asset beta, we note that the average asset beta is 0.47, while the coefficient estimate is -0.043 (column 6). A one standard deviation increase in the GP wealth invested in the fund reduces asset beta by 13%, from 0.47 to 0.41.

We next use return volatility as a measure for the firm’s idiosyncratic cash flow risk. While a well-diversified investor should care about systematic risk only, PE funds have a limited number of firms in the portfolio, so much of the idiosyncratic risk cannot be diversified away. Table 4 reports the coefficient estimates from OLS regressions of *Volatility*, using the same control variables as in Table 3 and clustering standard errors by GP. As shown in columns (1)-(4), *%_ownership* and *\$_ownership* now generate negative and highly significant (p-value<0.01) coefficients. The higher the GP’s percentage and dollar ownership in the fund, the lower the return volatility of the acquired firms, consistent with Proposition 1. However, there is no discernible effect of GP ownership when scaled with wealth, whether that of all investment

professionals (columns 5-6) or partners (columns 7-8).

Overall, the evidence in Tables 3 and 4 suggests that GPs tend to choose portfolio companies with less risky cash flows the higher their ownership in the fund, consistent with our model.

4.2 GP ownership and target firm leverage

The second implication of Proposition 1 is that the GP's incentive to finance acquisitions with debt is increasing in her ownership in the fund. To test this, Table 5 reports the coefficient estimates from OLS regressions for portfolio company leverage. Starting with the control variables, there is some evidence that leverage is decreasing in firm profitability and increasing in asset tangibility, consistent with, e.g., Titman and Wessels (1988) and Rajan and Zingales (1995).

Turning to GP ownership, *%_ownership* and *\$_ownership* are again insignificant (columns 1-4). That is, there is no evidence that the percent or the dollar amount ownership in the fund affects the GP's choice of portfolio company leverage. More importantly, *Rel_ownership_all* and *Rel_ownership_partners* both generate positive coefficients, significant at the 5% level (column 6) and 1% level (column 8), respectively, when including industry dummies. That is, consistent with Propositions 1 and 2, the higher the proportion of the GP's wealth invested in the fund, the more debt is used to finance the target firm relative to other portfolio companies in the same industry.

Thus, in line with the above results for asset beta, while GP ownership in itself does not affect the choice of portfolio company leverage, it does so when adjusted for the wealth of the GP's investment professionals or partners. To gauge the economic impact of the wealth-adjusted GP ownership on leverage, note in Table 1 that the average leverage in the sample is 0.62. From column (6), a one standard deviation increase in the GP's ownership scaled by her wealth increases portfolio company leverage by 15%, from 0.62 to 0.71.

4.3 GP ownership and PE fund portfolio risk

Our analysis so far shows that GPs with a relatively high fraction of their wealth invested in the fund tend to, on the one hand, select firms with lower asset beta and, on the other hand, use more debt to finance these firms. Both results follow from Propositions 1 and

2. Our model, however, stays silent on the combined effect of the lower cash flow risk and higher leverage. That is, whether or not the reduced cash-flow risk associated with higher GP ownership dominates the increased default risk from taking on more debt. We next examine the effect of GP ownership on the systematic risk of the fund’s equity investment in the target firm, capturing the net impact of the fund manager’s investment decision.

Table 6 shows the coefficient estimates from OLS regressions for portfolio company equity beta, using the same model specifications as before. As in Table 3, the control variables *Fund_sequence* and *GP_age* generate significant coefficients. This suggests that more successful GPs, having raised a greater number of funds in a shorter time, on average make riskier investments.

Turning to the variables capturing the GP’s ownership in the fund, the coefficient estimates for *%_ownership* and *\$_ownership* are insignificant. Consistent with Robinson and Sensoy (2013), who fail to find any effect of GP ownership on fund returns net of fees, neither the percent nor the dollar amount of GP investment can explain the choice of portfolio company equity risk. However, as shown in columns (5)-(8), *Rel_ownership_all* and *Rel_ownership_partners* both generate negative and highly significant coefficients ($p < 0.01$). That is, the higher the proportion of the GP’s wealth invested in the fund, the lower the systematic risk of the fund’s equity investments. The economic effect is large: A one standard deviation increase in the GP’s ownership scaled by wealth decreases the portfolio company equity beta from on average 0.69 to about 0.50 (column 6).

Another way to reduce risk is to lower the idiosyncratic risk of the PE fund’s equity investments. This could be achieved by increasing the number of portfolio companies, investing a smaller amount in each firm. While fewer companies in the portfolio increase the amount of time the GP can monitor each firm, it leaves the GP more vulnerable to random exogenous shocks that may reduce company performance. The decision is again the result of a tradeoff, where higher leverage increases equity risk, while at the same time reducing the size of the equity investment from the fund. Thus, to the extent higher ownership makes the GP more risk-averse, this could further manifest itself in a greater number of portfolio companies.

In table 7, we examine the cross-sectional determinants of *Ticket_size* (the fund’s equity investment in the target firm divided by fund size). In line with the results for portfolio

company risk, the coefficients for *Rel_ownership_all* and *Rel_ownership_partners* are negative although only marginally significant ($p < 0.10$). It appears that GPs with a relatively high fraction of their wealth invested in the fund not only select target firms with lower systematic equity risk (beta), but further diversify idiosyncratic fund risk by investing a smaller fraction of the fund’s capital in each portfolio firm. A one standard deviation increase in the proportion of the GP’s wealth invested in the fund reduces the fraction of the fund invested in the average target firm from 0.10 to 0.06 (column 6).

Ticket size is also decreasing in *%_ownership* ($p < 0.05$), consistent with increasing risk aversion as managers own a greater fraction of the fund. However, *\$_ownership* generates a positive coefficient ($p < 0.05$), so the ticket size tends to increase with the absolute amount the GP has invested in the fund. One possible explanation is that managers who have invested a relatively high dollar amount prefer to focus on a smaller number of target firms, monitoring each portfolio company more closely. The results are robust to a different measure of ticket size, which uses the total assets of the portfolio company instead of the book value of equity.

In sum, GP ownership appears to fundamentally influence the selection of individual portfolio companies with respect to their cash-flow risk and leverage, as well as the overall portfolio risk and diversification. However, our empirical results show that this incentive effect is typically not discernable unless adjusting for the private wealth of the GP’s investment professionals or partners, capturing their relative risk aversion. This suggests that it is critical to control for wealth to appropriately assess the impact of GPs’ ownership on their appetite for risk-taking in the funds they manage.

4.4 Estimating the effect of GP ownership using WLS regressions

For robustness, we estimate WLS regressions that use the square root of the number of GP professionals as weight. These regressions exploit the notion that the accuracy of our wealth estimate increases with the number of investment professionals used to compute the GP wealth measure. The results are reported in Appendix Tables 2–6. Note first that the same coefficient estimates are statistically significant in the WLS regressions as in the OLS regressions tabulated in Tables 3–7. Moreover, for the statistically significant coefficients, the point estimates are almost identical to those reported above, leaving all inferences unchanged.

In the following, we focus on the coefficients for which the statistical significance has changed between the 1%, 5%, and 10% level. First, the significance level of $\$ownership$ is lower in the WLS regressions for return volatility (Appendix Table 3) and ticket size (Appendix Table 6), down to 5% and 10%, respectively. Second, the significance level of $Rel_ownership$ is higher in the WLS regressions for portfolio company leverage (Appendix Table 4)—up to 1% and 5%—and ticket size (Appendix Table 6)—up to 5%. In the WLS regressions for asset beta (Appendix Table 2), the coefficient for $Rel_ownership$ is more significant in column 7 (p-value <0.05) but less significant in columns 6 and 8 (p-value <0.10). Moreover, as shown in Appendix Table 5, the effect of $Rel_ownership$ on equity beta remains significant at the 1% level in the WLS regressions. Overall, the WLS regressions confirm our finding that the wealth-adjusted GP fund ownership tend to influence the choice of portfolio company risk and leverage, consistent with Proposition 1 and 2.

5 Conclusion

GPs are required to invest in the PE funds that they manage. In this paper, we examine how this ownership affects the GP’s investment decision. Since the GP ownership is determined *ex-ante*, when the fund is raised, and the fund’s investment decisions are typically made several years later, this setting reduces concerns about endogeneity and reverse causality. In addition, reverse causality implies a relation between GP ownership and target company risk that is not supported by the data.

We first develop a simple model, which shows that higher ownership incentivizes the GP to select less risky target firms and use more debt to fund the acquisitions. Moreover, allowing GP risk aversion to be decreasing in wealth, the incentive effect of GP ownership is attenuated by GP wealth. We then take the model predictions to the data, using a unique sample of 62 Norwegian PE transactions. We use hand-collected data on the private wealth of the investment professionals as a proxy for differences in risk aversion across GPs.

The empirical evidence supports the predictions of the model. Portfolio company asset beta and stock return volatility decreases and leverage increases in GP ownership. Moreover, GPs with relatively high ownership tend to reduce the overall risk of the fund’s portfolio, both

in terms of target company equity beta and ticket size, defined as the fraction of the fund's committed capital invested in each target firm. Importantly, GP ownership is a significant determinant of investment risk primarily when adjusted for the wealth of investment professionals or partners. This suggests that wealth is of first-order importance when assessing the incentive effects of GP ownership.

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Table 1: **Summary statistics**

The table shows summary statistics for the sample of 20 PE funds (Panel A) and 62 portfolio companies (Panel B), as well as the GPs' ownership in the fund (Panel C). All wealth and firm characteristics are from year 0, in which the sample firm is acquired by the PE fund. The table uses an exchange ratio of 6 NOK/USD (the time-series average across the sample period).

Variable	Num. (1)	Mean (2)	Median (3)	Std. Dev. (4)	Min (5)	Max (6)
A: GP and fund characteristics						
Fund size (\$ million)	20	942	325	1700	53	5883
Fund sequence number	20	3.65	3	2.35	1	8
# of sample firms in portfolio	20	3.1	3	1.619	1	7
GP age at first acquisition in sample	20	9.65	8.5	6.53	1	20
# of professionals in Norway	20	16.6	10	17.95	4	83
# of partners in Norway	20	8.45	7	4.25	3	21
Avg. wealth professionals (\$ million)	20	1.92	1.31	2.05	0.02	6.82
Avg. wealth partners (\$ million)	20	3.22	1.53	4.27	0.03	17.33
Management fee	14	0.020	0.020	0.000	0.013	0.023
Carry	11	0.180	0.200	0.050	0.020	0.200
Hurdle rate	12	0.080	0.080	0.000	0.070	0.080
B: Firm characteristics						
Total assets (\$ million)	62	119.7	67	223	2.10	1717
Sales (\$ million)	62	100	54	116	0	628
Leverage	62	0.618	0.641	0.276	0.02	1.325
ROA	62	0.030	0.072	0.243	-1.66	0.315
Tangibility	62	0.080	0.004	0.149	0	0.554
Asset beta	62	0.473	0.459	0.298	-0.29	1.237
Equity beta	62	0.691	0.586	0.538	-0.47	2.747
Volatility	62	0.030	0.031	0.016	0.011	0.078
Ticket size	62	0.106	0.055	0.153	0	0.796
C: GP ownership						
Ownership in %	62	3.7	1.5	4.9	0	15.0
Ownership in \$ million	62	13.02	5.90	20.67	0	88.33
Relative ownership all	62	0.893	0.427	1.32	0	5.00
Relative ownership partners	62	0.932	0.476	1.33	0	5.00

Table 2: **Variable definitions**

The table defines all variables used in the empirical analysis. All GP and firm characteristics are from year 0, in which the sample firm is acquired by the PE fund.

Variable name	Definition
A: GP ownership and private wealth	
<i>%_ownership</i>	GP ownership in the fund in percentage points.
<i>\$_ownership</i>	GP ownership in the fund in billion NOK.
<i>Rel_ownership_all</i>	$\$_{ownership} / \textit{Wealth_all}$, winsorized at 500%.
<i>Rel_ownership_partners</i>	$\$_{ownership} / \textit{Wealth_partners}$, winsorized at 500%.
<i>Wealth_all</i>	The net wealth in billion NOK of the GP's investment professionals in Norway, averaged across the past three years.
<i>Wealth_partners</i>	The net wealth in billion NOK of the GP's partners in Norway, averaged across the past three years.
B: GP and fund characteristics	
<i>GP Age</i>	Number of years since the GP was founded when acquiring the portfolio company.
<i>Fund sequence</i>	Order of succession of the fund for the GP.
<i>Fund size</i>	Natural logarithm of fund size in billion NOK.
C: Firm characteristics	
<i>Asset_beta</i>	We estimate equity beta for five matched listed firms against the Oslo Main Index, using monthly returns over a 24 month-period ending in the month of the acquisition. <i>Asset_beta</i> is the average asset beta of the matched firms, computed as their equity beta*(1-market leverage), where market leverage is (total liabilities)/(market value of equity + total liabilities).
<i>Equity_beta</i>	Computed as $\textit{Asset_beta} / (1 - \textit{Leverage})$, where <i>Asset_beta</i> is from the five matched firms and <i>Leverage</i> is the sample firm's debt ratio.
<i>Volatility</i>	The standard deviation of the daily stock return over the eight months preceding the acquisition, averaged across the five matched firms.
<i>Ticket_size</i>	The ratio of the sample firm's book value of equity to fund size, winsorized at 0.
<i>Sales</i>	Natural logarithm of total sales in thousand NOK.
<i>Leverage</i>	Total liabilities/total assets.
<i>Tangibility</i>	Property, plant and equipment (PPE)/total assets.
<i>ROA</i>	Earnings before interest, taxes, depreciation and amortization (EBITDA)/total assets.

Table 3: **Cross-sectional determinants of cash flow risk**

The table shows coefficient estimates from ordinary least squares (OLS) regressions of portfolio company asset beta, estimated from five matched public firms. *Rel_ownership* is the GP's ownership in the fund scaled by the wealth of either all its investment professionals or its partners only. The sample is 62 Norwegian firms acquired by 20 Nordic PE funds between 2000 and 2010. All variables are defined in Table 2. Fund and firm characteristics are from the year of the acquisition. Standard errors are clustered by GP and shown in parenthesis. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<u>GP ownership:</u>								
<i>%_ownership</i>	-0.041 (1.041)	-0.001 (1.072)						
<i>\$_ownership</i>			0.084 (0.402)	-0.047 (0.448)				
<i>Rel_ownership_all</i>					-0.044** (0.019)	-0.043** (0.017)		
<i>Rel_ownership_partners</i>							-0.040* (0.021)	-0.040** (0.018)
<u>Fund characteristics:</u>								
<i>GP_age</i>	-0.026** (0.009)	-0.028*** (0.009)	-0.026*** (0.009)	-0.027*** (0.009)	-0.023** (0.009)	-0.025** (0.009)	-0.023** (0.009)	-0.025** (0.010)
<i>Fund_size</i>	-0.033 (0.030)	-0.039 (0.032)	-0.040 (0.048)	-0.035 (0.058)	-0.019 (0.027)	-0.025 (0.028)	-0.019 (0.027)	-0.025 (0.028)
<i>Fund_sequence</i>	0.072** (0.033)	0.076** (0.035)	0.071** (0.032)	0.077** (0.033)	0.076** (0.029)	0.081** (0.033)	0.076** (0.030)	0.081** (0.033)
<u>Firm characteristics:</u>								
<i>Sales</i>	-0.007 (0.010)	0.000 (0.010)	-0.007 (0.011)	0.000 (0.011)	-0.001 (0.010)	0.007 (0.010)	-0.002 (0.009)	0.006 (0.010)
<i>Tangibility</i>	0.236 (0.397)	0.148 (0.384)	0.234 (0.392)	0.147 (0.369)	0.245 (0.399)	0.168 (0.376)	0.246 (0.398)	0.167 (0.376)
<i>ROA</i>	-0.180 (0.205)	-0.197 (0.183)	-0.173 (0.228)	-0.199 (0.209)	-0.247 (0.219)	-0.267 (0.215)	-0.239 (0.219)	-0.259 (0.214)
Constant	1.051 (0.628)	1.141 (0.688)	1.186 (0.946)	1.055 (1.163)	0.656 (0.511)	0.742 (0.583)	0.672 (0.507)	0.757 (0.583)
Industry dummies	No	Yes	No	Yes	No	Yes	No	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	62	62	62	62	62	62	62	62
R-squared	0.311	0.354	0.312	0.354	0.336	0.376	0.331	0.372

Table 4: **Cross-sectional determinants of return volatility**

The table shows coefficient estimates from ordinary least squares (OLS) regressions of portfolio company cash flow risk, estimated as the average standard deviation of daily stock returns of five matched public firms over eight months prior to the acquisition. *Rel_ownership* is the GP's ownership in the fund scaled by the total wealth of either all its investment professionals or its partners only. The sample is 62 Norwegian firms acquired by 20 Nordic PE funds between 2000 and 2010. All variables are defined in Table 2. Standard errors are clustered by GP and shown in parenthesis. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<u>GP ownership:</u>								
<i>%_ownership</i>	-0.044*** (0.013)	-0.046*** (0.013)						
<i>\$_ownership</i>			-0.075*** (0.025)	-0.075*** (0.026)				
<i>Rel_ownership_all</i>					-0.000 (0.001)	0.000 (0.001)		
<i>Rel_ownership_partners</i>							0.000 (0.001)	0.000 (0.001)
<u>Fund characteristics:</u>								
<i>GP_age</i>	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
<i>Fund_size</i>	0.004** (0.001)	0.004** (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
<i>Fund_sequence</i>	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
<u>Firm characteristics:</u>								
<i>Sales</i>	-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)
<i>Tangibility</i>	0.027* (0.015)	0.025 (0.016)	0.027* (0.015)	0.028* (0.016)	0.026* (0.015)	0.026 (0.015)	0.026* (0.015)	0.026 (0.015)
<i>ROA</i>	0.003 (0.003)	0.003 (0.003)	-0.000 (0.004)	-0.001 (0.003)	0.004 (0.005)	0.004 (0.005)	0.004 (0.005)	0.004 (0.005)
Constant	-0.017 (0.030)	-0.020 (0.027)	0.093*** (0.025)	0.093*** (0.025)	0.061** (0.026)	0.063** (0.027)	0.061** (0.026)	0.064** (0.028)
Industry dummies	No	Yes	No	Yes	No	Yes	No	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	62	62	62	62	62	62	62	62
R-squared	0.690	0.692	0.676	0.677	0.651	0.653	0.651	0.653

Table 5: **Cross-sectional determinants of leverage**

The table shows coefficient estimates from ordinary least squares (OLS) regressions of portfolio company leverage, defined as liabilities/total assets. *Rel_ownership* is the GP's ownership in the fund scaled by the wealth of either all its investment professionals or its partners only. The sample is 62 Norwegian firms acquired by 20 Nordic PE funds between 2000 and 2010. All variables are defined in Table 2. Standard errors are clustered by GP and shown in parenthesis. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<u>GP ownership:</u>								
<i>%_ownership</i>	-1.527 (1.185)	-1.512 (1.098)						
<i>\$_ownership</i>			-0.798 (0.569)	-0.771 (0.538)				
<i>Rel_ownership_all</i>					0.072* (0.036)	0.100** (0.035)		
<i>Rel_ownership_partners</i>							0.071* (0.035)	0.100*** (0.035)
<u>Fund characteristics:</u>								
<i>GP_age</i>	0.003 (0.009)	0.003 (0.009)	0.006 (0.009)	0.005 (0.009)	-0.003 (0.007)	-0.005 (0.007)	-0.003 (0.007)	-0.005 (0.006)
<i>Fund_size</i>	0.035 (0.056)	0.029 (0.060)	0.134** (0.061)	0.125** (0.060)	0.038 (0.054)	0.022 (0.047)	0.036 (0.055)	0.018 (0.047)
<i>Fund_sequence</i>	-0.020 (0.024)	-0.019 (0.026)	-0.025 (0.020)	-0.023 (0.022)	-0.036* (0.019)	-0.038* (0.019)	-0.037* (0.019)	-0.039* (0.019)
<u>Firm characteristics:</u>								
<i>Sales</i>	0.022 (0.022)	0.022 (0.021)	0.018 (0.019)	0.019 (0.019)	0.008 (0.013)	0.003 (0.012)	0.009 (0.013)	0.003 (0.012)
<i>Tangibility</i>	0.360* (0.192)	0.370* (0.198)	0.356* (0.178)	0.311** (0.142)	0.321 (0.191)	0.279 (0.172)	0.317 (0.191)	0.276 (0.175)
<i>ROA</i>	-0.549* (0.309)	-0.565* (0.284)	-0.498* (0.264)	-0.507** (0.240)	-0.342 (0.241)	-0.307 (0.181)	-0.347 (0.241)	-0.311 (0.182)
Constant	-0.121 (1.080)	-0.060 (1.120)	-2.221* (1.221)	-2.073* (1.173)	-0.157 (1.013)	0.221 (0.833)	-0.126 (1.032)	0.273 (0.840)
Industry dummies	No	Yes	No	Yes	No	Yes	No	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	62	62	62	62	62	62	62	62
R-squared	0.385	0.426	0.394	0.430	0.428	0.525	0.427	0.525

Table 6: **Cross-sectional determinants of equity beta**

The table shows coefficient estimates from ordinary least squares (OLS) regressions of portfolio company equity beta, estimated by relevering the average asset beta of five matched public companies with the portfolio company's actual leverage. *Rel_ownership* is the GP's ownership in the fund scaled by the wealth of either all its investment professionals or its partners only. The sample is 62 Norwegian firms acquired by 20 Nordic PE funds between 2000 and 2010. All variables are defined in Table 2. Standard errors are clustered by GP and shown in parenthesis. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<u>GP ownership:</u>								
<i>%_ownership</i>	1.143 (2.312)	1.177 (2.312)						
<i>\$_ownership</i>			1.072 (0.818)	0.786 (0.875)				
<i>Rel_ownership_all</i>					-0.141*** (0.033)	-0.164*** (0.037)		
<i>Rel_ownership_partners</i>							-0.133*** (0.035)	-0.158*** (0.038)
<u>Fund characteristics:</u>								
<i>GP_age</i>	-0.039** (0.018)	-0.042** (0.018)	-0.043** (0.017)	-0.045** (0.017)	-0.029* (0.015)	-0.031 (0.018)	-0.030* (0.015)	-0.032* (0.018)
<i>Fund_size</i>	-0.011 (0.080)	-0.020 (0.084)	-0.129* (0.068)	-0.112 (0.085)	0.012 (0.059)	0.013 (0.054)	0.014 (0.061)	0.017 (0.056)
<i>Fund_sequence</i>	0.132** (0.058)	0.141** (0.064)	0.133** (0.055)	0.142** (0.059)	0.153*** (0.038)	0.164*** (0.055)	0.154*** (0.040)	0.166*** (0.056)
<u>Firm characteristics:</u>								
<i>Sales</i>	-0.029 (0.029)	-0.014 (0.028)	-0.025 (0.028)	-0.012 (0.028)	-0.006 (0.019)	0.015 (0.023)	-0.008 (0.019)	0.013 (0.023)
<i>Tangibility</i>	0.182 (0.664)	0.023 (0.641)	0.174 (0.653)	0.073 (0.604)	0.230 (0.668)	0.133 (0.602)	0.237 (0.667)	0.135 (0.602)
<i>ROA</i>	-0.009 (0.351)	-0.043 (0.341)	-0.022 (0.372)	-0.079 (0.371)	-0.301 (0.325)	-0.383 (0.323)	-0.283 (0.323)	-0.367 (0.319)
Constant	0.793 (1.662)	0.923 (1.733)	3.222** (1.342)	2.822 (1.685)	0.073 (1.095)	-0.083 (1.091)	0.066 (1.133)	-0.114 (1.131)
Industry dummies	No	Yes	No	Yes	No	Yes	No	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	62	62	62	62	62	62	62	62
R-squared	0.326	0.372	0.341	0.377	0.398	0.460	0.391	0.454

Table 7: **Cross-sectional determinants of ticket size**

The table shows coefficient estimates from ordinary least squares (OLS) regressions of portfolio company ticket size, defined as the ratio of the portfolio company's book value of equity to fund size. *Rel_ownership* is the GP's ownership in the fund scaled by the wealth of either all its investment professionals or its partners only. The sample is 62 Norwegian firms acquired by 20 Nordic PE funds between 2000 and 2010. All variables are defined in Table 2. Standard errors are clustered by GP and shown in parenthesis. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<u>GP ownership:</u>								
<i>%_ownership</i>	-0.265** (0.096)	-0.271** (0.097)						
<i>\$.ownership</i>			1.020** (0.440)	1.045** (0.425)				
<i>Rel_ownership_all</i>					-0.031* (0.015)	-0.030* (0.015)		
<i>Rel_ownership_partners</i>							-0.030** (0.014)	-0.030* (0.014)
<u>Fund characteristics:</u>								
<i>GP_age</i>	0.004 (0.005)	0.004 (0.005)	0.002 (0.006)	0.002 (0.006)	0.005 (0.005)	0.005 (0.005)	0.005 (0.005)	0.005 (0.005)
<i>Fund_sequence</i>	0.008 (0.015)	0.008 (0.015)	0.001 (0.020)	0.001 (0.020)	0.009 (0.013)	0.009 (0.014)	0.009 (0.014)	0.009 (0.014)
<u>Firm characteristics:</u>								
<i>Sales</i>	0.010 (0.010)	0.010 (0.011)	0.008 (0.010)	0.008 (0.010)	0.015 (0.014)	0.014 (0.015)	0.014 (0.014)	0.014 (0.015)
<i>Tangibility</i>	0.062 (0.095)	0.070 (0.066)	0.047 (0.117)	0.049 (0.081)	0.077 (0.103)	0.101 (0.072)	0.078 (0.103)	0.101 (0.072)
<i>ROA</i>	-0.036 (0.071)	-0.044 (0.074)	0.037 (0.073)	0.035 (0.076)	-0.078 (0.096)	-0.085 (0.096)	-0.076 (0.095)	-0.083 (0.095)
Constant	0.380** (0.159)	0.358** (0.159)	0.287* (0.151)	0.274* (0.157)	0.313 (0.214)	0.289 (0.207)	0.316 (0.212)	0.291 (0.206)
Industry dummies	No	Yes	No	Yes	No	Yes	No	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	62	62	62	62	62	62	62	62
R-squared	0.451	0.461	0.474	0.486	0.462	0.465	0.462	0.465

Appendix Table 1: Comparison of firms with and without GP ownership data

The table lists characteristics of the 62 sample firms (columns 1-3) and the 51 firms that are excluded from the sample due to missing data on the GP's ownership in the fund (columns 4-6). Column (7) lists the difference in means between the two subsamples. ***, ** and * indicate that the difference is significantly different from zero at the 1%, 5% and 10% level, respectively, based on a t-test. The total sample is 113 Norwegian portfolio companies acquired by Nordic buyout funds in the period 1997–2010. *Year* is the year of the acquisition. All other variables are defined in Table 2.

Variable Column	Sample firms			Excluded firms			Difference in mean (7)
	N (1)	Mean (2)	Std. dev. (3)	N (4)	Mean (5)	Std. dev. (6)	
<u>Fund characteristics:</u>							
<i>GP_Age</i>	62	9.90	5.96	28	7.61	6.14	-2.30
<i>Fund_Size</i>	62	21.29	1.15	28	20.98	1.27	-0.32
<i>Fund_sequence</i>	62	3.63	2.13	32	2.69	1.83	-0.94**
<u>Firm characteristics:</u>							
Total assets (\$ million)	62	119.7	223.0	51	96.0	174.8	23.6
Sales (\$ million)	62	100.6	116.2	51	76.2	122.5	24.4
<i>Tangibility</i>	62	0.08	0.15	51	0.14	0.25	0.06
<i>ROA</i>	62	0.03	0.24	51	-0.15	1.04	-0.19
<u>Deal characteristics:</u>							
Year	62	2007	2.28	51	2004	4.04	-3.49***

Appendix Table 2: Cross-sectional determinants of cash flow risk (WLS)

The table shows coefficient estimates from weighted least squares (WLS) regressions of portfolio company asset beta (estimated from five matched public firms) with the square root of the number of the fund's professionals in the sample as the weight. *Rel_ownership* is the GP's ownership in the fund scaled by the total taxable wealth of either all its investment professionals or its partners only. The sample is 62 Norwegian firms acquired by 20 Nordic PE funds between 1991 and 2010. All variables are defined in Table 2. Fund and firm characteristics are from the year of the acquisition. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<u>GP ownership:</u>								
<i>%_ownership</i>	0.152 (0.503)	0.043 (0.508)						
<i>\$_ownership</i>			0.076 (1.280)	0.088 (1.282)				
<i>Rel_ownership_all</i>					-0.049** (0.019)	-0.042* (0.022)		
<i>Rel_ownership_partners</i>							-0.043** (0.021)	-0.039* (0.023)
<u>Fund characteristics:</u>								
<i>GP_age</i>	-0.026*** (0.009)	-0.028*** (0.007)	-0.026*** (0.009)	-0.028*** (0.008)	-0.020** (0.009)	-0.023*** (0.008)	-0.023** (0.009)	-0.025*** (0.008)
<i>Fund_size</i>	-0.041 (0.065)	-0.040 (0.068)	-0.025 (0.036)	-0.034 (0.034)	-0.011 (0.032)	-0.022 (0.032)	-0.014 (0.034)	-0.024 (0.033)
<i>Fund_sequence</i>	0.070*** (0.024)	0.075*** (0.022)	0.070*** (0.025)	0.074*** (0.024)	0.072*** (0.022)	0.076*** (0.020)	0.076*** (0.023)	0.080*** (0.021)
<u>Firm characteristics:</u>								
<i>Sales</i>	-0.008 (0.011)	-0.001 (0.010)	-0.008 (0.010)	-0.001 (0.010)	0.002 (0.010)	0.007 (0.011)	-0.001 (0.010)	0.006 (0.011)
<i>Tangibility</i>	0.196 (0.379)	0.088 (0.333)	0.197 (0.380)	0.085 (0.337)	0.126 (0.327)	0.061 (0.296)	0.216 (0.383)	0.115 (0.345)
<i>ROA</i>	-0.147 (0.217)	-0.169 (0.204)	-0.150 (0.206)	-0.165 (0.186)	-0.213 (0.219)	-0.232 (0.215)	-0.230 (0.219)	-0.240 (0.219)
Constant	1.222 (1.289)	1.201 (1.347)	0.885 (0.786)	1.081 (0.777)	0.477 (0.639)	0.698 (0.685)	0.559 (0.669)	0.763 (0.712)
Industry dummies	No	Yes	No	Yes	No	Yes	No	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	62	62	62	62	62	62	62	62
R-squared	0.316	0.366	0.315	0.366	0.351	0.398	0.342	0.385

Appendix Table 3: Cross-sectional determinants of return volatility (WLS)

The table shows coefficient estimates from weighted least squares (WLS) regressions of portfolio company cash flow risk, with the square root of the number of the fund's professionals in the sample as the weight. Cash flow risk is estimated as the average standard deviation of daily stock returns of five matched public firms over eight months prior to the acquisition. *Rel_ownership* is the GP's ownership in the fund scaled by the total taxable wealth of either all its investment professionals or its partners only. The sample is 62 Norwegian firms acquired by 20 Nordic PE funds between 2000 and 2010. All variables are defined in Table 2. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<u>GP ownership:</u>								
<i>%_ownership</i>	-0.044*** (0.016)	-0.046*** (0.016)						
<i>\$_ownership</i>			-0.079** (0.033)	-0.079** (0.036)				
<i>Rel_ownership_all</i>					-0.000 (0.001)	0.000 (0.001)		
<i>Rel_ownership_partners</i>							-0.000 (0.001)	0.000 (0.001)
<u>Fund characteristics:</u>								
<i>GP_age</i>	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
<i>Fund_size</i>	0.004* (0.002)	0.004* (0.002)	-0.002 (0.001)	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)
<i>Fund_sequence</i>	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
<u>Firm characteristics:</u>								
<i>Sales</i>	-0.001** (0.000)	-0.001* (0.000)	-0.001* (0.000)	-0.001 (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)
<i>Tangibility</i>	0.027* (0.014)	0.025* (0.014)	0.029* (0.015)	0.029* (0.016)	0.030* (0.016)	0.027* (0.016)	0.028* (0.015)	0.027* (0.016)
<i>ROA</i>	0.000 (0.005)	0.000 (0.004)	-0.002 (0.005)	-0.002 (0.005)	0.001 (0.007)	0.002 (0.007)	0.002 (0.006)	0.003 (0.006)
Constant	-0.020 (0.038)	-0.023 (0.039)	0.093*** (0.028)	0.094*** (0.029)	0.067** (0.027)	0.073** (0.028)	0.060** (0.027)	0.064** (0.029)
Industry dummies	No	Yes	No	Yes	No	Yes	No	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	62	62	62	62	62	62	62	62
R-squared	0.689	0.692	0.667	0.669	0.624	0.629	0.642	0.644

Appendix Table 4: Cross-sectional determinants of leverage (WLS)

The table shows coefficient estimates from weighted least squares (WLS) regressions of portfolio company leverage, defined as liabilities/total assets, with the square root of the number of the fund's professionals in the sample as the weight. The table shows coefficient estimates from ordinary least squares (OLS) regressions of portfolio . *Rel_ownership* is the GP's ownership in the fund scaled by the total taxable wealth of either all its investment professionals or its partners only. The sample is 62 Norwegian firms acquired by 20 Nordic PE funds between 2000 and 2010. All variables are defined in Table 2. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<u>GP ownership:</u>								
<i>%_ownership</i>	-0.782 (0.537)	-0.750 (0.501)						
<i>\$_ownership</i>			-1.424 (1.012)	-1.460 (0.956)				
<i>Rel_ownership_all</i>					0.074** (0.032)	0.103*** (0.033)		
<i>Rel_ownership_partners</i>							0.073** (0.033)	0.103*** (0.034)
<u>Fund characteristics:</u>								
<i>GP_age</i>	0.007 (0.012)	0.006 (0.012)	0.003 (0.011)	0.003 (0.011)	-0.001 (0.010)	-0.004 (0.010)	-0.003 (0.010)	-0.005 (0.009)
<i>Fund_size</i>	0.126** (0.058)	0.116* (0.058)	0.024 (0.047)	0.017 (0.046)	0.020 (0.040)	0.003 (0.034)	0.026 (0.041)	0.009 (0.035)
<i>Fund_sequence</i>	-0.026 (0.029)	-0.024 (0.030)	-0.021 (0.031)	-0.020 (0.032)	-0.038 (0.029)	-0.038 (0.029)	-0.037 (0.029)	-0.040 (0.029)
<u>Firm characteristics:</u>								
<i>Sales</i>	0.023 (0.020)	0.024 (0.021)	0.028 (0.023)	0.027 (0.024)	0.015 (0.013)	0.007 (0.013)	0.013 (0.013)	0.006 (0.013)
<i>Tangibility</i>	0.310 (0.213)	0.314 (0.250)	0.319 (0.224)	0.371 (0.275)	0.183 (0.199)	0.205 (0.218)	0.271 (0.194)	0.260 (0.220)
<i>ROA</i>	-0.500** (0.242)	-0.523** (0.236)	-0.549** (0.258)	-0.583** (0.246)	-0.277 (0.242)	-0.263 (0.204)	-0.335 (0.210)	-0.307* (0.180)
Constant	-2.158* (1.174)	-2.004* (1.138)	-0.008 (0.940)	0.054 (0.919)	0.122 (0.761)	0.504 (0.640)	0.030 (0.782)	0.420 (0.665)
Industry dummies	No	Yes	No	Yes	No	Yes	No	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	62	62	62	62	62	62	62	62
R-squared	0.371	0.408	0.354	0.397	0.406	0.518	0.417	0.525

Appendix Table 5: Cross-sectional determinants of equity beta (WLS)

The table shows coefficient estimates from weighted least squares (WLS) regressions of portfolio company asset beta, with the square root of the number of the fund's professionals in the sample as the weight. Equity beta is estimated by relevering the average asset beta of five matched public companies with the portfolio company's actual leverage. *Rel_ownership* is the GP's ownership in the fund scaled by the total taxable wealth of either all its investment professionals or its partners only. The sample is 62 Norwegian firms acquired by 20 Nordic PE funds between 2000 and 2010. All variables are defined in Table 2. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<u>GP ownership:</u>								
<i>%_ownership</i>	1.252 (0.914)	0.991 (0.930)						
<i>\$_ownership</i>			1.381 (2.647)	1.349 (2.608)				
<i>Rel_ownership_all</i>					-0.148*** (0.034)	-0.172*** (0.041)		
<i>Rel_ownership_partners</i>							-0.140*** (0.035)	-0.165*** (0.042)
<u>Fund characteristics:</u>								
<i>GP_age</i>	-0.044*** (0.015)	-0.046*** (0.014)	-0.037** (0.016)	-0.041** (0.015)	-0.025 (0.016)	-0.027 (0.016)	-0.028* (0.016)	-0.030* (0.016)
<i>Fund_size</i>	-0.132 (0.105)	-0.119 (0.107)	0.018 (0.079)	0.003 (0.079)	0.040 (0.068)	0.037 (0.063)	0.035 (0.072)	0.031 (0.067)
<i>Fund_sequence</i>	0.131*** (0.045)	0.139*** (0.045)	0.128** (0.048)	0.136*** (0.048)	0.147*** (0.039)	0.157*** (0.040)	0.152*** (0.040)	0.164*** (0.041)
<u>Firm characteristics:</u>								
<i>Sales</i>	-0.033 (0.029)	-0.020 (0.027)	-0.038 (0.033)	-0.022 (0.029)	-0.011 (0.018)	0.010 (0.018)	-0.011 (0.020)	0.010 (0.021)
<i>Tangibility</i>	0.139 (0.614)	-0.001 (0.550)	0.136 (0.619)	-0.063 (0.557)	0.127 (0.525)	0.035 (0.480)	0.212 (0.600)	0.090 (0.547)
<i>ROA</i>	0.022 (0.378)	-0.022 (0.373)	0.047 (0.377)	0.021 (0.354)	-0.316 (0.356)	-0.395 (0.368)	-0.282 (0.358)	-0.358 (0.368)
Constant	3.400 (2.051)	3.110 (2.075)	0.319 (1.657)	0.619 (1.652)	-0.390 (1.301)	-0.463 (1.265)	-0.290 (1.391)	-0.351 (1.339)
Industry dummies	No	Yes	No	Yes	No	Yes	No	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	62	62	62	62	62	62	62	62
R-squared	0.364	0.398	0.341	0.387	0.460	0.524	0.421	0.485

Appendix Table 6: Cross-sectional determinants of ticket size (WLS)

The table shows coefficient estimates from weighted least squares (WLS) regressions of portfolio company ticket size, defined as the ratio of the portfolio company's book value of equity to fund size, with the square root of the number of the fund's professionals in the sample as the weight. *Rel_ownership* is the GP's ownership in the fund scaled by the wealth of either all its investment professionals or its partners only. The sample is 62 Norwegian firms acquired by 20 Nordic PE funds between 2000 and 2010. All variables are defined in Table 2. ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<u>GP ownership:</u>								
<i>%_ownership</i>	-0.243** (0.091)	-0.254** (0.101)						
<i>\$_ownership</i>			1.033* (0.613)	1.057* (0.605)				
<i>Rel_ownership_all</i>					-0.026** (0.013)	-0.026** (0.012)		
<i>Rel_ownership_partners</i>							-0.028** (0.013)	-0.028** (0.013)
<u>Fund characteristics:</u>								
<i>GP_age</i>	0.004 (0.005)	0.004 (0.005)	0.002 (0.005)	0.002 (0.006)	0.003 (0.004)	0.003 (0.005)	0.004 (0.004)	0.004 (0.005)
<i>Fund_sequence</i>	0.006 (0.015)	0.007 (0.016)	-0.000 (0.017)	-0.000 (0.018)	0.008 (0.015)	0.008 (0.016)	0.008 (0.015)	0.008 (0.016)
<u>Firm characteristics:</u>								
<i>Sales</i>	0.009 (0.008)	0.009 (0.008)	0.007 (0.008)	0.007 (0.009)	0.012 (0.011)	0.012 (0.012)	0.014 (0.012)	0.013 (0.013)
<i>Tangibility</i>	0.059 (0.106)	0.064 (0.087)	0.057 (0.118)	0.057 (0.096)	0.119 (0.104)	0.133* (0.079)	0.091 (0.100)	0.113 (0.076)
<i>ROA</i>	-0.026 (0.074)	-0.035 (0.084)	0.040 (0.068)	0.038 (0.073)	-0.071 (0.096)	-0.076 (0.103)	-0.076 (0.102)	-0.082 (0.108)
Constant	0.404*** (0.118)	0.386*** (0.126)	0.302** (0.146)	0.296* (0.154)	0.357** (0.175)	0.342* (0.177)	0.331* (0.185)	0.309 (0.188)
Industry dummies	No	Yes	No	Yes	No	Yes	No	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	62	62	62	62	62	62	62	62
R-squared	0.444	0.454	0.460	0.471	0.434	0.435	0.448	0.450