Cross-Border Private Equity and Valuation Effects *

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Abstract

Empirical evidence from cross-border mergers and acquisitions suggests a role for the acquirer's valuation. Using a large sample of fund-level and deals data, I show that an increase in valuation of a private equity (PE) fund raises the probability of a cross-border leveraged buyout (LBO) more relative to a domestic LBO. Over my entire sample, a one-standard-deviation increase in valuations - equivalent to 5.18 percent of fund size - raises the predicted number of cross-border buyouts (at the mean) by approximately 12 to 18 percent. Considering high levels of debt that characterize LBOs, this valuation effect is larger when expected long-term borrowing costs in advanced economies are low, credit risk is low and foreign investor risk appetite is high. The effect is also larger for low reputation PE firms facing higher asymmetric information costs of raising external capital relative to high reputation PE firms. Finally, valuation effects driving cross-border buyouts contain both a fundamental and a non-fundamental or mispriced component, reflecting either errors in valuing portfolio companies or strategic manipulation of valuations. These findings have implications for our understanding of the mechanisms driving cross-border LBOs and risk-adjusted return delivered to institutional investors supplying capital to PE funds.

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1 Introduction

Over the past four decades, private equity (PE) has grown into a sizeable asset class, with more than 10,000 funds raising in excess of $ 2 trillion from institutional and other investors (Source: Preqin). Buyout funds account for 63 percent of this amount. Another notable trend is the rising share of cross-border buyout investments; Figure 1 shows the number of cross-border buyouts as a share of total buyout transactions rose from 26 percent in 1991 to a high of 43 percent in 2017. In contrast to venture funds (which have received more academic attention) buyout funds usually purchase a controlling interest in an established corporation or one of its product lines, typically involving large amounts of debt (i.e., leveraged buyouts). Despite their important role in financing firms and reallocating capital to more productive sectors of the economy, relatively little is known about the factors affecting the likelihood of buyouts, and even less about those affecting cross-border buyouts.

In this paper, I examine the empirical relationship between cross-border leveraged buyouts (LBOs) and changes in PE fund valuations, or *Valuation Effects*. Considering the magnitude the global buyout industry, this question is especially crucial to gain deeper understanding of (i) a fundamental mechanism driving cross-border leveraged buyouts and (ii) risk-adjusted return delivered to institutional investors supplying capital to PE funds since cross-border transactions are inherently more risky.

The transmission from fund valuations to the likelihood of cross-border buyouts rests on two key ideas: (i) fund valuations proxy changes in asymmetric information costs in raising debt, and (ii) valuations (proxied by fund NAV and change in IRR) are affected by both portfolio company performance (firm-specific effect) as well as macroeconomic changes (country-level effect). To fix ideas on the transmission mechanism consider the following. First, private equity groups with higher performance and reputation reduce information asymmetry costs for the lender by lowering screening, monitoring and/or reputation-related costs, leading to more favorable borrowing terms (Demiroglu and James, (2010); Achleitner et. al (2012); Malenko and Malenko, (2015)). Malenko and Malenko (2015) theoretically

show that the higher is the perceived skill of the PE firm, the more leverage it can add to the target. From an empirical standpoint, it follows then that lenders must rely on observable PE firm valuation or performance metrics such as the Internal Rate of Return (IRR) and Net Asset Value (NAV) as signals of the sponsor's past performance and skill[1]. Theory suggests lenders will invest less in monitoring and screening targets in deals sponsored by funds with high NAVs or by extension, high Total Value/Paid-in Capital [2].

Second, I note that evidence from the literature on Mergers and Acquisitions shows that changes in an acquirer's valuation affect the likelihood of a cross-border deal more relative to domestic deal, since valuations are affected by both firm-specific and country-specific differences (e.g. Froot and Stein (1991), Baker, Foley and Wurgler (2009) and Erel, Liao and Weisbach (2012)). The latter generates additional sources of valuation differences between rival bidders from different countries.

Taken together, since a PE fund's IRR and NAV are subject to both portfolio company-specific and economy-wide shocks, I suggest changes in valuations affect the probability of a cross-border LBO more, relative to a domestic LBO. Following Froot and Stein (1991) and Erel, Liao and Weisbach (2012), I conjecture that when a foreign PE firm's valuation increases relative to that of a domestic one due to country-level macroeconomic differences, it can bid more aggressively for the target than domestic rivals because of a reduction in the magnitude of information problems it faces in raising new capital[3]. Section 3 offers a stylized example to illustrate this mechanism.

To address this question, I use a global dataset of 11,252 buyout deals from 1994 to 2018, fund-level cash flow and NAV and target firm financial variables. To set the stage, I begin by verifying the importance of valuation effects using quarterly change in IRR on the

[1]The NAV a private equity fund is defined as the sum of the NAVs of its unrealized portfolio companies. Recall that Fund NAV is affected by changes in cash flows between the PE fund and the investor or changes in valuations of unrealized portfolio companies

[2]An increase in fund NAV will have a direct positive impact on TVPI since the numerator includes the NAV of unrealized investments, while the denominator will remain unchanged.

[3]PE Valuation at the firm-level refers to a weighted average of fund-level valuations, where the weight is the fund size. This is discussed in detail in the Methodology.

probability of a cross-border buyout relative to that of a domestic buyout. The data reveals an increase in the probability of a cross-border buyout in the quarter following a positive change in IRR. Since the IRR is heavily dependant on the timing of cash flows into or out of the fund (Jenkinson, Sousa and Stucke, 2013), I extract a measure of valuation directly from a fund's NAV. Following Jenkinson, Sousa and Stucke (2013) and Barber and Yasuda (2017), I define valuation effects as the quarterly change in fund NAV adjusted for cash flows. Since lenders will assess firm-level performance (as proxy for skill and reputation) I aggregate this valuation measure to the firm-quarter level using fund-size as weights.

I estimate a logit model of cross-border buyout probabilities as a function of pre-acquisition valuation effects while controlling for variations in PE firm, target firm and external environment characteristics. Consistent with the idea proposed, I find a strong and positive relationship between PE firm valuation and probability of a cross-border buyout relative to a domestic buyout. Several iterations robust to alternate deal and target-firm variables as well as acquirer and target country characteristics confirm my hypothesis. This finding is novel.

To quantify the economic magnitude of this relationship, I compute average marginal effects and marginal effects at the mean. My estimates suggest a one standard deviation increase in valuations - equivalent to 5.18 percent of fund size - raises the predicted probability of a cross-border buyout (at the mean) by 4.04 to 6.38 percent depending on the specification. When aggregated over my entire sample, this systemic effect translates to a 11.9 to 18.8 percent increase in the predicted number of cross-border buyouts.

I also conjecture that shocks to global financial conditions modulate this relationship between valuation effects and cross-border buyout probabilities. Asis, Chari and Haas (2020) suggest that a cost of external finance channel operates through different types of global funding shocks. Candidate global financial shocks that receive attention in the capital flows literature primarily falls into three inter-related categories: (i) U.S./advanced economy monetary policy shocks, (ii) shocks that impact foreign investor risk aversion and liquidity in

international financial markets, and (iii) exchange rate shocks. Consistent with their idea, I conjecture that an easing of global funding conditions strengthen the positive association between rising valuations and cross-border buyout probability. The data reveals that a flatter US yield curve, higher excess stock market return over 1-month treasury rate, depreciating broad dollar, falling TED spread and lower VIX strengthen the impact of valuation changes on the probability of cross-border buyouts. To formally characterize how changes in risk attitude govern cross-border buyouts, I construct a "Risk-on", "Risk-off" index and show that the probability of cross-border buyout is higher following positive valuation effects in 'Risk-on' states of the world.

Next, I examine how reputation modulates the impact of valuation effects on cross-border buyout probability. Consider, small young General Partners (GPs) that lack top performing funds in their track record. A positive NAV shock will be more important for these GPs, as they have little track record or accumulated reputation capital to obtain favorable loan conditions. To test this conjecture, I define low reputation PE firms in terms of performance and size. High reputation PE firms are the complements to low reputation PE firms. I show that cross-border buyout probabilities are stronger for low reputation PE firms as positive valuation shocks reduce the agency cost of lending more for these types of firms relative to high reputation firms.

Finally, I explore if valuation effects entirely represent movements in fundamental factors such as acquirer country GDP, tax rates, factor endowments or firm productivity, or if it also reflects errors in reported fund NAVs by GPs. Similar to Baker, Foley and Wurgler (2009), I call this a 'mispricing' component. Traditional finance theory holds that prices across world capital markets are equalized by the arbitrage trades of agile portfolio investors including individuals, fund managers and other institutional investors. However, fluctuations in risk aversion by local investors or irrational expectations can cause cross-market mispricings (i.e. prices that differ from the theoretical ideal price that would obtain in perfectly integrated and efficient world markets) (Baker, Foley and Wurgler (2009)). The collection of evidence from

the PE literature also indicates that performance estimates such as NAV are strategically inflated, especially around fund-raising. More generally I suggest some component of cash flow adjusted change in NAV contains errors in valuations, irrespective of whether it was strategic manipulation or irrational expectations of future cash flows. Using future changes in returns to instrument for *ex ante* mispricing of NAVs, I find that valuation effects contain both a fundamental component as well as a mispriced or a non-fundamental component.

The paper proceeds as follows. Section 2 surveys the related literature and discusses the contribution to the private equity as well as the cross-border M&A literature. Section 3 provides a more detailed discussion of the economic transmission mechanism of valuation effects and cross-border buyout investments. Section 4 discusses the data used in the analysis. Section 5 reports the main results and associated discussion. Section 6 concludes.

2 Related Literature

This paper primarily contributes to the literature on investment behavior and strategies of private equity buyout funds. Malenko and Malenko (2015) show that buyout leverage increases with PE sponsor's skills. Their model of LBO activity proves that if PE firms never add any operational value to portfolio companies, no buyout takes place suggesting higher PE firm performance leads to more favorable borrowing conditions in subsequent deals. Ljungqvist, Richardson and Wolfenzon (2019) develop a model of buyout fund investment behavior based on imperfectly competitive market for private equity in which demand varies over time and supply is sticky in the short run. An important element of their model, consistent with the idea proposed in this paper, is that fund manager's can affect the market's perception of their talent by generating high returns in their current funds. They find that funds generally make acquisitions when investment opportunities are good, bargaining power is higher and debt is cheap.

My results also complement those in two highly influential papers in the cross-border

M&A literature. In their canonical paper, Froot and Stein (1991) show that when a foreign firm's value increases relative to that of a domestic one, for example, through unhedged exchange rate changes or stock market fluctuations, its cost of capital declines relative to that of a domestic firm because of a reduction in the magnitude of information problems it faces in raising new capital.

Erel, Liao and Weisbach (2012) suggest since this explanation for a relation between valuations and cross-border acquisitions is based on asymmetric information, it is likely to be particularly relevant in the case of private targets for which asymmetric information tends to be high relative to otherwise similar public targets. They note what little work has been done on cross-border acquisitions focuses on public and/or US firms. However, they suggest most cross-border merger and acquisitions do not involve U.S. firms and do involve privately held firms. In their global sample of 56,978 cross-border acquisitions that occurred between 1990 and 2007, 97 percent involved a private firm as either acquirer or target while 53 percent did not involve U.S. firms. They suggest that even though cross-border acquisitions may be occurring for the same synergistic reasons as domestic acquisitions, country-level factors such as currency appreciation and macroeconomic performance as captured by stock market movements are likely to be making these acquisitions significantly more attractive for the acquiring firm. Consistent with prior literature, they find that countries with relatively superior-performing stock markets tend to purchase firms in the worse-performing country. Furthermore, countries whose currencies have appreciated are more likely have acquiring firms while countries whose currencies have depreciated are more likely to have target firms. They conclude that higher acquirer valuations lead to a higher propensity of cross-border acquisitions.

My work is distinguished from these papers in four main ways. First, to the best of my knowledge, the literature does not provide aggregate or micro evidence on the link between valuation effects and cross-border buyout investments, choosing to focus on strategic acquisitions (Erel, Liao and Weisbach, 2012) or aggregate FDI (Froot and Stein, 1991). This

paper extracts a measure of valuation from private equity fund-level data to examine the relationship between valuations and cross-border buyout probabilities. The granularity of my data overcomes shortcomings of country-level measures previously used in the M&A literature which ignore firm-level information. I conjecture that rising PE firm valuations, as proxy for reduced information asymmetry costs, raises probability of cross-border buyouts. I elaborate on this transmission mechanism in the next section.

Second, this paper extensively analyzes the importance of global financial conditions in modulating the relationship between PE valuations and cross-border buyout probabilities. Axelson et al. (2013) document on average 75 percent of purchase price in leveraged buyouts are funded with debt. I draw on the capital flows literature to document how global financial shocks measured by U.S/advanced economy monetary conditions, shocks that impact foreign investor risk aversion and liquidity in financial markets and exchange rate shocks affect this link between cross-border buyout probability and PE firm valuations.

Third, I uniquely emphasize heterogeneity in PE firm reputation in regulating the impact of valuation changes on cross-border buyout probability. I hypothesize that low reputation PE firms face problems of asymmetric information to a greater extent relative to high reputation firms. As a result, following a positive valuation shock the probability of a cross-border buyout is greater for these types of firms relative to high reputation firms.

Fourth, I explore the possibility of mispricing in these valuation effects. Prior research in PE has explored NAV mispricing in the context of fund-raising. To the best of my knowledge, my paper is the first to investigate fund-level mispricing as a general determinant of buyout deals.

3 Cross-Border Buyout and Valuation Effects: Transmission Mechanism

This section surveys the transmission mechanism through which valuation effects may impact the probabilities of a cross-border buyout. The mechanism connects two key ideas: (i) changes in fund valuations proxy changes in asymmetric information costs in raising debt, and (ii) Fund valuations (proxied by fund NAV and change in IRR) are affected by both portfolio company performance (firm-specific effect) as well as macroeconomic changes (country-level effect).

The relationship between a PE firm and a bank is unique because the formal loan contract is between the portfolio company and the bank, with no direct claim against the PE firm. However, PE firms are effectively shadow borrowers as they control the borrower's equity, management, capital structure and strategic decisions (Ivashina and Kovner (2011)). Prior studies argue that, since targets are held privately by PE firms with limited public disclosure, PE firms mitigate asymmetric information costs in lending markets through their general reputation (Achleitner et al. (2012)) and past performance (e.g., Demiroglu and James (2010); Malenko and Malenko (2015). The theoretical framework in Malenko and Malenko (2015) predict that PE firms which add more operational value to their portfolio companies are able to access higher external debt. Empirically, higher operational value in portfolio companies is reflected in higher fund NAVs.

To fix ideas consider the following. In a typical LBO, private equity sponsors present the potential deal to banks with a view to obtaining debt. Axelson et al. (2007) documented that on average 81.3 percent of non-equity financing in leveraged buyouts is bank debt [4]. The relationship between General Partners (GPs) in a private investment firm and outside lenders is complicated by lack of hard and timely information on a potential target company.

[4]It typically is broken into tranches, with the average deal containing 3.8 tranches. Senior bank debt provides 52 percent of the debt financing, junior bank debt 4.7 percent, and 'contingent' debt such as a revolving credit facility 24.6 percent

Consequently, when making lending decisions, banks must rely on the perceived skill of sponsoring PE firms through observable performance indicators such as past IRR and NAVs which signals the GP's talent in selecting, monitoring and restructuring target companies and ensuring a good track record of repayment [5]. Lending to PE firms with higher valuations - and by construction, better performance figures such as higher Total-Value/Paid-in Capital - can lower asymmetric information costs in terms of monitoring, screening and/or reputation-related costs [6].

Next I apply the reduced information cost argument to predictions from Froot and Stein (1991) and Erel, Liao and Weisbach (2012). They suggest country-level macroeconomic factors are additional sources of valuation differences between rival acquirers from different countries. More specifically, valuation effects arise from both unrealized portfolio holdings (firm-specific effects) or economy-wide changes (country-specific effects). Consider two PE firms of similar characteristics bidding for a potential target: one PE firm is domiciled in the U.S., the other in Japan. Assume the target is also domiciled in Japan. Suppose the U.S. experiences some exogenous macroeconomic upswing leading to higher valuations of all domestic portfolio holdings of the U.S. PE firm, either due to higher expected future cash flows or lower discount rate. A higher fund valuation, as proxy for lower information asymmetry costs, raises access to bank debt allowing the U.S. PE firm to bid more aggressively for the target, raising the probability of a cross-border buyout relative to a domestic buyout.

In sum, I conjecture that an increase in fund valuations, observable through fund-level NAV and IRR, will lead to higher probability of a cross-border deal relative to a domestic deal.

Closely related to the use of NAV as a measure of valuation is a growing literature on NAV manipulation by GPs. Various studies have focused on agency problems around fundraising,

[5]For example, private equity group involvement could lead to more rapid management turnover following poor operating performance. See Cimilluca (2007)

[6]Academic evidence suggests relying on past performance as a predictor of subsequent performance is reasonable. For example, Kaplan and Schoar (2005) document that absolute and relative performance of earlier funds predicts that of subsequent funds managed by the same private equity firm.

centering on the question of whether agents inflate portfolio values prior to fundraising (e.g., Jenkinson, Soussa and Stucke (2013); Barber and Yasuda (2017); Brown, Gredil and Kaplan (2016)). These studies use fund-level data and find that fund returns are systematically lower after fundraising events. Alternatively, Huther (2016) uses portfolio-company level data and finds no evidence of NAV manipulation and suggests that lower returns after fundraising is a result of deal composition. In other words, he argues it reflects true economic value of the underlying portfolio companies. For the purposes of my primary hypothesis, I expect to observe cross-border buyouts following changes in valuations regardless of whether they occur due to manipulation or true changes in economic value. In section 5.5, I address this issue and investigate if valuation effects contain some mispriced component.

4 The Data and Methodology

4.1 Data Source

In this section, I describe the data, construction of variables of interest and methodologies deployed to test my hypothesis. I use deal and fund-level data from Preqin. To obtain fund-level data, Preqin gathers information from public sources and make direct requests for submission. Freedom of Information Act (FOIA) requests (or their parallel outside the U.S.) requiring LPs to reveal certain information are often used, combined with requests to both LPs and GPs to voluntarily make their information public (Brown et al, 2015)[7].

Preqin's fund-level data is considered representative in the literature. For instance, Brown et al. (2015) examine fund performance across various datasets. They find that performance based on Preqin data is comparable to other widely used datasets. They also find that Preqin's coverage of geography, fund count and committed capital is also comparable to

[7]A downside of the public approach is that reliance on FOIA disclosures and voluntary submissions may lead to a sample that is not representative of the universe of funds. FOIA taps only certain types of investors (e.g., public pension funds); moreover, voluntary submission (especially by GPs) may introduce selection and survivorship biases. Moreover, this process may make it more difficult to check the data for accuracy or create comprehensive performance histories.

other datasets. Recent papers which have used Preqin data include Easton, Larocque and Stevens (2020) Ang, Chen, Goetzmann and Phalippou (2018), Barber and Yasuda (2017) and Ewen, Jones and Rhodes-Kropf (2013). Ang, Chen, Goetzmann and Phalippou (2018) also report that Preqin data have similar characteristics, including similar average and median returns, as reported in other studies such as those of Robinson and Sensoy (2011) and Harris, Jenkinson and Kaplan (2013).

My analysis rests on three datasets from Preqin: (i) Deals dataset and (ii) Fund-level quarterly cash flows and NAV, (iii) Performance Analyst Database which provides the net private equity fund performance and performance benchmarks, as well as fund type and size. The first advantage of using fund-level data is that it removes endogeneity concerns related to country-level valuation measures and allows researchers to extract a measure of valuation effect directly from a fund's Net Asset Value. A second advantage comes from the quarterly frequency of the dataset, providing a rich time-series dimension to exploit.

First, I retrieve fund-level quarterly data on IRR, Size and Investment Multiple from the Performance Analyst Database. The Investment Multiple is the ratio of all fund distributions and remaining NAV (i.e. "Total Value") to total capital calls (i.e. "Paid-in Capital"). Second, I retrieve deals data. Preqin's deal-level data contains information on leveraged buyout, add-on, venture and growth capital investments. Each observation is a deal that contains name of the acquiring private equity firm, the name of the portfolio company, their respective countries of domicile, the deal value, the portfolio company's pre-acquisition revenue, primary industry and Entry Multiple (Enterprise Value/Sales). I retrieve all buyout investments from 1990 to December 2019 and drop add-ons and growth capital investments even if they were made by a buyout fund since my focus is only on buyout deals, which typically utilize a large proportion of debt[8]. I keep only completed deals, as opposed to announced or rejected bids and also drop any observation for which the year, acquiring firm country or portfolio company country is not available. After this screening process, I am left

[8]Even though add-on investments also use debt, I drop this type of deal since my data does not provide platform company valuations.

with a sample of 39,617 deals.

4.2 Constructed Variables and Controls

Next, I retrieve Private Equity Cash Flow Data which provides full cash flow information (calls, distributions, and quarterly NAVs) at the fund-level and is the key data that allow me to measure valuation effects for sample firms. All cash-flow information and NAVs are scaled by fund size and represent a hypothetical LP capital commitment of USD 10,000,000. As Brown, Gredil and Kaplan (2016) and Jenkinson, Soussa and Stucke (2013) suggest, popular measures of performance such as the Internal Rate of Return (IRR) have significant drawbacks if used as a measure of valuation. The IRR is heavily dependant on the timing of cash flows into or out of the fund, and so will also be dependant on the holding period of an investment.

Using Preqin's quarterly cash flow and NAV data, I construct fund-level cash-flow adjusted valuation effects drawing on ideas suggested in previous work. Jenkinson, Soussa and Stucke (2013) note that the NAV of a fund will change for one of three reasons: (i) cash is called from investors which is used to invest in a portfolio company, (ii) if cash is distributed back to investors when dividends are paid from existing portfolio companies or they are sold and (iii) the valuation of an existing portfolio company changes due to its performance and/or changes in the market valuation of companies.

I isolate this third factor as it captures fund-specific changes or economy-wide changes such as aggregate stock market movement or currency appreciation. Following Barber and Yasuda (2017), *Valuation Effects* are defined as NAV changes adjusted for calls (C_{jit}) and distributions (D_{jit}) for each fund j in firm i in year-quarter t:

$$\Delta NAVCF_{jit} = NAV_{jit} - (NAV_{jit-1} + C_{jit} - D_{jit}) \tag{1}$$

Since I observe buyout deals at the PE firm-level, valuation effects are aggregated at

the firm-quarter level using fund-size weighted average of all funds' valuation effects for a given firm-quarter[9]. To the extent that lenders assess the PE firm's performance and reputation at the firm-level (as opposed to the fund-level), aggregating to the firm-quarter level is not only reasonable but necessary for the theory underpinning my analysis. Next, I match firm-level valuation measures (cash flow adjusted NAV change and IRR change) to deals data and augment this data with a set of controls which consists of three types of variables: PE-firm specific control, portfolio-company specific accounting variable and deal-specific controls. PE-firm specific control is what I define as *Experience* which is simply the firm's age; portfolio-company specific accounting variable is company revenue; deal-specific variables are: Enterprise Value/Sales and deal value. Although I would have liked to include a variable on portfolio company profitability (Eg: Earnings before Interest, Taxes, Depreciation and Amortization (EBITDA)) or a valuation multiple based on profitably (Eg: Enterprise Value/EBITDA), unfortunately good quality data are not available for the firms in my sample.

Finally, as suggested in Asis, Chari and Haas (2020), the globalization of and increased interconnectedness of financial markets propagates the transmission of financial and economic conditions between developed countries as well as from developed to emerging markets. Due to their reliance on debt markets, I suggest that buyout firms are likely to be affected by changes in global financial conditions. For this reason, I include several global variables that may affect the relationship between valuation effects and cross-border buyout probabilities. Following Asis, Chari and Haas (2020), my first proxy for international debt market conditions is the U.S. yield curve slope calculated as the difference between the 5-year treasury and the Fed funds rates, retrieved from Thomson Reuters. My second global macro variable is Excess Market Return, calculated as the difference between the value-weighted return on all NYSE, AMEX and NASDAQ stocks and the one-month treasury bill rate, retrieved from

[9]Brown, Gredil and Kaplan (2016) construct change in Public Market Equivalent (PME) as a valuation measure using NAV changes adjusted for cash flows. They also adjust for market returns, which we do not do since our purpose is to capture the relationship of market returns and buyout investments at the firm-level

Ken French's website. The third global variable, the Chicago Board Options Exchange's CBOE Volatility Index (VIX), captures shifts in foreign investors' risk appetite in risk-on risk-off states of the world. Next, to capture liquidity and exchange rate shocks, I add TED Spread and Broad Dollar Index from the FRED, Federal Reserve Bank of St. Louis.

Finally, to measure changes in risk attitudes, I construct a Risk-on, Risk-off (RORO) index similar to that described in Datta et al (2017). The RORO index comprises of daily changes in several standardised variables, retreived from FRED: ICE BofA BBB Corporate Index Option-Adjusted Spread, Moody's Seasoned Aaa Corporate Bond Yield Relative to Yield on 10-Year Treasury Constant Maturity, Moody's Seasoned Baa Corporate Bond Yield Relative to Yield on 10-Year Treasury Constant Maturity, Broad Dollar Index, TED spread, NASDAQ Index, S&P 500 Index, EURO STOXX Index, CBOE Volatility Index, NASDAQ Volatility Index, CBOE DJIA Volatility Index and Gold spot price. First, I normalize components such that positive changes imply risk-off behavior. Then, I scale these normalized changes by their respective historical standard deviations. After these transformations, the index is a simple average of the components[10].

The number of PE-firm-quarter and deals with data for any variable is 39,617. However, due to missing data and sparsity of fund-level financial data, my final matched sample includes 11,252 buyout observations, with 3,801 cross-border buyout deals and 654 distinct PE firms.

4.3 Descriptive Statistics

Before formally examining my main research questions, I provide in Table 1 a descriptive analysis of private equity firm and portfolio company characteristics. Rows 1 and 2 of Panel A report fund IRR and fund size in the full Preqin sample. Mean IRR is 11.16, broadly consistent with Brown et al (2015) and higher than the median IRR of 8.83. Fund size values display large dispersion with a mean size of USD 992 million, 2.5 times greater than

[10]To match my quarterly valuations data, the index is aggregated to the year-quarter level using simple average

the median fund of USD 389 million. This can be attributed to the emergence of mega-funds: column 7 of row 2 shows funds at the 95th percentile are valued at USD 3.8 billion.

Focusing on the matched sample, row 3 shows firm-level capital commitments. The mean and median values echo patterns similar to those at the fund-level reported in row 2, with mean firm capital commitments higher than the 75th percentile. The next two rows shows weighted-average firm-level IRR and change in weighted-average firm-level IRR, where the weights are fund-size. The patterns in weighted-average firm-level IRR echo those at the fund-level for the full Preqin sample. For example, the mean firm-level IRR is 11.83, similar to the mean fund-level IRR of 11.16.

I next move onto examining NAV distribution. At any given point in the life of a fund, the NAV represents the sum of its cash contributions from limited partners to date (Capital Calls), less any distributions of realized returns to limited partners to date (Distributions), plus accounting recognition of estimated unrealized returns made on investments within the fund, net of fees. Thus, in a given quarter, *Valuation Effect* is the change in quarterly NAV that is not explained by contributions, distributions and fees during the quarter. Consistent with this idea, rows 6 and 7 show fund-size weighted firm-level NAV and change in NAV adjusted for calls and distributions. The mean fund-weighted Firm-level NAV is \$4,856,250 on a scaled LP capital commitment \$10,000,000 [11].

Considering the differences in fund size, I observe large dispersion in *Valuation Effects* with mean values significantly higher than the median. $\Delta NAVCF$ has a mean value of 2.33. Recall Preqin data represents a hypothetical fund of USD 10 million. For ease of interpretation of the link between *Valuation Effects* and cross-border buyout probability, I express the cashflow adjusted change in valuation as a percentage of fund-size. The mean change in cash flow adjusted valuation is 2.33 percent of fund size for a given firm-quarter with a standard deviation of 5.18 percent of fund size. Turning to the Investment Multiple, I note that the mean fund-size weighted firm-level multiple is 1.30, approximately equal to the

[11] The ratio of NAV to capital commitments is approximately similar to that in Barber and Yasuda (2017)

median multiple. Firm-level Investment Multiple at the 75th and 95th percentile is 1.52 and 2.35 respectively. Finally, row 9 reports private equity firm age, which captures experience, computed as the difference between the date of firm inception and a buyout deal completion. Firms age at the 25th and 75th percentiles are 13 and 28 respectively.

Looking at portfolio firm characteristics, Panel B of Table 1 reports pre-acquisition Revenue, Enterprise Value/Sales and Deal Value for the matched sample. Portfolio firm size displays large variation: the median firm reports revenue of USD 150 million, considerably less than the mean revenue of USD 857 million. Consistent with this pattern, median Enterprise Value/Sales if 1.48, considerably less than the mean of 3.97. Given the differences in portfolio firm size, deal values display similar patterns. Median deal value is reported at USD 206 million. To ensure that the target sample does not suffer from any selection bias I compare target deal and revenue with the literature. Hammer et. al (2017) reports similar deal values using a different database.

Finally, to get a sense of coverage across countries, Table A1 in the Appendix lists the top 15 acquirer countries in buyout investments from 1990 to December 2019. These 15 countries together account for 96 percent of total worldwide buyout deals and 90 percent of worldwide cross-border buyouts. Somewhat intriguingly, I find that the share of cross-border deals with US acquirers is lowest among the top 5 countries at 23.2 percent. Cross-border deals conducted by PE firms from UK account for 56 percent of total deals conducted by UK. I also observe that China is the only country outside of the developed world that enters the top 15 acquiring country list.

Table A2 in the Appendix lists the top 15 countries that receive the highest number of buyout investments from 1990 to May 2020. These 15 countries together receive 74 percent of worldwide buyout deals. I observe that the share of cross-border buyouts in total buyout activity in the US is the lowest among the top 20 countries at 5.4 percent [12]. In other words,

[12]I found this number lower than my priori, hence I verified that my original unmatched buyout deals data from Preqin shows a similar pattern. I found that the share of cross-border deals targeting US firms is 7.1 in my unmatched full Preqin dataset, quite comparable to the matched sample.

an overwhelming share of buyout activity in the US are conducted by domestic PE firms. Emerging market economies like India, China and Brazil also receive substantial number of buyout deals. China receives the largest number of buyout deals in the developing world. Their share of cross-border deals as targets is 88 percent, signifying growing global interest in the Chinese economy.

4.4 Cross-border buyouts and Valuation Effect

Next, I move on from inspecting summary statistics to examining cross-border buyout in detail to formally test for the statistical significance of the patterns suggested earlier. My goal is to test the hypothesis that PE firm valuations affect the probability of a cross-border buyout transaction more relative to a domestic buyout transaction. Following Erel, Liao and Weisbach (2012), I assume a logistic distribution for the marginal probability of a buyout being cross-border relative to being domestic:

$$p(y_{it} = 1) = \frac{1}{1 + exp(-\alpha - \beta_1 \frac{1}{n} \sum^{n} x_{i,t-n} - \gamma z_{i,t})} \tag{2}$$

The dependant variable is assigned a value of 1 if PE firm i in country j in year-quarter t acquires a cross-border company, and 0 if it acquires a domestic company. My primary interest lies in the coefficient β_1 which measures the marginal change in the likelihood of a cross-border deal in year-quarter t due to a unit change in the acquirer's valuation effect in year-quarter $t - n$. I choose to use the average of the two quarters preceding acquisition for two reasons: (i) It creates an appropriate lag effect that would otherwise be absent for deals that were completed at the beginning of any year-quarter since valuation changes are based of end-of-quarter values (ii) Announcements can be made at least one quarter prior to deal completion, hence I reduce the announcement effect on valuation by averaging valuation effects in year-quarter $t - 1$ and $t - 2$.

The vector of covariates include *Experience* measured by the firm's age, which captures

network effects and advantageous relationships with debt providers a firm may build with time, deal entry-multiple (Enterprise Value/Sales), deal size and portfolio company revenue. Finally, I control for year-quarter, industry, investor country and target-company country fixed effects. Apart from time fixed-effects, industry fixed-effects are particularly important since PE funds invest in correlated industries. In the absence of industry fixed-effects, industry-specific valuation changes could give rise to confounding effects.

5 Results

5.1 Baseline Results

In this section, I formally investigate the role of pre-acquisition valuation effects and cross-border buyout probabilities. In section 3, I suggest in theoretical settings, valuation effects are more pronounced in cross-border buyout transactions relative to domestic buyout transactions. Therefore I test the null hypothesis that $H_0 : \beta_1 = 0$ versus the alternative that $H_1 : \beta_1 > 0$ in equation (2). A positive and significant estimate for β_1 confirms my hypothesis, assuming there is no measurement error. Similar to Erel, Liao and Weisbach (2012), I estimate a model of probability of cross-border buyout using a logit specification augmented by a measure of valuation effects and relevant target firm controls.

I begin by running regressions in a manner similar to Jenksinon, Soussa and Stucke (2013). The main measure of performance that GPs and LPs discuss for private equity funds is the IRR. Any change in valuation will have an immediate effect on the reported IRR. Therefore, I first run the baseline specification using pre-acquisition quarterly change in the IRR, aggregated at the firm-quarter level using fund-size as weights. The results are reported in columns 1 to 4 of Table 2. I find a positive and statistically significant relationship across various specifications signalling that there may be valuation effects driving cross-border investments. However, as noted earlier, the IRR is heavily dependant on the timing of the cash flows into or out of a fund. Thus the primary message then from this

set of regressions is that while quarterly change in IRR may signal valuation effects driving cross-border buyouts, they could also be confounded by cash flow effects.

I now turn to my primary measure of valuation outlined in equation 1. Results for the baseline specification, using quarterly change in NAV adjusted for calls and distributions, are summarized in Table 2, columns (5) to (8). Columns (5) to (8) deploy various portfolio-company and deal-specific controls[13]. My main coefficient of interest, β_1 is positive and statistically significant. Column (5) presents results where I only control for portfolio company's industry and country factors, not company-specific factors. When I introduce portfolio company revenue, Enterprise Value/Sales and deal size, the value of β_1 rises from 0.19 to 0.36 to 0.049. I also find that cross-border target firm size measured by revenue and deal value tend to be larger, relative to their domestic counterparts.

To measure goodness of fit, I use McFadden's $pseudo - R^2$, which compared the model's likelihood (L) to that of a model consisting of only a constant (L_0), i.e. the average cross-border buyout rate in the sample and can be interpreted as the standard R^2. $Pseudo - R^2$ ranges from 0.47 to 0.54. Importantly, there is no difference in goodness of fit when I use change in cash-flow adjusted NAV compared to change in IRR suggesting valuation effects and not cash flow effects are driving cross-border buyout probabilities.

It is important to keep in mind that these results are cross-border relative to domestic buyout deals, providing evidence to the hypothesis that valuation effects are stronger in a cross-border context due to country-level macroeconomic factors such as real exchange rate and stock market movements. This finding is consistent with those in the cross-border M&A literature seen in Baker, Foley and Wurgler (2009) and Erel, Liao and Weisbach (2012), but is a novel finding in the cross-border private equity literature.

[13]Note that I use a time-varying PE firm specific control, *Experience* which is omitted from the display for the purposes of brevity.

5.2 Marginal Effects and Predicted Increase in Cross-border Buyouts

Ultimately, the economic significance of the coefficients from the logit specification lies in predicting actual cross-border buyouts. The disadvantage of utilizing odds ratios is that one cannot deduce a sense of magnitude. I seek to understand what the model is saying in the probability scale and not in the odds scale, much less in the estimation scale, the log-odds. Hence, in this section, I compute marginal effects which allows easily interpretable quantification of the impact of changes in a specific predictor variable on the probability of a cross-border buyout, holding all other predictors constant.

Specifically, I compute average marginal effects (AME_i) by taking averages of the individual marginal effects for one standard deviation changes in the explanatory variable for each firm evaluated at their true valuation effects, deal values and target revenues across the sample. I next compute marginal effects at the mean (MEM_i) - the effects of one standard deviation change in the explanatory variable on the probability of cross-border buyouts for a representative firm with valuation effects, experience and target characteristics held at their respective sample means. From equation (2), taking the first derivative with respect to the conditioning variable and letting $h_t = p(y_{i,t} = 1|X)$, AME and MEM for pre-acquisition valuation effects are calculated as:

$$AME_i = \frac{1}{N \times T} \sum_{i,t}^{N,T} \frac{dh_t(X_{i,t-1})}{dx_j} = \beta_j \left(\frac{1}{N \times T} \sum_{i,t}^{N,T} (1 - h_t(X_{i,t-1})) \cdot (h_t(X_{i,t-1}))\right) \tag{3}$$

$$MEM_i = \frac{dh_t(\overline{X})}{dx_j} = \beta_j (1 - h_t(\overline{X})) \cdot h_t(\overline{X}) \tag{4}$$

The results are summarized in Figure 3. Starting from the left, the first two bars report AME, the third and fourth report MEM. Specification 1 controls for the target's revenue and

Specification 2 controls for the deal value of a specific LBO. The effect is quite large. Controlling for target revenue, a one-standard-deviation increase in valuations which is equivalent to a change in valuations of 5.18 percent of fund size, is associated with a 2.5 percentage increase in the probability of a cross-border buyout. Turning to the MEM estimates, we immediately see these estimates are significantly higher. A valuation effect equivalent to 5.18 percent of fund size is associated with a 6.38 percent increase in probability of a cross-border buyout. Controlling for deal size, this estimate is reported at just over 4 percent.

As Asis, Chari and Haas (2020) suggest, it is important to remember that although at first glance the magnitude of these effects may appear small, these are systemic effects and can translate to large numbers in predicted cross-border buyouts when aggregated across firms. To illustrate this point, I aggregate predicted cross-border buyouts over my entire sample for each of the specifications reported in Figure 3. Aggregated AME and MEM estimates are reported in Figure 4. For the baseline specification controlling for target revenue, I observe a 7.35 percent increase in predicted number of cross-border buyouts over my entire sample in response to a 1 S.D. change in valuations, equivalent to 5.18 percent of fund size. The effect is substantially larger when deploying the MEM estimates. Controlling for target revenue, change in valuations equivalent to 5.18 percent of fund size is associated with a 18.8 percent increase in the predicted number of cross-border buyouts over my entire sample[14]. In unreported regressions, I also compute the AME and MEM at different points in the distribution of Valuation Effcts, Target Revenue and Deal Size. The results are quantitatively quite similar.

What becomes clear from this exercise is that Valuation Effects have an economically significant impact on the probability of a cross-border buyout deal. It is not improbable to consider valuation effects of 10 percent of fund size or more which would have an ever greater impact on cross-border buyout numbers.

[14]The two approaches yield estimated marginal effects of different magnitudes for since the logit model specification is non-linear, marginal effects for continuous variables vary depending on the point in the sample space at which we evaluate them. Further, the marginal effects of each variable will also depend on the values of all other covariates.

5.3 International Financial Conditions and Cross-Border Buyouts

Considering large share of debt in LBOs, a natural question concerns how cross-border buyouts are affected by global financial conditions. Axelson et al (2013) suggest that when debt markets periodically become "overvalued", investors do not demand the full interest rate corresponding to the fundamental underlying risk of a firm. This should lead firms to issue more debt when debt is more overvalued. In buyouts, if we presume LBO sponsors are rational, they would be expected to be willing to pay a higher price, and take on more leverage, when debt financing is "cheap" (Axelson et al (2013); Ljungqvist, Richardson and Wolfenzon (2019)). Asis, Chari and Haas (2020) suggest that a cost of external finance channel operates through different types of global funding shocks. Candidate global financial shocks that receive attention in the capital flows literature primarily falls into three inter-related categories: (i) U.S./advanced economy monetary policy shocks, (ii) shocks that impact foreign investor risk aversion and liquidity in international financial markets, and (iii) exchange rate shocks. Moreover, evidence suggests that these shocks characterize 'risk-on' and 'risk-off' states of the world. I suggest there is a differential response of cross-border buyout probabilities to valuation effects conditional on global financial conditions. Specifically, I expect valuation effects on cross-border buyout probabilities to be larger when global financial conditions are favorable. Specifically I estimate the following generalized equation:

$$p(y_{it} = 1) = \frac{1}{1 + exp(-\alpha - \beta_1 GFV \times \frac{1}{n}\sum^{n} x_{i,t-n} - \beta_2 GFV - \gamma z_{i,t})} \tag{5}$$

In equation (3), GFV represents Global Financial Variable, which I interact with Valuation Effects. I use several variables from the international finance literature as proxies for global financial conditions. I begin with two proxies for U.S./advanced economy monetary policy shocks: First, I introduce the US Yield curve slope calculated as the difference between the 5-year treasury and the Fed funds rates. The Federal funds rate is indicative of monetary conditions and changes in monetary policy in the United States, whereas the slope

of the yield curve captures how bond markets expect short-term interest rates (as a reflection of economic activity and future levels of inflation) to move in the future, and therefore borrowing costs at longer maturities. This is particularly applicable for leveraged buyouts which typically have holding periods of around 5 years, as documented in the literature. Second, I introduce Excess Market Return calculated as the value-weighted return on all NYSE, AMEX and NASDAQ stocks minus the one-month treasury bill rate. Baker, Foley and Wurgler (2009) suggest, if equity valuations are high, cost of debt should be low and this effect will be transmitted to comparable private sector firms. To capture this monetary policy effect, I augment my baseline specification with interaction terms between cash-flow adjusted change in NAV and the quarterly Yield Curve Slope and Excess Market Return.

Results using these two interactions are summarized in Table 3. Columns (1) to (4) present estimates of the yield curve slope and valuation effects interaction and columns (5) to (8) present estimates of excess market return and valuation effects interaction. Consistent with my hypothesis, the interaction term between the yield curve slope and valuation effects is statistically significant and negative. This result is robust to alternate specifications using portfolio company controls, industry, country and year-quarter fixed effects. These results suggest as the yield curve becomes flatter, the effect of rising valuation effects on cross-border buyout probability becomes stronger. Looking at the estimates for the second interaction, there is a positive and statistically significant relationship between the interaction term and cross-border buyout probabilities. In column (5) where I do not control for target or deal characteristics and also omit industry and year fixed-effects, only the unconditional valuation effects coefficient is statistically significant with the expected sign. However, controlling for these variables, the interaction coefficient estimates from columns (6)-(8) indicate as excess market return increases, the impact of rising valuation effects on cross-border buyout probabilities becomes larger. This finding is consistent with Baker, Foley and Wurgler (2009) who suggest that higher public equity valuations lead to lower cost of borrowing for private firms through widely used credit scoring models which uses share price as an input to determine

credit risk of a private firm. It is worth noting that for all specifications in Table 3, the unconditional effect of cash-flow adjusted change in NAV remains positive and statistically significant at the 1 percent level, lending further credence to the primary hypothesis. In section 5.4, I show that the unconditional marginal effects of cash-flow adjusted change in NAV rises when I introduce global macroeconomic conditions.

The next pair of global financial variables I introduce is the VIX and TED spread. Focusing on U.S. monetary policy, market risk and investor sentiments, Bakaert, Hoerova and Lo Duca (2013), Miranda-Agrippino and Rey (2019) and many others use the VIX as a proxy to measure the risk appetite of global investors. Since the VIX captures the market's expectation for 30-day volatility in the S&P 500, a higher VIX typically denotes a general increase in risk premium, and consequently, an increase in borrowing costs. I suggest there is a correlation between cross-border buyout probabilities and a combination of valuation effects and foreign investor risk appetites. Fratzscher (2012) includes the TED spread, calculated as the spread between 3-month LIBOR Rates and 3-month T-bill rates, to capture credit risk and liquidity in international capital markets. To capture how valuation effects on cross-border buyout probabilities are shaped by these variables, I introduce interactions between cash-flow adjusted NAV change and the VIX and TED spread.

Table 4 presents findings from this specification. Without accounting for deal-specific or portfolio company accounting variables, I do not find a statistically significant effect between the TED spread and valuation effects interaction and cross-border buyout probabilities. However, as column (2) shows, introducing portfolio company revenue results in a negative and statistically significant coefficient at the 5 percent significance level on the interaction term. When I introduce EV/Sales and deal value, the statistical significance rises to the 1 percent level. Similar patterns emerge for the interaction between VIX and change in $NAVCF$. For all specifications in columns (5) to (8), the interaction term is negative and statistically significant at the 1 percent level. Moreover, the unconditional effect of the primary variable of interest, cash-flow adjusted NAV change remains positive

and statistically significant at the 1 percent level. These results provide evidence to the hypothesis that favorable global liquidity and credit risk conditions as well as an increase in foreign investors' appetite for risk, captured by falling TED Spread and VIX, strengthens the positive association between PE firm valuations and cross-border buyout probabilities.

Finally, to further characterize how cross-border buyouts and valuation effects are tied to "risk-on", "risk-off" states of the world, I introduce two more variables: first, I construct a RORO index. Despite being somewhat imprecisely defined, the RORO terminology has come into pervasive use in the financial press and among policy makers in the years since the global financial crisis (Chari, Dilts-Stedman and Lundblad, (2020)). Second I introduce the change in the broad dollar index , calculated using trade-weighted averages of exchange rates from a broad basket of US trading partners; the broad dollar is said to appreciate as the index value rises. For both variables, an increase in value indicates a 'risk-off' state of the world, and *vice versa*. Problems of information assymetry are particularly severe in cross-border deals due to unfamiliar legal regimes, accounting standards, langauge or corporate cultures, inherently making cross-border deals risky relative to domestic deals. Interactions with $\Delta NAVCF$ show if the positive relationship between cross-border buyouts and valuation effects is stronger in the face of favorable, risk-on shocks.

Table 5 reports this set of results. Columns (1) to (4) presents results with interactions of the RORO index, columns (5) to (8) with the broad dollar index. For all specifications using the RORO index, I find a statistically significant and negative relationship between the interaction term and cross-border buyout probabilities. When I control for deal size and target revenue (column 2) or entry multiple (column 3), the significance level rises from 5 percent to the 1 percent level. Moving on to the change in broad dollar index, the results echo a similar pattern: the interaction term has a statistically significant and negative effect at the 1 percent level. These results indicate that a favorable, 'risk-on' shock strengthens the impact of valuation effects on cross-border buyout probabilities.

5.4 Heterogeneity in PE Firm Reputation and Cross-Border Buyouts

My primary results indicate that PE firm valuation has a material impact on the probability of a cross-border buyout by reducing information asymmetry costs. Reputation is an important part of the story since it provides lenders valuable information about PE firms on their ability to make operational improvements to portfolio companies. In this section, I investigate how differences in PE firm reputation affect the relationship between cross-border buyout probability and valuations. I conjecture that the impact of valuation changes on cross-border buyout probabilities is stronger for low reputation PE firms facing greater information asymmetry costs relative to high reputation PE firms.

At first pass this might seem counter-intuitive since high reputation firms such as KKR or Blackstone are much more active in the cross-border LBO market. However considering that heterogeneity in reputation captures information asymmetry cost differences, an upward valuation shock reduces information asymmetry costs to a greater extent for low reputation firms relative to high reputation firms. Consider a simple example between two PE firms: a high reputation firm such as KKR and an unknown low reputation firm. A positive valuation shock will benefit the low reputation firm relatively more, since lenders will be already willing to lend to KKR given its reputational capital, perceived skill in selecting good deals and adding value to targets and associated lower screening and monitoring costs.

I extend model (i) by including the interaction of $\Delta NAVCF$ with a $Reputation_{it}$ dummy for a firm i in year-quarter t which is defined in a number of ways in terms of performance and PE firm size, consistent with the literature. Formally, I estimate the following equation:

$$p(y_{it} = 1) = \frac{1}{1 + exp(-\alpha - \beta_1 Reputation \times \frac{1}{n}\sum^{n} x_{i,t-n} - \beta_2 Reputation - \gamma z_{i,t})} \quad (6)$$

First, reputation is defined by performance. As Demirogulu and James (2010) and

Malenko and Malenko (2015) suggest, better performing PE funds can secure more external capital. For my measure of performance, I use Total Value/Paid-in Capital. An increase in fund NAV will have a direct positive impact on TVPI since the numerator includes the NAV of unrealized investments, while the denominator will remain unchanged. Higher TVPI indicates greater value added to portfolio holdings. For example, a TVPI of 1.3 indicates that the value of unrealized investments plus distributions is 1.3 times greater than the book value of capital committed by institutional investors to the PE fund. To define Reputation, I split my sample of PE firms in each year-quarter *t-1* prior to a deal in year-quarter t into a top and bottom half based on TVPI. I then define a high reputation PE firm in a given firm-quarter if its TVPI in year-quarter *t-1* is in the top half of sample TVPI for that particular quarter, i.e. above the median. Using lagged values of a proxy for information costs is consistent with the literature [15]. The advantage of this measure is that lenders can update their assessment of good performing funds based on the available set of PE firm performance prior to a deal. This measure accounts for the time-varying nature of the number of PE firms in existence (and by extension, their performance) over my long sample period. To provide a concrete example, in 2018Q3 the median TVPI is 1.49 in my sample. Based on my definition, CVC Capital Partners is a high reputation PE firm (TVPI of 1.73) and Growth Capital Partners is a low reputation PE firm (TVPI of 1.14).

Second, following Demirogulu and James (2010) and Achleitner et al. (2012), reputation is defined by firm size or Assets Under Management (AUM). This is simply the total book-value of capital commitments to GPs. I start of by using a simple cut-off approach where I define high reputation firms as those above the median of all PE firm's AUM across my entire sample. To account for possible endogeneity of this measure, I create two further measures of Reputation based on AUM. For each firm-quarter *t-1* prior to a deal, a high reputation firm is one which is in the top tercile of sample AUM for that quarter. To further check robustness, I repeat the exercise using top quartile of sample AUM.

[15] Achleitner et. al (2012) uses lagged values of PE firm capital commitments

Table 6 reports these results. Columns (1)-(4) presents results using the dynamic performance-based measure of Reputation while columns (5)-(8) reports results using median AUM cutoff-based measure. The coefficient of interest is the interaction term $\Delta NAVCF \times Reputation$. A positive value indicates the positive impact of higher valuations on cross-border buy-out probability is higher for low reputation PE firms relative to high reputation PE firms. Starting from column 1, I find that the coefficient is positive and statistically significant consistent with my hypothesis. The statistical significance rises to the 95 percent level when I control for the target's revenue and deal value. When I introduce the entry multiple, the significance rises to 99 percent. The unconditional effect of $\Delta NAVCF$ is also positive and statistically significant in columns (3) and (4). Next, I examine $\Delta NAVCF \times Reputation$ using the median AUM based definition. Again, the coefficient is positive and statistically significance. Controlling for portfolio company revenue and deal value, the coefficient is statistically significant at the 99 percent level.

It is also worth mentioning that the unconditional effect of the reputation dummy is negative and highly statistically significant in every iteration. This indicates that low reputation PE firms are less likely to engage in cross-border acquisitions relative to high reputation PE firms. One explanation is that since cross-border deals tend to be bigger than domestic acquisitions, as suggested by the positive coefficient on *Deal Size*, the information costs of raising external capital for a cross-border acquisition is likely higher for a low reputation PE firm. An implicit assumption is that monitoring, screening and overall information costs are higher for larger deals since lenders are likely to invest more time screening companies when they lend large sums of capital. That said, we cannot rule out alternate explanations such as lack of an adequate network of information related to cross-border deals or higher risk aversion by low reputation firms.

The AUM median-cutoff measure could suffer from endogeneity since it uses information from the entire sample. To address any such concerns, I reports results using the dynamic AUM-based measure outlined above in Table 7. The results are quite similar. $\Delta NAVCF \times$

Reputation is positive and statistically significant in columns (1) - (6), showing that choice of threshold does not significantly affect the results. As a final robustness check, I also use an absolute value of AUM based Reputation dummy. Table A4 in the Appendix reports these results. The results are qualitatively unchanged. These results signify that heterogeneity in PE firm reputation, which governs their ability to raise external capital, matters for the relationship between valuations and cross-border LBOs.

5.5 Valuation Effects and Cross-Border Buyouts: Fundamental vs Non-Fundamental Components

My results suggest that there is a strong pattern in the country pairs that are affected by valuations. There are two potential (not mutually exclusive) explanations for the source of this valuation effects channel. First, GPs are correctly interpreting changes in fund valuations based on movements in portfolio company valuations and economy-wide factors. Second, these effects could reflect errors in reported valuation by GPs. As Brown, Hu and Zhang (2020) suggest, there remains considerable discretion in valuation methodologies and existing research documents systemic misvaluations. For instance, Brown, Gredil, and Kaplan (2019) find underperforming managers overstate valuation during the time of follow-on fund raising, while top-performing managers understate valuation. As a consequence, fund NAVs likely incorporate a subjective assessment of true economic value. Similarly, Jenkinson, Soussa and Stucke (2013) show GPs tend to manipulate NAVs prior to fund-raising. Baker, Foley and Wurgler (2009) also provide evidence that an important component of the source-country valuation effect likely reflects mispricing due to irratonal expectations. I do not attempt to distinguish between these two types of mispricing and simply call this a *'misvaluation'* or non-fundamental component of valuation effects.

In this section, I formally test if there exists any non-fundamental or *'misvaluation'* component of valuation effects at the deal-level. I follow a test introduced by Baker, Foley and Wurgler (2009) and subsequently used by other researchers (e.g. Erel, Liao and Weisbach

(2012)). They use future returns to instrument for the component of valuation that reflects mispricing[16]. The idea behind this approach is that mispricing *ex ante* can be detected from the returns that correct the mispricing *ex post*. As Baker, Foley and Wurgler (2009) suggest, if future returns are negatively correlated with *ex ante* mispricing and otherwise uncorrelated with measurement error in measures of valuations, the fitted values from a first stage regression of valuation on future returns serve as a purer measure of mispricing. By construction, the residual is then the fundamental component.

In a similar spirit, I regress fund-level Δ NAVCF on future change in IRR to investigate the existence of a non-fundamental component of valuation effects. If there exists any mispricing in fund NAV changes, this will be reflected in future change in IRR as the mispricing is eventually corrected. There is no a priori notion of the exact horizon over which to expect correction; too short a horizon leaves open the possibility that the mispricing is not yet corrected, while too long reduces power in a short time series. Since I use quarterly data I use 2-quarter ahead and 1-year ahead future change in IRR. The latter is consistent with Baker, Foley and Wurgler (2009), Kothari and Shanken (1997) and Pontiff and Schall (1998). I assume there is no measurement error in Δ NAVCF and that there exists a linear decomposition of Δ NAVCF to fundamental and misvaluation components. I then use the fitted values to explain cross-border buyout deal probabilities. Defining the fitted values as $\Delta\widehat{NAVCF}$, I also include the residual which is more likely to be the fundamental component:

$$Residual = \Delta NAVCF - \Delta\widehat{NAVCF} \tag{7}$$

Table 8 reports the result from this specification. First, and perhaps not surprisingly, the fundamental component of valuation effects is statistically significant and positive for all iterations, mostly at the 99 percent level. I observe this effect for both 1-year ahead change in future IRR and 2-quarter ahead change in future IRR. This indicates valuation effects indeed contain a fundamental component that represents true valuations of portfolio

[16]Their primary measure of valuation is the Market-to-Book ratio, measured at the country-level.

holdings.

Next, I turn to the coefficients of $\Delta\widehat{NAVCF}$ or fitted Δ NAVCF in columns (2) to (4). I find a positive and statistically significant relationship using 1-year ahead future change in IRR controlling for portfolio company revenue, deal value or entry multiple. However, this relationship is substantially weaker when using 2-quarter ahead change in IRR. The coefficient is only significant at the 90 percent level in two out of my four iterations. A simple explanation is that corrections take place at horizons longer than 2-quarters. The coefficient estimates of the mispricing component is substantially larger than those of the residual component. For example, controlling for portfolio company revenue I find that fitted $\Delta NAVCF$ has a coefficient estimate of 0.39, while the same for the residual is 0.03. Overall, I find existence of both a fundamental as well as a non-fundamental component of valuation effects on cross-border buyout probabilities.

6 Conclusion

There is a dearth of research looking at the role valuation effects play on cross-border buyout investments. Valuation changes can be the result of fund-specific or market-wide shocks such as exchange rate movements or stock market fluctuations. Several studies show that higher private equity groups reduce asymmetric information costs leading to more favorable borrowing conditions through their general reputation and past performance. Consistent with this idea, I conjecture that cash flow-adjusted valuation measures are positively associated with the probability of a cross-border buyout.

I disentangle valuation effects from a private equity fund's NAV, and show that private equity firm valuations are positively related to the probability of a cross-border buyout, relative to a domestic buyout. This result is robust to PE firm, target firm, country and external market conditions. Introducing marginal effects shows that the marginal change in probability of a cross-border buyout in response to a one-standard-deviation valuation

change is non-trivial. Over my entire sample, a one-standard-deviation increase in valuations - equivalent to 5.18 percent of fund size - raises the predicted number of cross-border buyouts (at the mean) by 11.9 to 18.8 percent depending on controls used.

I extend my baseline results in two main directions: external market conditions and PE firm heterogeneity. First, since the hallmark of a buyout transaction is high levels of debt, I explore how changes in global financial conditions affect my baseline hypothesis. I find that easing monetary conditions in U.S./advanced economies, falling VIX, TED spread and broad dollar index strengthens the effect valuation changes on cross-border buyout probability. More generally, the results indicate that a 'risk-on' shock to global funding conditions leads to a larger valuation effect on cross-border buyout probabilities. This finding is novel. Second, the paper explores how heterogeneity in PE firm reputation governs the relationship between valuation and cross-border buyouts. Modelling reputation in terms of performance and assets under management, I find that valuation effects are particularly strong for low reputation PE firms facing relatively higher assymetric information costs or raising debt. This finding is novel in the context of private equity.

Finally, I decompose valuation effects into a fundamental and non-fundamental component and investigate which is driving cross-border buyout probabilities. I find evidence that valuation effects represent both fundamental factors such as change in macroeconomic conditions as well as a mispriced component that corrects over time. These results help better understand strategies and investment behavior of PE funds and have implications for asset allocation in modern capital markets.

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Figure 1 :

Share of Cross-Border Buyout Deals (Deal Count)

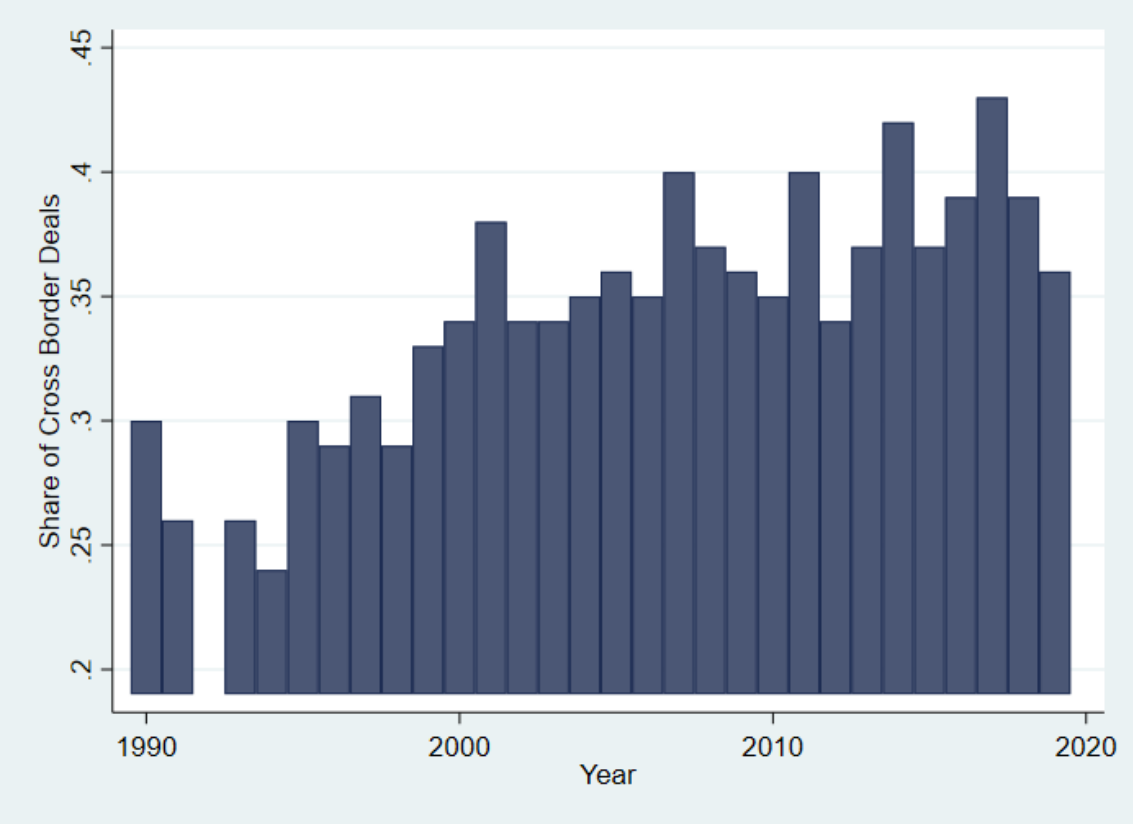

Figure 2 :

Number of Buyout Transactions

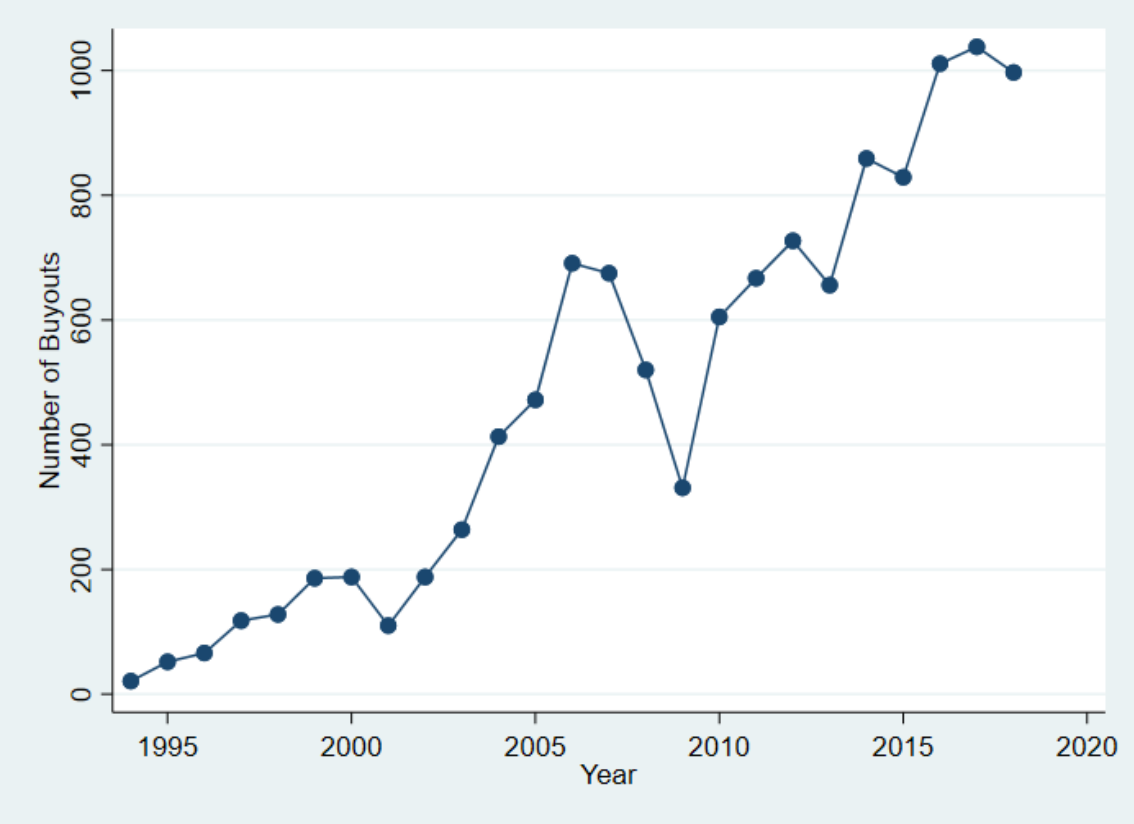

Figure 3 :

Marginal Effects and Predicted Cross-Border Buyouts

Notes: This chart reports Average Marginal Effects (AME) and Marginal Effects at the Mean (MEM) for two iterations of the baseline equation predicting change in probability of a cross-border buyout relative to a domestic buyout. Starting from the left, the first two bars report AME, the third and fourth bar report MEM. The predictor is my measure of Valuation Effects. As reported in Table 1, a one standard deviation cash-flow adjusted change in Valuations is equivalent to 5.18 percent of Fund Size. Specification 1 controls for Target Revenue; Specification 2 controls for Deal Value. The Y-axis is expressed in the probability-scale.

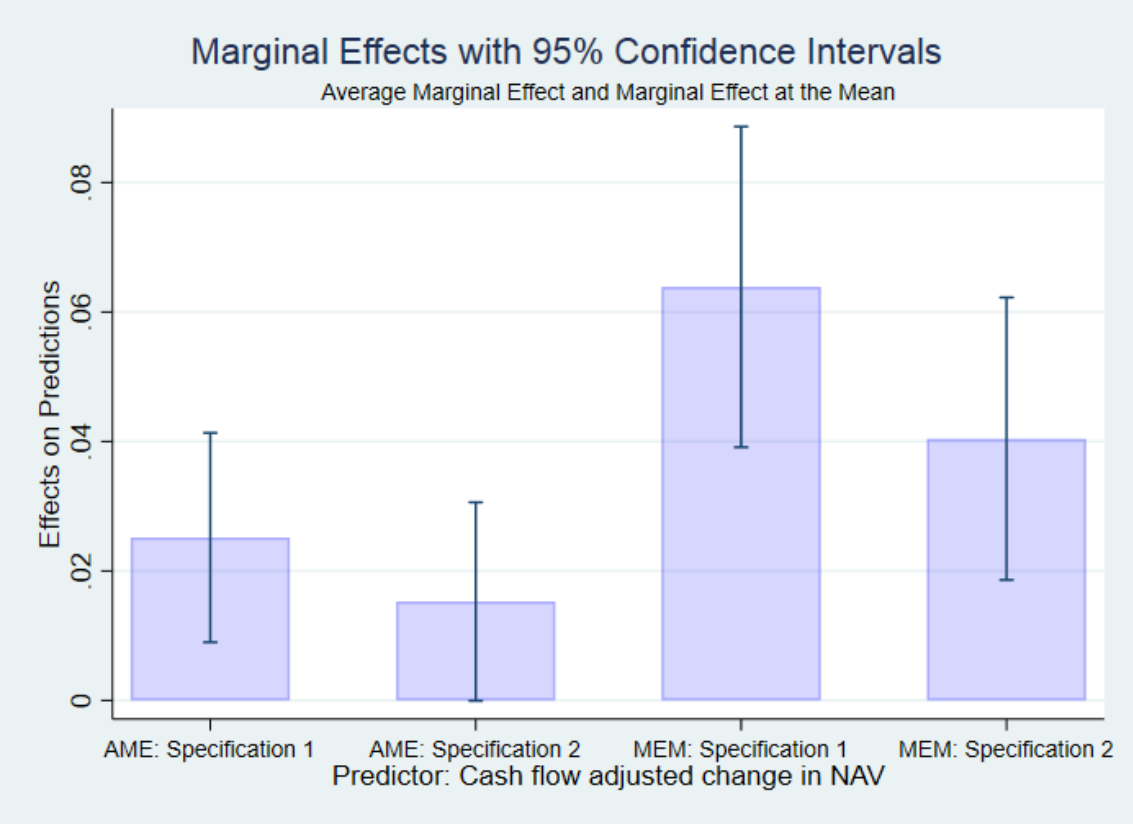

Figure 4 :

Aggregate Marginal Effects and Predicted Cross-Border Buyouts

Notes: This chart reports Aggregated Marginal Effects for each econometric specification listed in Figure 3. Aggregated Marginal Effects are calculated by first computing mean cross-border buyout probability. Next, the predicted increase in buyout probability is added to the mean buyout probability. This is used to compute the estimated total number of cross-border buyouts in the sample. Finally, the chart reports the percentage change between the estimated and actual number of cross-border buyouts.

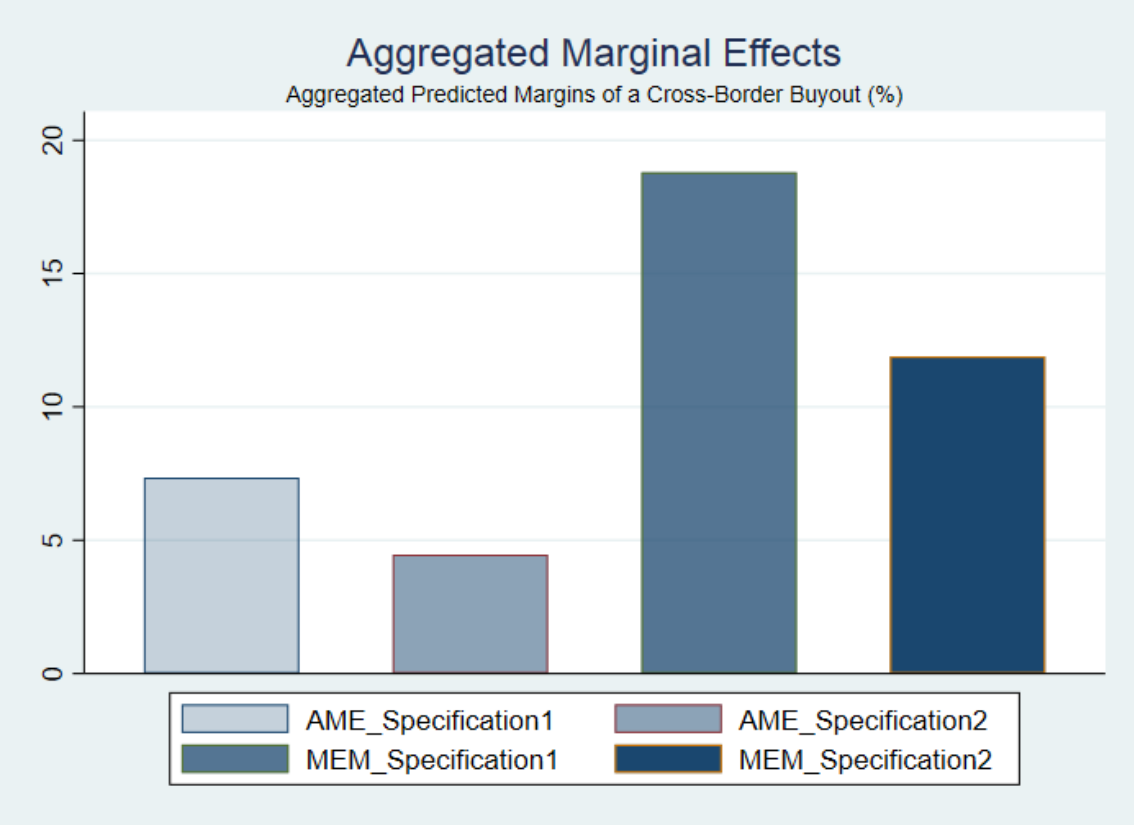

Table 1 :

Summary Statistics

This table reports descriptive statistics for all private equity fund-level, private equity firm-level and portfolio company variables. The first two rows report unmatched full sample from Preqin. All variables from Row 3 onwards are matched to an LBO transaction. The third row presents capital commitments at the firm-level. Rows 4-8 present fund-size weighted firm-level aggregate measures. Cash flow-adjusted change in Net Asset Value, $\Delta NAVCF$, is expressed as percentage of fund size for ease of interpretation. Firm Age is the difference between the date of a buyout transaction and the firm's inception expressed in years.

	Obs	Mean	Std. Dev	p25	p50	p75	p95
			Panel A: Private Equity firm				
Fund IRR (Full Preqin sample, %)	81154	11.16	25.39	0.90	8.83	17.44	40.47
Fund Size (Full Preqin sample, $ Mn)	213715	992	1959	175	389	890	3873
Firm Capital Commitments ($ Mn)	11344	8721	14641	725	2275	8426	46962
Fund-Size Weighted Average Firm IRR (%)	11075	11.83	13.62	4.1	11.38	17.45	35.53
Fund-Size Weighted Average Δ Firm IRR (%)	11429	0.33	2.01	-0.11	0.00	0.58	3.30
Fund-Size Weighted Average Firm NAV ($ Mn)	11551	4.85	2.40	3.30	4.80	6.20	8.90
Fund-Size Weighted Average Firm Δ NAVCF (% of Fund Size)	11837	2.33	5.18	0.00	1.51	3.54	9.58
Fund-Size weighted Firm Investment Multiple	11398	1.30	0.42	1.04	1.29	1.52	2.35
Firm Age (Years)	11608	21.40	12.04	13.00	20.00	28.00	46.00
			Panel B: Target Company				
Revenue ($ mn)	2901	857	72612	74	150	816	5900
Entry Multiple (Enterprise Value/Sales)	2001	3.97	40.32	0.4	1.48	2.69	6.41
Deal Value ($ mn)	4390	690	2535	100	206	909	3600

Table 2 :

Logit Regressions of Probability of a Cross-Border Buyout

This table reports results from estimating equation 2. The dependant variable takes a value of 1 if a buyout deal is cross-border and 0 otherwise. Explanatory variables include cash-flow adjusted quarterly change in Net Asset Value, $\Delta NAVCF$ of a private equity fund, aggregated to the firm-quarter level using fund-size weighted average, quarterly change in IRR, ΔIRR, of a private equity fund aggregated to the firm-quarter level using fund-size weighted average, PE firm age, log of Portfolio Company Revenue, Enterprise Value/Sales and log of Deal Value. All specifications control for PE firm country, portfolio firm country, portfolio firm's primary industry and Year-quarter fixed effects. Standard errors are clustered at the country-pair level.

	Change in IRR				Change in cash flow Adjusted NAV			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ΔIRR	0.049***	0.071**	0.058***	0.052**				
	(0.011)	(0.030)	(0.013)	(0.021)				
$\Delta NAVCF$					0.019***	0.050***	0.033***	0.045***
					(0.005)	(0.011)	(0.000)	(0.012)
Target Revenue		0.215***				0.222***		
		(0.044)				(0.045)		
Deal Size			0.285***				0.285***	
			(0.000)				(0.041)	
Entry Multiple				0.000				0.000
				(0.001)				(0.001)
Pseudo R-squared	0.550	0.521	0.540	0.491	0.543	0.527	0.553	0.471
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
N	10868	2488	3795	1545	10934	2498	3856	1508

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 3 :

Advanced Economy Monetary Conditions and Probability of Cross-border Buyouts

This table summarizes results of the logit regressions where the dependant variable takes a value of 1 if a buyout deal is cross-border and 0 otherwise. Explanatory variables and fixed effects are the same as those in Table 2. In addition, it includes two interaction terms: (i) Yield curve slope (Yld Slope) and Δ NAVCF, (ii) Excess Market return and Δ NAVCF. Standard errors are clustered at the country-pair level.

	Yield Curve Slope				Excess Market Return			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta NAVCF$	0.024***	0.075***	0.060***	0.072***	0.017***	0.040***	0.039***	0.039***
	(0.007)	(0.010)	(0.007)	(0.012)	(0.006)	(0.011)	(0.011)	(0.011)
$\Delta NAVCF \times Yield\ Slope$	-0.007**	-0.033***	-0.029***	-0.032***				
	(0.003)	(0.008)	(0.008)	(0.011)				
$\Delta NAVCF \times Excess\ Return$					0.000	0.018***	0.018***	0.018***
					(0.916)	(0.004)	(0.004)	(0.004)
Yield Slope	-5.219	-5.702	-3.546	-5.961				
	(5.797)	(5.110)	(5.856)	(8.198)				
Excess Return					-0.006	0.017	0.004	0.010
					(0.567)	(0.042)	(0.041)	(0.043)
Target Revenue		0.222***				0.172***		
		(0.046)				(0.051)		
Deal Size			0.000***			0.000		0.000**
			(0.000)			(0.000)		(0.000)
Entry Multiple				0.000			0.000	-0.000
				(0.001)			(0.001)	(0.001)
Pseudo R-squared	0.543	0.528	0.544	0.472	0.529	0.477	0.473	0.474
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	N	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	N	Y	Y	Y
N	10934	2498	3856	1508	10969	1508	1508	1508

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 4 :

Global Liquidity/Credit Risk, Market Volatility and Probability of Cross-border Buyouts

This table summarizes results of the logit regressions where the dependant variable takes a value of 1 if a buyout deal is cross-border and 0 otherwise. Explanatory variables and fixed effects are the same as those in Table 2. In addition, it includes two interaction terms: (i) Chicago Board Options Exchange's CBOE Volatility Index (VIX) and Δ NAVCF, (ii) TED spread (TED). Standard errors are clustered at the country-pair level.

	TED Spread				VIX			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta NAVCF$	0.028***	0.068***	0.087***	0.086***	0.132***	0.174***	0.173***	0.173***
	(0.011)	(0.012)	(0.019)	(0.018)	(0.023)	(0.024)	(0.024)	(0.024)
$\Delta NAVCF \times TED\ Spread$	-0.016	-0.031**	-0.071***	-0.070***				
	(0.016)	(0.013)	(0.027)	(0.025)				
$\Delta NAVCF \times VIX$					-0.004***	-0.007***	-0.007***	-0.007***
					(0.001)	(0.001)	(0.001)	(0.001)
TED Spread	-17.448	-19.337	-15.849	-20.011				
	(19.425)	(17.608)	(20.399)	(27.437)				
VIX					-1.389	-1.143	-1.443	-1.431
					(1.262)	(1.496)	(2.002)	(1.950)
Target Revenue		0.221***	0.173***		0.221***	0.172***		
		(0.046)	(0.051)		(0.046)	(0.050)		
Deal Size			0.000			0.000		0.000**
			(0.000)			(0.000)		(0.000)
Entry Multiple				-0.000			0.000	-0.000
				(0.001)			(0.001)	(0.001)
Pseudo R-squared	0.543	0.527	0.476	0.472	0.528	0.478	0.474	0.474
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
N	10934	2498	1508	1508	2498	1508	1508	1508

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 5 :

Risk-on/Risk-off, Valuation Effects and Probability of Cross-border Buyouts

This table summarizes results of the logit regressions where the dependant variable takes a value of 1 if a buyout deal is cross-border and 0 otherwise. Explanatory variables and fixed effects are the same as those in Table 2. In addition, it includes two interaction terms: (i) Risk-on,Risk-off (RORO) Index and Δ NAVCF, (ii) Broad Dollar defined as Real Trade Weighted U.S. Dollar Index and Δ NAVCF. Standard errors are clustered at the country-pair level.

	RORO Index				Change in Broad Dollar			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta NAVCF$	0.013***	0.026	0.024	0.030***	0.005	0.022	0.016	0.026
	(0.005)	(0.017)	(0.017)	(0.005)	(0.007)	(0.015)	(0.012)	(0.018)
$\Delta NAVCF \times RORO\ Index$	-0.903**	-2.446***	-2.526**	-1.125**				
	(0.442)	(0.905)	(0.981)	(0.441)				
$\Delta NAVCF \times \Delta Broad\ Dollar$					-0.020***	-0.021**	-0.021***	-0.024***
					(0.007)	(0.010)	(0.007)	(0.009)
RORO Index	62.964	58.521	73.552	42.591				
	(68.167)	(67.788)	(89.595)	(65.713)				
$\Delta Broad\ Dollar$					0.943	-3.200	0.222	-7.273
					(8.098)	(9.685)	(7.231)	(7.666)
Target Revenue		0.171***				0.193		
		(0.049)				(0.171)		
Deal Size		0.000		0.000***		-0.000**	-0.000	
		(0.000)		(0.000)		(0.000)	(0.000)	
Entry Multiple			-0.000					-0.000
			(0.001)					(0.001)
Pseudo R-squared	0.543	0.475	0.471	0.544	0.027	0.103	0.056	0.084
Country FE	Y	Y	Y	Y	N	N	N	N
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
N	10934	1508	1508	3856	9625	1677	3425	1677

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 6 :

Reputation Effects by Performance and Assets Under Management

This table summarizes results of the logit regressions similar to Table 2. Additionally, I include a Reputation dummy which takes the value of 0 for high reputation and 1 for low reputation and its interaction with $\Delta NAVCF$; in columns (1)-(4), a firm is defined as a high reputation firm in a given firm-quarter t if its Total Value/Pain-in Capital (TVPI) ratio is above the median of all PE firm's TVPI in year-quarter *t-1*; in columns (5)-(8), a firm is defined as high reputation firm in a given firm-quarter if its Assets Under Management (AUM) is above the median of all sample AUMs. Low reputation firms are the complements to high reputation firms. Standard errors are clustered at the country-pair level.

	Performance-based Reputation by Year-Quarter				AUM cutoff-based Reputation			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta NAVCF$	0.008	0.026	0.019*	0.015**	0.008	0.005	0.011	0.010**
	(0.010)	(0.019)	(0.010)	(0.006)	(0.009)	(0.018)	(0.012)	(0.004)
$\Delta NAVCF \times Reputation$	0.017*	0.043**	0.050**	0.081***	0.024*	0.070***	0.041***	0.050*
	(0.008)	(0.019)	(0.022)	(0.027)	(0.014)	(0.025)	(0.013)	(0.029)
Reputation	-0.564***	-0.952***	-0.354*	-1.032***	-1.450***	-1.544***	-1.142***	-1.612***
	(0.155)	(0.212)	(0.204)	(0.301)	(0.228)	(0.208)	(0.244)	(0.292)
Target Revenue		0.149***				0.079**		
		(0.050)				(0.036)		
Deal Size			0.240***				0.150***	
			(0.041)				(0.029)	
Entry Multiple				0.000				-0.001
				(0.001)				(0.001)
Pseudo R-squared	0.546	0.543	0.555	0.499	0.560	0.549	0.565	0.503
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
N	9985	2319	3558	1424	10506	2433	3765	1473

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 7

:

Sensitivity Test: Reputation Effects using AUM Tercile and Quartile

This table summarizes results of the logit regressions similar to Table 2. Additionally, I include a Reputation dummy which takes the value of 0 for high reputation and 1 for low reputation and its interaction with $\Delta NAVCF$; in columns (1)-(4), a firm is defined as a high reputation firm in a given firm-quarter t if its Assets Under Management (AUM) is in the top tercile of all PE firm's AUM in year-quarter *t-1*; low reputation firms are the complements to high reputation firms. In columns (5)-(8), a firm is defined as a high reputation firm in a given firm-quarter t if its Assets AUM is in the top quartile of all PE firm's AUM in year-quarter *t-1*. Standard errors are clustered at the country-pair level.

	Top Tercile AUM				Top Quartile AUM			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta NAVCF$	-0.007	0.012*	0.014**	-0.008	0.000	-0.012	0.026*	-0.003
	(0.007)	(0.007)	(0.004)	(0.026)	(0.006)	(0.024)	(0.016)	(0.039)
$\Delta NAVCF \times Reputation$	0.040***	0.075**	0.032*	0.070*	0.030***	0.075**	0.016	0.057
	(0.012)	(0.030)	(0.019)	(0.037)	(0.011)	(0.030)	(0.020)	(0.046)
Reputation	-1.460***	-1.281***	-1.046***	-1.473***	-1.455***	-1.281***	-0.946***	-1.416***
	(0.246)	(0.327)	(0.217)	(0.285)	(0.268)	(0.327)	(0.241)	(0.460)
Target Revenue		0.134***				0.134***		
		(0.046)				(0.046)		
Deal Size			0.161***				0.187***	
			(0.030)				(0.032)	
Entry Multiple				-0.001				-0.001
				(0.001)				(0.001)
Pseudo R-squared	0.560	0.542	0.566	0.501	0.558	0.542	0.564	0.500
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
N	10506	2433	3765	1473	10506	2433	3765	1473

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 8 :

Cross-Border Buyout Probabilities and Valuation Effects: Fundamental and Non-Fundamental Components

This table summarizes results of the logit regressions where the dependant variable takes a value of 1 if a buyout deal is cross-border and 0 otherwise. I decompose Δ NAVCF into a fundamental (Residual Δ NAVCF) and non-fundamental or mispricing component (Fitted Δ NAVCF). The decomposition is based on a first-stage regression of ΔNAVCF on future change in returns, proxied by ΔIRR. For 1-year ahead future change in returns, Fitted ΔNAVCF = 2.41 - 0.16ΔIRR (N=10244, t=-8.07, R^2=0.01). For 2-quarter ahead future change in returns, Fitted ΔNAVCF = 2.36 - 0.09ΔIRR (N=10676, t=-4.16, R^2=0.003). Standard errors are clustered at the country-pair level.

	1-year ahead future change in returns				2-quarter ahead future change in returns			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fitted $\Delta NAVCF$	0.064	0.390***	0.160**	0.370***	0.123	0.505	0.466*	0.572*
	(0.043)	(0.087)	(0.076)	(0.122)	(0.193)	(0.382)	(0.263)	(0.328)
Residual $\Delta NAVCF$	0.015***	0.031***	0.031***	0.028**	0.016***	0.043***	0.032***	0.040***
	(0.004)	(0.010)	(0.006)	(0.013)	(0.004)	(0.011)	(0.006)	(0.010)
Target_Revenue		0.222***				0.195***		
		(0.052)				(0.052)		
Entry_Multiple				0.000				0.001
				(0.001)				(0.001)
Deal_Size			0.000***				0.000***	
			(0.000)				(0.000)	
Pseudo R-squared	0.546	0.544	0.511	0.469	0.551	0.481	0.522	0.481
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
N	9318	2173	3255	1312	9689	2083	3376	1382

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Appendix: Cross-Border Private Equity and Valuation Effects

Sharjil M. Haque

Figure A1 :

Global PE Capital Commitments: Full Preqin Sample

Notes: This chart aggregates capital commitments to all types of private equity funds including Buyout, Venture capital, Mezzanine, Growth Capital, Recapitalization and Turnarounds

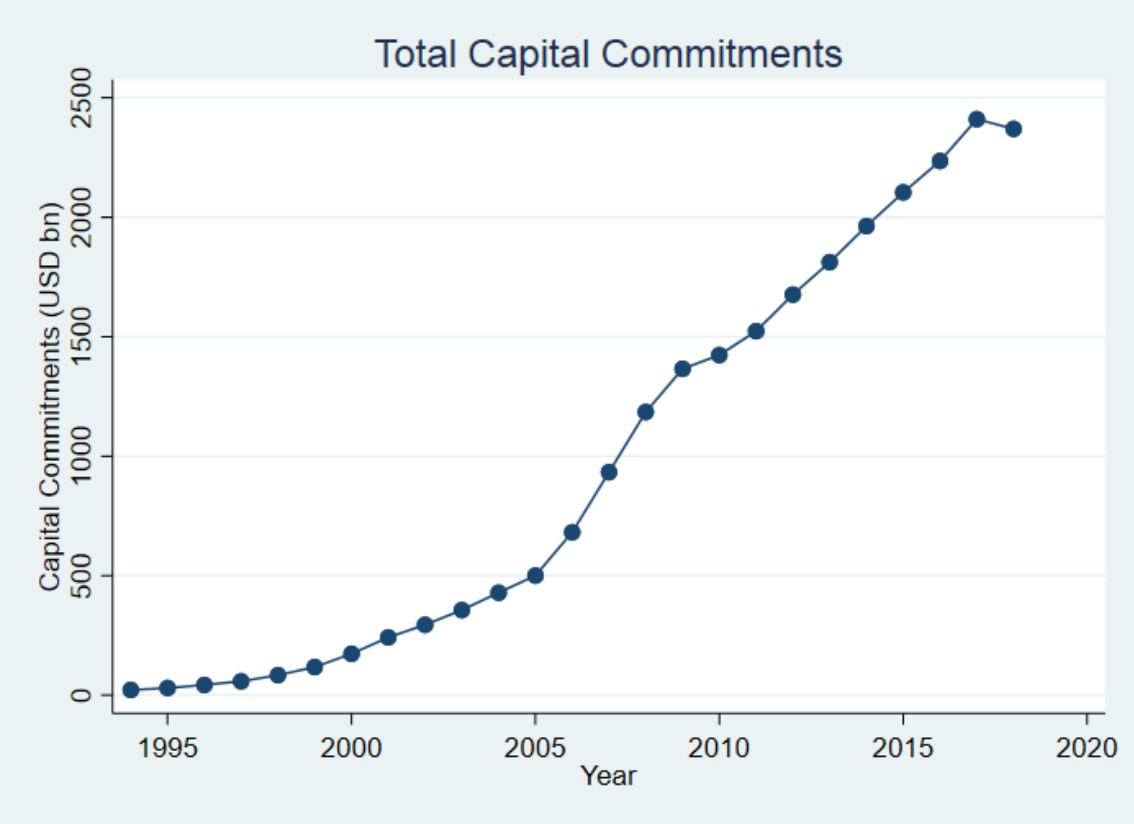

Figure A2 :

Global Buyout Committed Capital

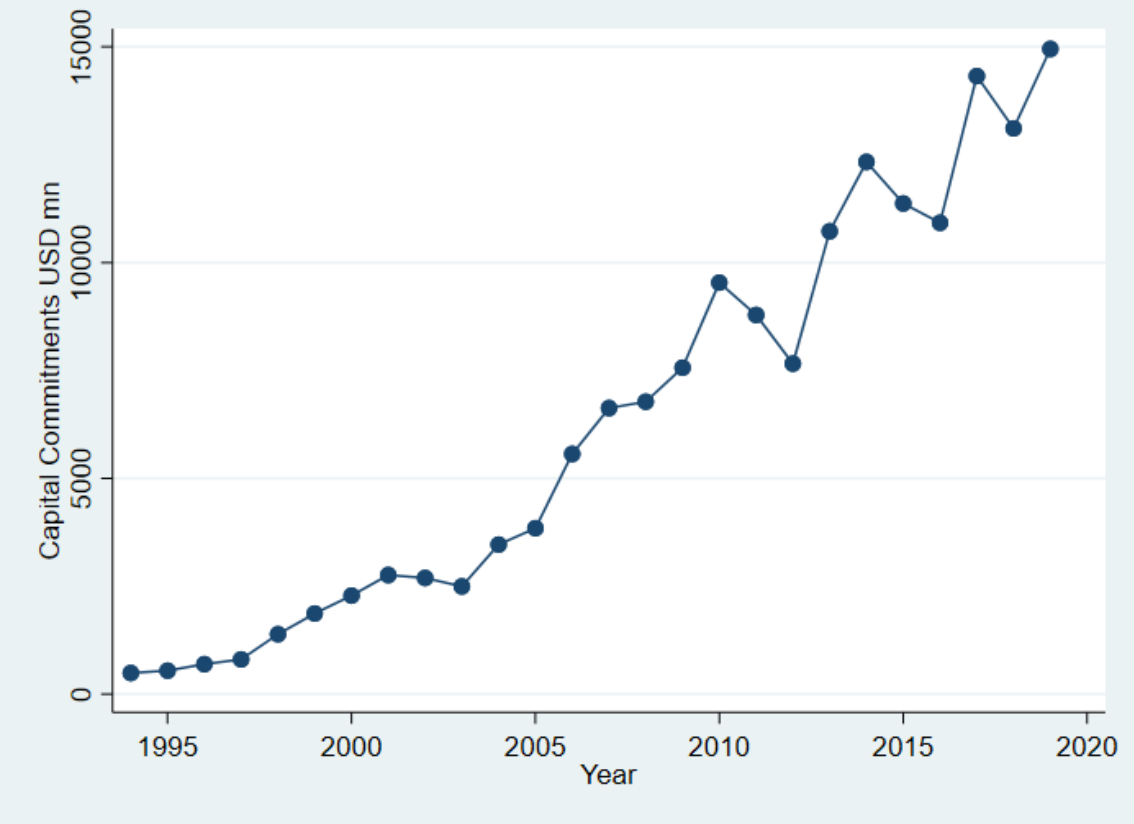

Figure A3 :

Firm Size Distribution: Assets Under Management

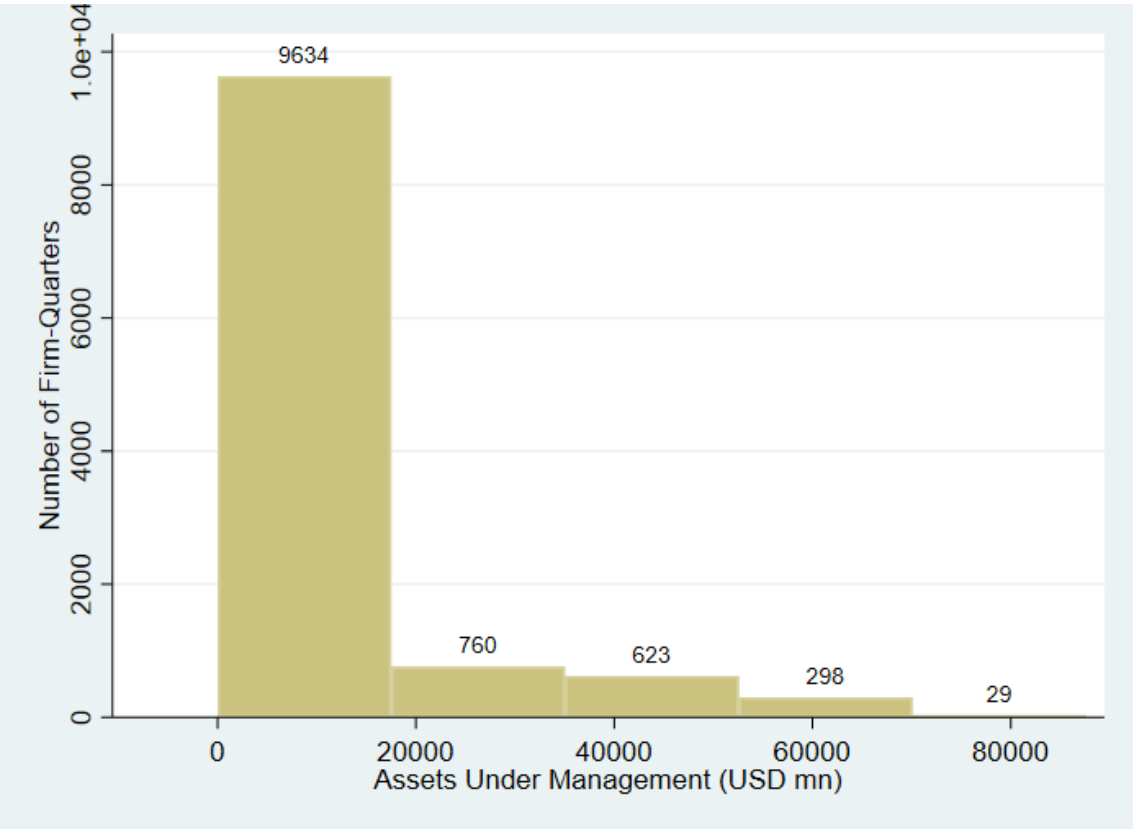

Table A1 :

Top Investor Countries by Buyout count

Investor Country	Total Deals	Total Cross-border deals	Share of Cross-Border deals
US	7637	1772	23.2
UK	1851	1032	55.8
France	356	152	42.7
Netherlands	173	79	45.7
Sweden	167	113	67.7
Canada	106	70	66.0
Switzerland	101	93	92.1
Norway	91	53	58.2
Finland	78	34	43.6
Australia	71	7	9.9
Italy	70	8	11.4
Denmark	42	9	21.4
South Africa	39	5	12.8
Japan	37	7	18.9
China	32	17	53.1
Total Buyouts	**10851**	**3451**	**31.8**

Table A2 :

Top Target Countries by Buyout count

Investor Country	Total Deals	Total Cross-border deals	Share of Cross-Border deals
US	6200	335	5.40
UK	1231	412	33.47
France	485	281	57.94
Germany	419	160	38.19
Netherlands	254	84	33.07
Italy	239	163	68.20
Sweden	217	72	33.18
Canada	183	147	80.33
Spain	178	37	20.79
Australia	156	92	58.97
India	133	24	18.05
China	133	118	88.72
Denmark	122	89	72.95
Norway	110	34	31.10
Brazil	102	26	25.00
Total Buyouts	**10162**	**2074**	**20.4**

Table A3 :

Summary Statistics: Global Financial Variables

	Obs	Mean	Std. Dev	p25	p50	p75	p95
Fed Funds Rate	11837	1.63	1.9	0.14	0.79	2.27	5.27
5-year Treasury	11837	2.59	1.48	1.52	2.07	3.5	5.55
VIX	11837	17.65	6.25	13.407	16.072	20.67	29.93
TED Spread	11837	0.42	0.31	0.229	0.309	0.495	1.12
Excess Market Return	11837	0.686	2.25	0.001	0.976	1.9367	3.936
Delta Broad Dollar	11837	0.05	0.77	-0.5	0	0.51	1.55

Table A4 :

Reputation Effects by PE Firm Size

This table summarizes results of the logit regressions similar to Table 2. In addition, I include a Reputation dummy which takes the value of 0 for high reputation and 1 for low reputation; in columns (1)-(3), a firm is defined as a high reputation firm in a given firm-quarter if has top-decile capital commitments; in columns (4)-(7), a firm is defined as a high reputation firm in a given firm-quarter if its capital commitments is above $ 20 billion. Finally it includes an interaction between Reputation and $\Delta NAVCF$. Standard errors are clustered at the country-pair level.

	Top Decile Capital Commitments				AUM above USD 20 Billion			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta NAVCF$	-0.005	-0.061	-0.061	-0.013	-0.012	0.032	-0.037	0.010
	(0.028)	(0.039)	(0.039)	(0.017)	(0.035)	(0.025)	(0.040)	(0.012)
$\Delta NAVCF \times Reputation$	0.055**	0.100**	0.100**	0.033*	0.063*	0.006	0.078*	0.083***
	(0.028)	(0.046)	(0.045)	(0.019)	(0.033)	(0.024)	(0.040)	(0.023)
Reputation	-1.423***	-1.733***	-1.731***	-1.701***	-1.446***	-1.360***	-1.911***	-0.118
	(0.396)	(0.370)	(0.371)	(0.290)	(0.496)	(0.328)	(0.516)	(0.151)
Target_Revenue	0.177***	0.090*	0.089*		0.157***			
	(0.045)	(0.051)	(0.053)		(0.045)			
Entry_Multiple			0.001				-0.002*	-0.000
			(0.001)				(0.001)	(0.001)
deal_size		-0.000				0.000		
		(0.000)				(0.000)		
Pseudo R-squared	0.541	0.505	0.505	0.554	0.545	0.564	0.514	0.493
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
N	2413	1461	1461	10475	2413	3755	1461	1462

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

Table A5 :

Marginal Effects: Fundamental and Non-Fundamental Components

This table summarizes Average Marginal Effects (AME) of the logit regressions where the dependant variable takes a value of 1 if a buyout deal is cross-border and 0 otherwise and explanatory variables include fitted and residual $\Delta NAVCF$ described in Table 10. Fixed effects are the same as those in Table 2. Standard errors are clustered at the country-pair level.

	(1)	(2)	(3)	(4)
Fitted $\Delta NAVCF$	0.005	0.037**	0.015	0.037
	(0.004)	(0.017)	(0.012)	(0.023)
Residual $\Delta NAVCF$	0.001*	0.003**	0.003*	0.003**
	(0.001)	(0.001)	(0.002)	(0.001)
Country FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
Year-Quarter FE	Y	Y	Y	Y
N	9318	2173	3255	1312

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$