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Abstract

We study the global competition among private equity (PE) buyout firms. Using a detailed database of PE firm characteristics, we investigate how PE firm heterogeneity across strategy and performance affects the volume of global acquisitions. A one-standard-deviation increase in a firm's average internal rate of return is associated with an approximate doubling of the number of deals in any given country. We also find that transaction costs associated with geographic, cultural, and administrative distance matter to different degrees across PE firms, and that these differences are related to the strategic profiles of the firms.

JEL classification:: F21; G24; G34

Keywords: cross-border mergers and acquisitions (M&As); private equity; leveraged buyout

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1. Introduction

Research in finance, international economics, and international business has established a set of stylized facts about the determinants of cross-border economic flows. At the bilateral country level, frictions associated with geographic, cultural, and administrative distance are consistently found to influence the pattern of bilateral economic flows and the decisions of firms and investors, including trade in goods (Helpman, Melitz, & Rubinstein, 2008) and services (Head, Mayer, & Ries, 2009), mergers and acquisitions (Erel, Liao, & Weisbach, 2012), and migration (Lewer & Van den Berg, 2008). Distance continues to matter despite advances in transportation and information technology (Ghemawat, 2001). A second stylized fact speaks to the selection of firms that are able to succeed in international markets despite the disadvantages of remoteness. Heterogeneity in ability leads to a hierarchy of firms: the best performers are able to remain competitive in more distant foreign markets, whereas lower-ability firms find foreign entry unprofitable given the additional costs (Melitz, 2003). Transaction costs thus imply a trade-off between proximity and ability.

Our paper considers this trade-off for the case of private equity (PE) firms' global acquisitions through leveraged buyout (LBO) funds, specialized investment vehicles, which in 2011 accounted for $77 billion, or 15% of all cross-border M&As by value (World Investment Report, 2012). These deals represent an important slice of economic activity in their own right, but are typically dropped in studies of cross-border M&As.[1] Because of the unique organizational structure of PE buyout firms (or PE firms hereafter) and the available data, this study allows us to look for and uncover rich interactions between transaction costs and PE firm characteristics.

The core difference between strategic and LBO deals lies in the distinct economic motivations. Strategic buyers are in search of operational synergy, whereas PE firms, as financial buyers, are in search of returns. As such, the former does not usually require an exit strat-

[1] Exceptions include, among others, Cao, Cumming, Qian, & Wang (2015), and Cornelius, Juttmann, & de Veer (2009), discussed below.

egy and presumably aspires to make long-term combined enterprise improvements. Strategic buyers should be less sensitive to the macroeconomic and industrial conditions affecting the target purchase price than the financial buyers. Significant determinants of many strategic acquisitions will be difficult to generalize because of the highly idiosyncratic operational synergy, whereas we posit that determinants of LBO acquisitions can be mapped to distinguishing features that form the underlying heterogeneity of PE firms.

Following Head & Ries (2008) we view each acquisition as an outcome of the international market for corporate control.[2] In this formulation, each acquirer places a valuation on each potential target company. The PE firm with the highest valuation makes the highest bid for the target and wins the stylized auction for control. Valuations differ across PE firms because of the value-adding ability of firms, because of different transaction costs of managing a portfolio of companies, and because of idiosyncratic match-specific synergies.

To formalize the intuition, we build a model similar to the one in Head & Ries (2008), and develop a testable equation that relates the number of acquisitions by each PE firm in each target country to PE firm ability, the costs of remote ownership, and the degree to which PE firms can mitigate these transaction costs. Previous studies on the determinants of cross-border M&As find the importance of costs of remote ownership. In this paper, we contribute to the literature by providing empirical evidence on an additional channel that could affect cross-border transactions, namely, the PE firm's heterogeneity in ability and cost mitigation. We believe that the institutional characteristics of PE firms make this international competition particularly salient, because these buyers are less likely to have valuations driven by synergies and are less susceptible to empire building. Moreover, empirical proxies for these dimensions of heterogeneity that are specific to PE firms offer an opportunity to test aspects of this theory rather directly.

As suggested by Kaplan & Schoar (2005), we take the view that PE firms' managers (and the funds they manage) possess underlying ability, leading to persistence in performance.

[2]This line of thinking goes back to Jensen & Ruback (1983).

Thus, PE firms that perform well in a given period will, in expectation, perform well in subsequent periods. The first heterogeneity in ability is analogous to firm productivity being an inherent firm trait in the international trade literature (Melitz, 2003). In that context, it has been documented that high-productivity firms are more likely to export (Bernard & Jensen, 1999) and undertake foreign direct investment (Helpman, Melitz, & Yeaple, 2004). We find that the heterogeneity in PE firms' performance, a proxy for ability, is important in cross-border LBOs. In particular, we similarly find that high-performing PE firms are more likely to carry out cross-border investments and to acquire more target companies in each country than low-performing PE firms.

We introduce heterogeneity in transaction-cost mitigation into the theory on cross-border acquisitions. This source of variation across PE firms is distinct from value-adding ability, and is crucial in understanding variation in the cross-border acquisitions of firms. While PE firms with high ability will acquire more targets abroad, they will also win more deals at home. This increase is proportional in standard models, including ours. In contrast, cost mitigation lowers the effective cost of remote ownership faced by the PE firm, and thus increases the likelihood of an acquisition for remote potential targets.

PE firms do not all follow a common strategy, and we base our measure of cost mitigation on survey data on the main applied strategies for each PE firm. We argue that these profiles are systematically related to transaction-cost mitigation. For example, PE firms that specialize in hands-on management will be particularly affected by the transaction costs of remote ownership. These strategies, which rely on limited human capital and path-dependent experience, can be a source of lasting competitive advantage because other PE firms are not able to simply copy the market leaders.[3]

One implication of this second dimension of heterogeneity is that some PE firms with mediocre value-adding ability may still be successful internationally because of their transaction cost-mitigating strategy. We should observe these PE firms winning more deals abroad

[3]In the PE industry, fund flow and access to deal flow is a direct function of past performance.

than at home relative to PE firms with average cost mitigation.

We use bilateral country variables relating to geographic, cultural, and legal differences to proxy for transaction costs of remote ownership. Empirical results suggest these measures are correlated with the number of deals occurring between two countries, a finding consistent with studies on strategic M&As (Erel et al., 2012).

Furthermore, we find that the effects of our cost proxies are significantly stronger for PE firms with investment strategies associated with low transaction-cost mitigation. In particular, PE firms that rely on active managerial engagement with target companies and that specialize in managing intangible assets are subject to bigger costs associated with remote cross-border LBO deals. PE firms that specialize in the strategy of consolidation and growth are less impacted by costs of remoteness. These findings suggest that heterogeneity in transaction-cost mitigation provides an additional source of variation in the outcome of this international competition for corporate control.

There is a relatively large literature on cross-border M&As. However, the focus is mainly on strategic buyers (among others, Bris & Cabolis, 2008; Erel et al., 2012). The economics of cross-border acquisitions by financial buyers—PE firms—is less well understood. Cao, Cumming, Qian, & Wang (2015) study the impact of legal and institutional environment on cross-border LBOs and find that LBO investment is more likely from sponsors in countries with stronger creditor rights towards targets in countries with weaker creditor rights. Chemmanur, Hull, & Krishnan (2014) use a natural experiment to study the causal relation between proximity and cross-border investment propensity of U.S. PE firms. Aizenman & Kendall (2008) study cross-border venture capital (VC) and private equity flows in a gravity framework and find that geographic and cultural distance, technological and human-capital development, and business conditions are statistically significant drivers of these cross-border investments. They also provide some evidence that firms that are more internationally oriented participate in larger deals on average. Cornelius, Juttmann, & de Veer (2009) study the home bias of LBO funds and the aggregate home bias in different regions of the world.

They find that the funds based in the United Kingdom are the least home biased, although they show a large degree of intra-European bias. The funds based in the United States are the least home biased on an inter-regional basis. Our paper is different from those studies. We focus on the heterogeneity of PE firms and study its effect on cross-border investment flows.

Meuleman & Wright (2011) study the likelihood that a cross-border LBO deal is syndicated with target local banks, using a particular sample of PE investors in United Kingdom and continental-European targets. We focus on cross-border LBO transactions using a broader sample and abstract from the specifics of deal financing.

Our study is also related to a literature on firm heterogeneity in the VC industry. Cumming & Dai (2011) investigate the impact of fund size on outcomes such as firm valuation and exit success, and find non-linear effects of size. Firm valuations are convex in size; whereas the probability of a successful exit is concave in size. We also control for PE firm size and find some evidence of non-linear effects. Cumming & Dai (2010) look at the determinants of local bias within the United States VC industry. They measure local bias by constructing an average distance to portfolio companies for each VC fund. We construct an analogous measure for our sample of global buyout deals and include it as a control for unobserved local bias. Nahata (2008) investigates the impact of VC reputation on the performance of portfolio companies, and finds reputation to significantly improve successful exit rates and asset productivity. We control for a measure of PE firm reputation in each market and find it to be positively associated with the number of deals completed.

A series of studies investigate the impact of differences in legal conditions across countries on PE and VC deals. Cumming, Schmidt, & Walz (2010) provide evidence that cross-country differences in legal standards have a significant impact on the governance structure of investments in the VC industry. Cumming & Walz (2010) provide evidence that differences in legal and accounting standards influence the degree to which PE fund managers report inflated valuations of portfolio companies prior to an exit. Cumming & Knill (2012) find

that more stringent securities regulation, across countries and time, is positively associated with the supply and performance of venture capital. We control for various measures of differences in legal standards across countries, and find deal counts to be highest, all else equal, for PE firms from countries with strong legal institutions investing in countries with weak legal institutions.

2. Institutional details: private equity

Generations of corporate managers living through the Great Depression (1929-1945) became averse to debt financing, rendering corporate America vulnerable to agency costs and poor corporate governance, culminating in the wave of conglomerate building in the 1960s. CEOs often staggered boards to rubber stamp empire building and corporate profits slid to historical lows (Baker & Smith, 1998).

In response, many saw opportunities to buy companies trading at or below net asset values, to improve governance and profitability by taking leverage, then to sell the targets at higher prices. LBO managers purchased large enterprises using high debt-to-equity leverage, financing the debt using bank loans secured by the targets' assets. Following a completed transaction, acquirers subsequently rolled over the debt to the target's balance sheet. In theory, the capital restructuring disgorged large free cash flow to improve corporate governance, align managerial incentives by consolidating control, and make operational improvements for an eventual sale at higher valuation (Holmstrom & Kaplan, 2001).

PE funds are typically structured as a limited liability partnership consisting of equity capital raised mostly from limited partners and some from general partners. General partners are the delegated managers of the fund and they make investments at various stages (seed, early, expansion, mature, etc) into portfolio companies. Managers usually follow the 2-20 rule for compensation: an annual management fee of 2% of assets under management plus a carry of 20% of net-of-fees profit (Metrick & Yasuda, 2010). The typical lifespan of a fund is 10 years; called capital is invested in the first half, then harvested in the second half.

In general, there are three major exit channels for PE funds. Mergers and acquisitions include target sale to strategic buyers, the management of the company, and other interested shareholders or buyers. Leveraged recapitalization is sale to another leveraged buyout fund, consisting of an acquisition followed by re-levering by the secondary buyer. Initial public offering (IPO) is the popular exit route for many VC funds, or early-stage PE investors.

LBO funds often co-invest with top management to align incentives, but an LBO deal can also be a uniquely attractive event for target managers for several reasons. The target firm gains tax advantages associated with debt financing, freedom from audit requirements of being publicly listed, or from being a captive division of a larger parent. Often times, the management team receives liquidity without relinquishing operational influence, and an opportunity to increase their share of equity ownership.

In financial engineering of the capital structure, most LBO deals involve multiple tranches of debt: revolving credit facility to provide working capital and cover liquidity emergencies, bank loans, mezzanine debt which is junior to bank loans but senior to subordinated debt, and subordinated/high-yield notes, or junk bonds (Wruck, 1989). For the largest deals, LBO funds co-invest with other LBO funds forming a consortium of buyers. In general, LBO funds own 70-90% of common equity while the remainder is owned by the management and employees of the target. Preferred equity is often used to receive a pre-determined dividend interest payment for a minimum return and is often structured as Pay-In-Kind (paid using additional shares), in addition to the returns of common equity. Axelson, Strömberg, & Weisbach (2009) rationalize the financial structure of PE funds and show in the model that it can minimize the agency conflict between fund mangers and investors.

3. Model

We develop a model of a competitive market for control and ownership of potential target companies by PE firms. The model builds on Head & Ries (2008), who analyze the aggregate bilateral and multilateral stocks of FDI. Our model departs from theirs in two significant

ways. First, we derive the estimating equations to motivate firm-level regressions, and second, we introduce two dimensions of PE firm's heterogeneity. We use discrete choice theory to determine the probability that a given PE firm will win a stylized auction for control of a potential target company. This probability is a function of variables for which we have observable proxies. From this probability, we derive the expected number of deals won by each PE firm in each target country and show this number to be related to key firm-level characteristics, in addition to frictions at the bilateral country level.

Each PE firm (investor), i, is endowed with an ability a_i, which directly adds value to any target company under its control. Similarly, each potential target company (seller), s, contributes value b_s. Upon a successful buyout, the PE firm incurs transaction costs, c_{hd}, associated with managing the portfolio company, where h is the home country of investor i and d is the country of target s. We normalize these costs to equal zero for domestic deals. For cross-border deals, PE firms are heterogeneous in their ability to mitigate costs, and so the total effective costs are given by $z_i c_{hd}$. For example, the general partners of a PE firm must monitor their portfolio managers to ensure that they do not shirk. The cost of this monitoring is given by $z_i c_{hd}$, where c_{hd} is a function of bilateral country characteristics such as geographic and cultural distance, and z_i, an inverse measure of mitigation ability, is a function of the PE firm's strategic orientation and is exogenously determined by the expertise of the PE firm's managers.[4] Therefore, the total transaction cost is a function of the effects of the PE firm i, the home country h, and the target country d. All other determinants of value are subsumed by an idiosyncratic match value, ϵ_{is}, which, for reasons explained below, is drawn from the standard Gumbel (Type I extreme value) distribution with cumulative distribution function $F(x) = e^{-e^{-x}}$. Given the notation above, a PE firm i

[4]This example is based on the formulation of costs in Head & Ries (2008). That paper solves for the Nash Equilibrium in a game between the headquarters of the acquirer and the manager of the subsidiary, where the manager exerts effort in order to contribute b to the subsidiary, and the headquarters pays the monitoring cost c in equilibrium. We introduce PE firm heterogeneity in cost mitigation.

values the acquisition of a target s as follows:

$$V_{is} = a_i + b_s - z_i c_{hd} + \epsilon_{is} \,, \tag{1}$$

We assume that target firms are sold under a mechanism of a first-price auction such that the PE firms with higher valuations bid the highest and make the acquisition.[5] A PE firm i will have the highest valuation if $V_{is} > \max_{j \neq i}\{V_{js}\}$. Under the Gumbel distribution, this probability is given by the multinomial logit formula:

$$\begin{aligned} \mathbb{P}[V_{is} > \max_{j \neq i}\{V_{js}\}] &= \frac{e^{a_i + b_s - z_i c_{hd}}}{\sum_j e^{a_j + b_s - z_j c_{h(j)d}}} \,, \\ &= \frac{e^{a_i - z_i c_{hd}}}{\sum_j e^{a_j - z_j c_{h(j)d}}} \,. \end{aligned} \tag{2}$$

Equation (2) could be estimated using multivariate logit if we knew the full set of potential target firms. Instead, we can recognize that the product of the probability of a PE firm i winning a deal in country d and the number of potential target companies in country d gives the expected number of deals in country d won by the PE firm i:

$$\begin{aligned} \mathbb{E}[X_{id}] &= \frac{e^{a_i - z_i c_{hd}}}{\sum_j e^{a_j - z_j c_{h(j)d}}} M_d \\ &= e^{a_i - z_i c_{hd}} B_d^{-1} M_d \,, \end{aligned} \tag{3}$$

where $B_d = \sum_j e^{a_j - z_j c_{h(j)d}}$ is the "bid competition" in target country d, which depends on the proximity of other bidders in target country d, and M_d is the number of potential targets in country d. Define $\eta_{id} = X_{id}/\mathbb{E}[X_{id}]$ as the ratio of actual to expected number of deals by a PE firm i in target country d, with expectation of one. Then we obtain

$$X_{id} = \mathbb{E}[X_{id}]\eta_{id} = e^{a_i - z_i c_{hd} + \gamma_d} \eta_{id} \,, \tag{4}$$

[5] Lebrun (1999) proves the existence of such an equilibrium for a first price auction with N asymmetric bidders.

where $\gamma_d = \ln[B_d^{-1} M_d]$ comprises the target-country-specific variables.

Equation (4) can be consistently estimated using Poisson pseudo-maximum likelihood estimation (PMLE). Alternatively, we can drop observations for which $X_{id} = 0$ and take logarithms of both sides of equation (4) to obtain

$$\ln X_{id} = a_i - z_i c_{hd} + \gamma_d + e_{id} \,, \tag{5}$$

where $e_{id} = \ln \eta_{id}$.

Empirical proxies are introduced and discussed in Section 5. In Section 6, we estimate equations (4) and (5) using PE firms' performance as a proxy for the ability, a_i, PE firms' strategies as proxies for the cost mitigation, z_i, bilateral frictions related to geographic and cultural distance as proxies for c_{hd}, and country fixed effects to control for γ_d.

4. Data

We collect LBO deal-level data from the 2013 edition of Preqin Private Equity and Venture Capital database. The baseline sample consists of 8,107 unique deals targeting 7,276 companies sponsored by 1,504 LBO funds covering deals completed between 1986 and 2013.[6] Each deal is associated with a target company and year, and is sponsored by one or more funds, each of which is owned by one of 663 PE firms. A target company could be involved in more than one deal over time, representing a chain of levered recapitalizations.

Of the 8,107 deals, 264 include deal size (in various international currencies) and total equity investment. The difference between the two values divided by deal size yields leverage. Since many deals are sponsored by a consortium of funds, the computed leverage represents an aggregate leverage of the deal's co-sponsors. Further restricting this set to deals with a single buyer PE firm reduces the sample size to 188. A notable observation is that the

[6]The commercially available databases widely used in academic research are Venture Economics, Preqin, and Cambridge Associates. Harris, Jenkinson, & Kaplan (2014), Robinson & Sensoy (2011), and Phalippou (2014) discuss the comparisons of different databases and performance measures.

mean leverage of cross-border deals among this restricted sample is 52.2% (50 observations) whereas the mean leverage of domestic deals is 43.5% (138 observations). The difference is statistically significant. Further attempts to relate capital structure of deals to PE firms' performance and/or strategies do not yield significant and stable results, largely because of the limited sample size relative to the total number of controls. Given these data limitations, we abstract from controlling for the heterogeneity in the financing terms when study the determination of cross-border LBOs.

It is well known in the literature on strategic M&As that time-varying macroeconomic forces play a role in shaping the pattern of deal flows. For example, previous literature finds merger waves for strategic deals (Harford, 2005). We document a similar pattern for LBO deals. Fig. 1 shows the number of cross-border and within-border deals for both strategic and LBO transactions. The sample of strategic M&As from 1990 to 2013 is collected from Security Data Corporation's (SDC) Mergers and Corporate Transactions database. We keep completed deals, and exclude LBOs, IPOs, recapitalizations, repurchases, partial equity stake purchases, and acquisitions of remaining interest, as well as deals in which the target or the acquirer is in the financial or utilities industry, and in which the home or target nation information is missing. Two interesting results emerge. First, cross-border and within-border transactions have a similar movement for both strategic and LBO deals. For LBO deals, the number of cross-border deals and the number of within-border deals gradually increase before the 2007 financial crisis, and then decrease afterwards. Second, the strategic and LBO deals have a similar movement after the burst of the dotcom bubble. These patterns suggest that some common macroeconomic determinants documented in Erel et al. (2012) are also likely to affect LBO deals.[7]

Preqin offers capital-weighted performance information, including internal rate of return (IRR); quartile ranking bench-marked by vintage year, region and type; and multiples. Performance data are cumulative as of the second quarter of 2013. Fig. 2 shows the trends in the

[7]We find further support for this argument in unreported results of regressions in which the number of deals between country pairs are regressed on an array of macroeconomic bilateral variables.

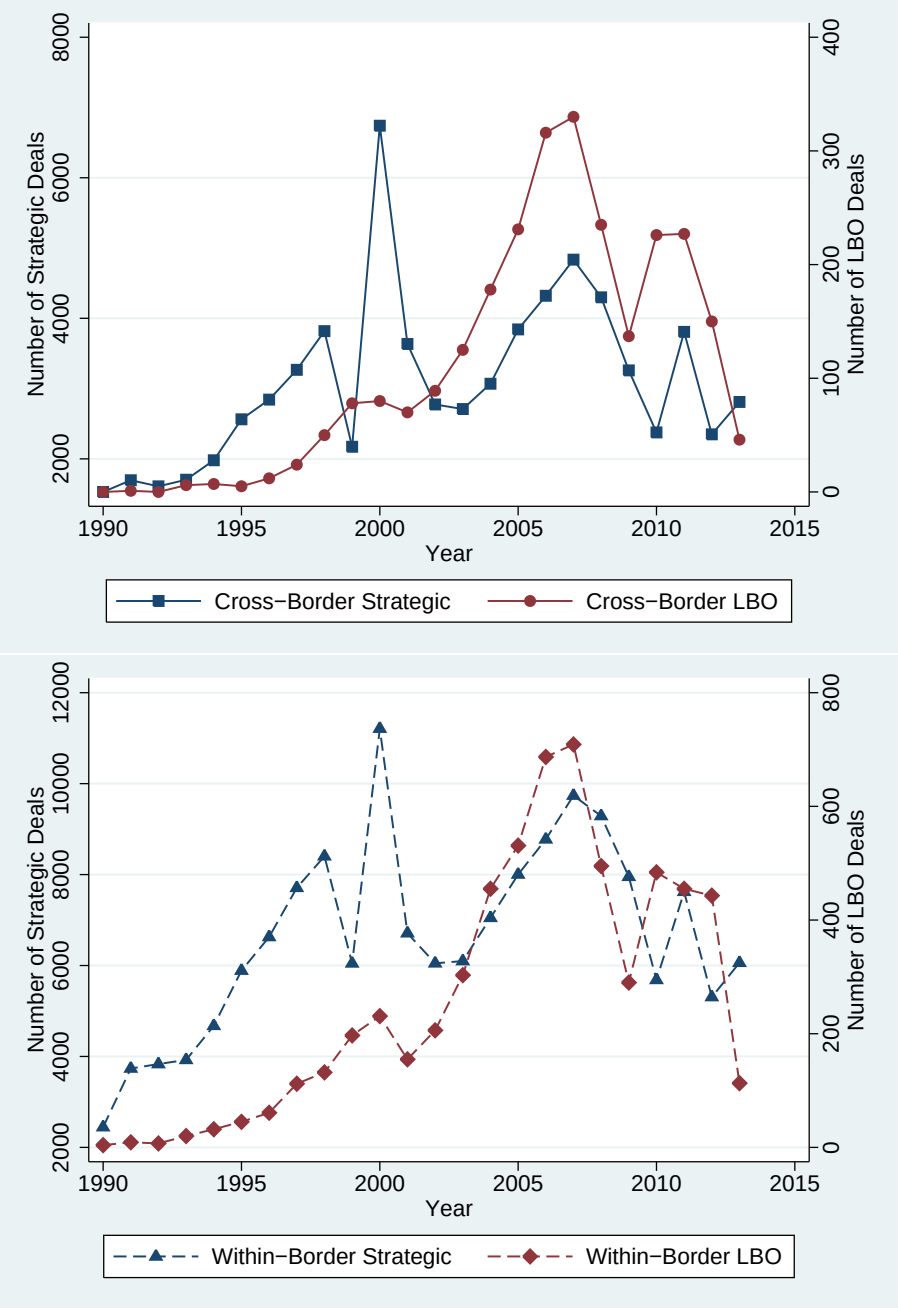

Fig. 1. Number of cross-border and within-border deals by year

number of LBO funds, as well as their size and performance (in net multiples). The number and the value of the fund raised are consistent with the number of deals presented in Fig. 1. Those statistics are also comparable to other proprietary databases widely used in the literature (Acharya, Gottschalg, Hahn, & Kehoe, 2013; Harris, Jenkinson, & Kaplan, 2014;

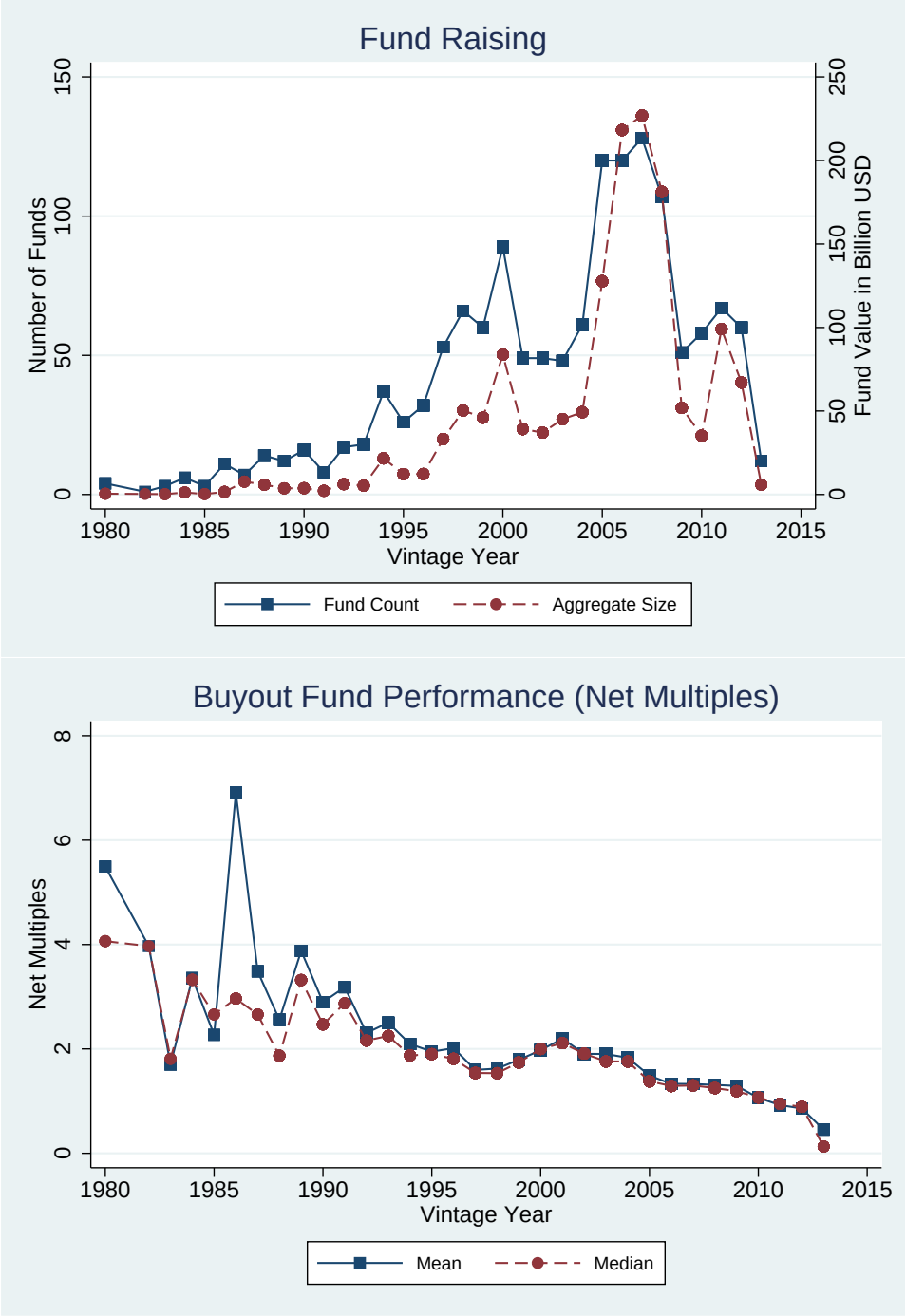

Fig. 2. Fund count, size, and performance by year

Sensoy, Wang, & Weisbach, 2014). For comparison, we provide similar summary statistics using data from Capital IQ in Fig. 3. Capital IQ tends to capture a larger universe of deals and funds as shown by higher counts, however with limited depth of information. We note

the similar patterns across the numbers of LBO deals (both cross-border and within-border), fund count, and aggregate size in the same time periods between the two databases.

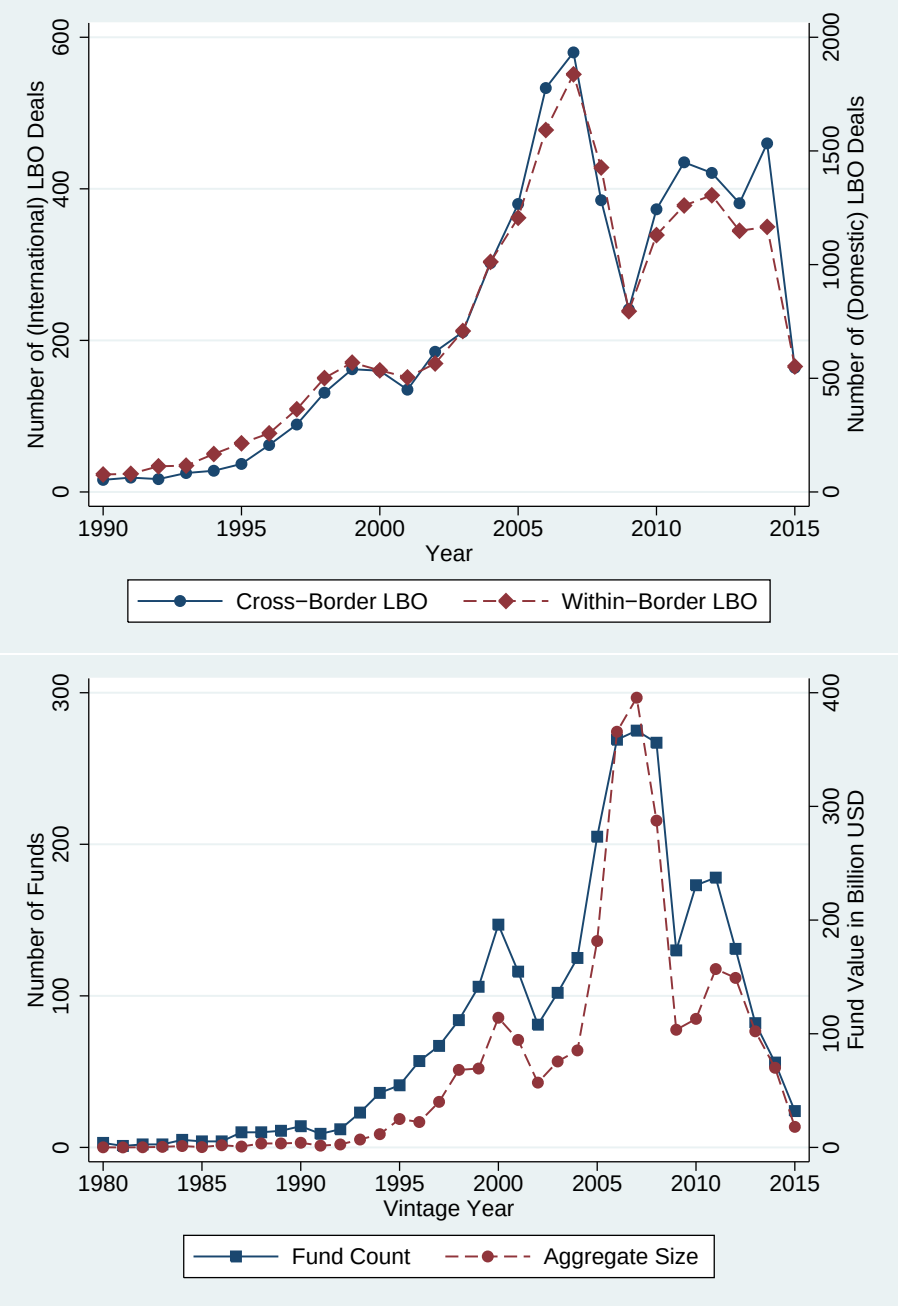

Fig. 3. Comparative summary statistics using Capital IQ

Though a general decline in performance is shown in Fig. 2, Harris et al. (2014) conclude that LBO funds highly likely outperformed the public markets in the 1980s, 1990s and 2000s.

Table 1

Number of LBOs by country

		Acquirer																											
		America					Europe														Asia-Australasia						Other	
Location	TGT	USA	CAN	BRA	MEX	ARG	GBR	FRA	SWE	FIN	NLD	DEU	CHE	ITA	DNK	ESP	NOR	POL	LUX	RUS	AUS	HKG	MYS	NZL	IND	SGP	ZAF	Total
US	USA	4119	41	1	1	1	111	10	14		1	7	9	1		1			1		6	7	1		1	1		4334
Canada	CAN	97	36				6	1									1	1										142
Brazil	BRA	29		21		6	2						2													1		61
Mexico	MEX	19			15	3	1																					38
Bermuda	BMU	14	1				1																					16
Argentina	ARG	8				4																						12
UK	GBR	223	1				776	8	10		2		4	1			1		1		1	1			1			1030
France	FRA	64	1				152	275	3		5	6	24	2					22				1					555
Germany	DEU	120					117	21	19		15	79	5						8									384
Sweden	SWE	15	1				51	2	161	17	1	7			12		11											278
Italy	ITA	35					50	13	1			3	11	71					7									191
Netherlands	NLD	40					50	3	2		77	4							2			2						180
Finland	FIN	3					22		18	120																		163
Spain	ESP	27					43	4					5	1		43		1			1							125
Denmark	DNK	7					17		26	3	4	1			51		3											112
Norway	NOR	13					12		23	13							38											99
Switzerland	CHE	23					20	4	5		5		24	1			1		3									86
Poland	POL	10					11	2										39									1	63
Belgium	BEL	11					23	5			10	2			1				1		1							54
Russia	RUS	7					2			10		1								13								33
Austria	AUT	7					2	1	1		2	5	3															21
Ireland	IRL	5					14							1														20
Czech Republic	CZE	7					7	1										2										17
Romania	ROU	4					1									5		5										15
Luxembourg	LUX	7					3	1		1																		12
Hungary	HUN	5					4	1										1										11
Turkey	TUR	6					4											1										11
Israel	ISR	4					6																					10
Portugal	PRT	2														7												9
Bulgaria	BGR	2					1		1							3		1										8
Australia	AUS	26					11	1					1								98	6	7	6			1	157
China	CHN	42					3	1	5			1										20				2		74
India	IND	28					8														1	4	6		21	2		70
New Zealand	NZL	12																			24	3		18				57
Japan	JPN	26					6								2						1	6						41
South Korea	KOR	12					3															12						27
Singapore	SGP	5					6		1								1					5	2			6		26
Hong Kong	HKG	11					2		1				1									3	2			1		21
Thailand	THA	8																					5					13
South Africa	ZAF	3					6																				26	35
	Total	5106	81	22	16	14	1554	354	291	164	122	116	89	78	66	59	56	51	45	13	133	69	24	24	23	13	28	8611

This table presents the number of leverage buyout deals between country pairs. The sample of PE firms from 1986 to 2013 is collected from Preqin 2013. The columns represent the countries of the acquirers and the rows represent those of the targets. Countries are first sorted by continents (America, Europe, and Asia-Australasia), and then sorted by number of LBO deals. We drop the acquirers or target countries that have less than 10 LBO deals. In the later regression analysis, we keep those countries.

Table 1 provides a summary of bilateral country-level LBO deal counts. The columns represent the countries of the acquirers whereas the rows represent those of the targets. To emphasize the importance of geography on cross-border transactions, we sort countries by continents (America, Europe, and Asia-Australasia) and by the number of deals. In this table, we drop the acquirer or the target countries that have fewer than 10 LBO deals in the sample period. Because of this treatment, the total number in the last row or column does not reflect the actual total number of deals for each country in our sample. Table 1 reveals two important facts about international LBO activity. First, the United States and the United Kingdom are the predominant players in LBO deals, making up more than three-quarters of all acquisitions. Second, the cross-border LBO activity is largely intra-continental, as the off-diagonal blocks are much sparser than the diagonal (continental) blocks. This pattern is consistent with the idea that proximity is an important factor in cross-border LBO transactions.

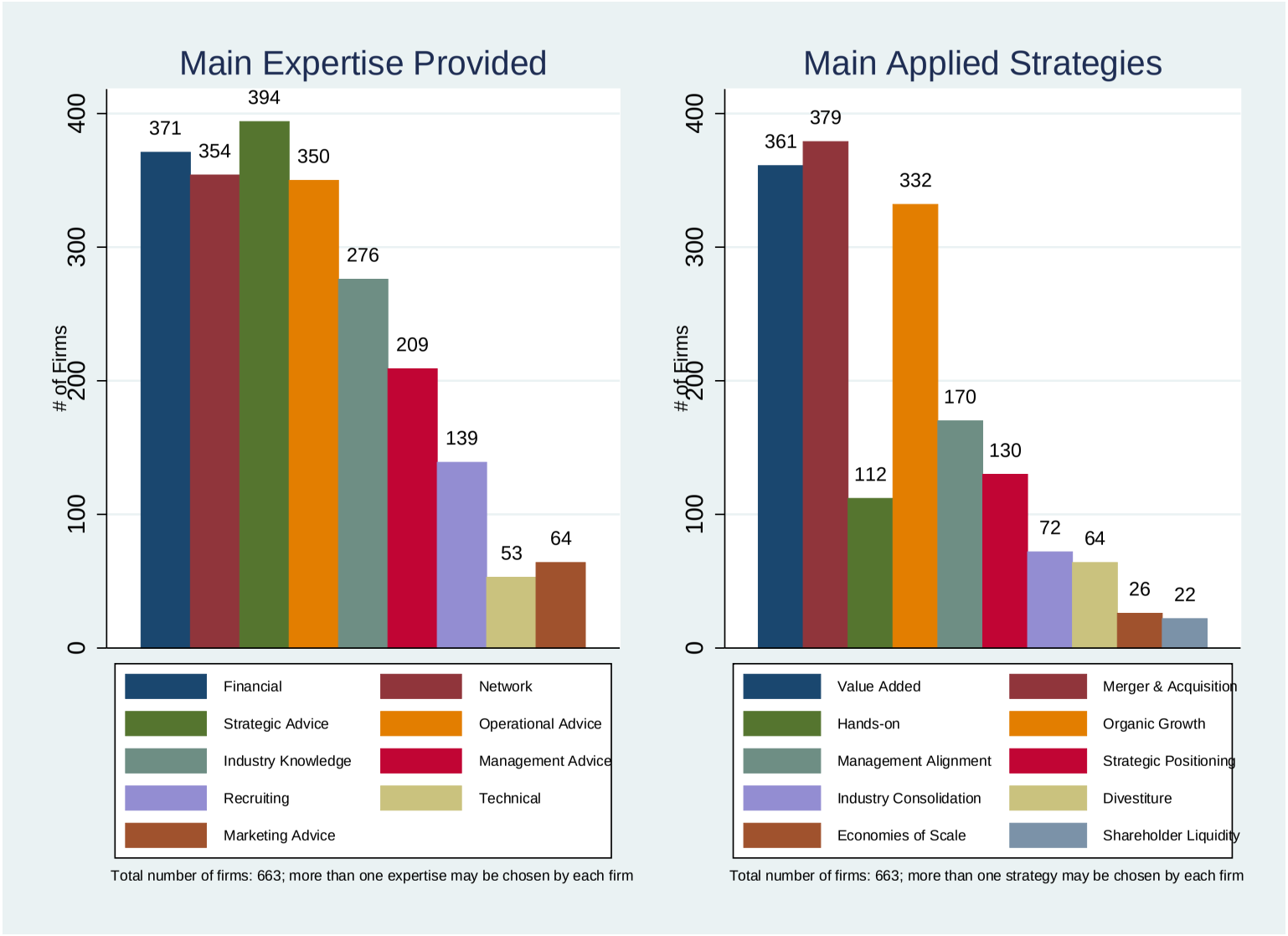

Fig. 4. Main expertise and applied strategies

Preqin also provides a comprehensive array of information related to expertise, applied strategies, financing structure, and preferred target company characteristics of each PE firm. These pieces of information are based on a survey carried out by the data vendor and completed by PE firms' managers. Fig. 4 shows that strategic advice and financial expertise are the types of expertise most frequently identified by PE firms' managers. This observation is consistent with the prevalence of former management consultants and investment bankers entering PE firms, whose human capital will be most correlated with expertise in strategic advice and financial engineering. The survey data also reveal an overwhelming preference for a controlling shareholding position, suggestive of implementing managerial improvements. Fig. 5 shows the preferences regarding target company situations. We take these preferences as describing strategies related to the selection of targets by fund managers. Further discussion on the strategies and expertise is in the subsection 5.3.

Fig. 5. Target preferences

5. Empirical proxies

To move from the theoretical number of deals by firm–target country to an estimable equation, we require empirical proxies for the PE firm's ability, a_i, the bilateral transaction costs, c_{hd}, and the PE firm's cost mitigation, z_i.

5.1. Firm performance

As a proxy for value-adding ability, we use the PE firm's performance, as measured by its internal rate of return (IRR) weighted over each of its funds. Other performance measures used in the literature include investment multiples and public market equivalent (PME). The investment multiple is defined as the ratio of total distributed capital (net of fees) to total called capital. If all distributions and capital calls occur in a single outflow and inflow, respectively, then this measure would be equal to the IRR. More generally, IRR takes into account the timing of cashflows. PME is calculated as the ratio of discounted cash outflows of the fund using the S&P 500 return as the discount factor, to the discounted value of the cash inflows (all net of fees), again using the S&P 500 returns. In sum, a PME greater than one means the fund outperformed the market benchmark (Kaplan & Schoar, 2005). We chose IRR as our performance measure due to the difficulty of identifying the appropriate public market benchmark given the global scope of our fund data. Moreover, Harris, Jenkinson, & Kaplan (2014) show that investment multiples combined with vintage years, IRR and year dummies explain at least 90% of the variation in PMEs.

A large literature studies the relation between fund performance and managerial skill, or ability. Because successful investing is a combination of ability and luck, the problem is to distinguish between these two components. A common approach to this problem is to test for persistence in fund performance. The presence of skilled fund managers implies that past winners should continue to outperform their peers. Although early literature finds some mixed evidence (Brown & Goetzmann, 1995; Carhart, 1997), a number of recent studies find

that good performance indicates superior skill. For example, Cremers & Petajisto (2009) construct a new measure of active portfolio management and find that funds with a high value in the measure outperform benchmarks and exhibit strong performance persistence. Puckett & Yan (2011) find that institutional investors earn significant abnormal returns on their trades within the trading quarter and that interim trading performance is persistent. Kacperczyk, Van Nieuwerburgh, & Veldkamp (2014) decompose the fund performance into the skill of stock picking and of market timing, and find that the skilled fund managers can both pick stocks well during booms and time the market well in recessions. These managers significantly outperform other funds and benchmarks.

Although the evidence on performance and managerial ability is mainly found in the mutual fund industry due to data availability, the underlying economics are likely to prevail for PE firms. Indeed, Kaplan & Schoar (2005) document large persistence in LBO and VC performance. This persistence exists up to three consecutive funds. In particular, Kaplan & Schoar (2005) emphasize that the most likely explanation for the persistence is heterogeneity in the skills of the general partners. Acharya et al. (2013) further show that PE firms improve the operating performance of portfolio companies and that this improvement is associated with the ability of PE firm managers.

5.2. Transaction costs

Transaction costs are represented by a dummy for cross-border country pairs (equal to one except in the case where the target country is equal to the home country), the logarithm of geographic distance, and dummies for different official language and different legal origins. We collect the bilateral country level variables on geographic distance, common language, and common legal origin from the CEPII gravity database.[8] The database provides population-weighted great circle distance between large cities of each country pair and is based on the data collected in Head, Mayer, & Ries (2010). We define dummies for different language and

[8]The database is available at `cepii.fr`

legal origin to express this information in terms of costs.

To facilitate estimation of several interaction terms in our empirical specifications, we also construct a transaction cost index equal to

$$Cost\ Index = CrossBorder + BigDistance + Diff.Lang + Diff.Legal\ , \tag{6}$$

where $BigDistance$ is a dummy variable equal to one when the geographic distance is greater than average. The cost index takes on values 0 through 4, with approximately equal numbers of observations in each category.[9]

5.3. Strategies and expertise

Our proxy for PE firm heterogeneity in the mitigation of transaction costs is based on their main investment strategies and target preferences. Based on the descriptions, we have *ex ante* reasons to believe that some strategies will be subject to transaction cost frictions more than others. We think of the theoretical variable z_i as varying in a continuum from zero to one, where a value of zero means that the PE firm is able to entirely circumvent the cost of remoteness, and a value of one means that the PE firm incurs the full cost. The strategy profile of each PE firm maps into this continuum and provides an empirical measure of the transaction cost mitigation of the PE firm. Given the qualitative nature of strategies, this mapping is fairly crude, but patterns in the data suggest this measure of cost mitigation is informative for predicting outcomes in expected ways.

Acharya et al. (2013) and Bottazzi, Da Rin, & Hellmann (2008) employ human capital based managerial expertise as instruments for applied strategies of funds. Lee & Li (2014) find that strategy profiles and target company preferences are driven by the expertise of PE firm managers. As such, we view strategy profiles, including the screening of potential

[9]The cost index could also include other variables such as the religion, colony status, time difference, accounting standards, legal protections, and so forth. Inclusion of these variables does not change our results, but some of them are highly correlated with each other. Therefore, we keep the cost index parsimonious.

target companies for particular characteristics, as arising from the pre-determined expertise of general partners.

Table 2

Strategy classification

Group	Strategy/Target Preference	
Consolidation & Growth	Mergers & Acquisitions	S
	Industry Consolidation	S
	Economies of Scale	S
	Organic Growth	S
	Reach Critical Size	S
	Buy and Build	S
	Become Attractive to Acquisition	T
	International Growth Potential	T
Management	Management Alignment	S
	Day to Day Involvement	S
	Hands-on	S
	Succession Issues	T
	Underperforming	T
	Family Business	T
Market Positioning	Strategic Positioning	S
	Strong Market Position	T
	Defined Niche	T
	Defensible Market Position	T
	Diverse Customer Base	T
Idea-core	Competitive Advantage	T
	Innovative Company	T
	Intellectual Property	T
Financial Related	Undervalued	T
	Positive/Stable Cashflow	T
	Shareholder Liquidity	S

The analysis of strategy groups. Table 2 provides a list of the strategies and target preferences we believe should be linked to the incidence of transaction costs. The strategies and target preferences are ordered into five strategy groups. We focus on the group instead of individual component for two reasons. First, the survey data contain many strategies and target preferences. It is difficult to present the results of each of them in detail. Second, many

strategies and target preferences are similar in nature. Grouping them together reduces the potential for multicollinearity and measurement error.

The first group is consolidation and growth, which consists of six strategies and two preferred target situations. The target preferences reveal that the PE firm's strategies are related to consolidation and growth. The international business literature suggests that M&As is the preferred mode of entry for firms in distant markets because this approach allows them to readily tap into local business networks and appear less foreign (Kostova & Zaheer, 1999; Nachum, 2003). For similar reasons, we imagine that PE firms that look to consolidation and growth for portfolio companies, of which one component is an M&A strategy, will have an easier time in foreign markets. Moreover, the consolidation and growth strategy is associated with firms trying to exploit economies of scale to reach minimum efficient size. The managerial strategy of the PE firms in this group is less on the detailed operations and more on "big picture" trajectory. We predict that firms following this strategy will mitigate costs of remote ownership.

The second group is management, which has three strategies and three preferred target situations. Firms that take a management alignment, hands-on, or a day-to-day involvement approach to the management of portfolio companies are likely to feel the effects of remoteness more acutely. In an alternative view, hands-on strategies may tend to reduce agency cost, thereby mitigating transaction costs. However, when we examine how shareholding preferences are distributed between VC and buyout funds (Lee & Li, 2014), the majority of buyout funds prefer controlling stakes whereas VCs prefer minority positions or are indifferent. And yet, the distribution of main applied strategies between VCs and buyout funds indicate that 'hands-on' is the second most popular strategy for VCs, whereas it is one of the least preferred for buyout funds. The investor-entrepreneur agency problem can be viewed using the framework of formal and real authority following Aghion & Tirole (1997). For early-stage firms, investors must provide sufficient incentives to entrepreneurs via majority equity to compensate for large risk and overcome major information asymmetry (entrepreneurs have

better knowledge of the business and should be delegated with formal authority to execute). However, for mature enterprises, risk is low and information is more public, so the costs of loss of control dominate and investors will prefer controlling stakes. Shareholding preferences are consistent in this regard, and the interpretation on 'hands-on' is less about control rights, but more consistent with our notion of day-to-day involvement while maintaining managerial alignment.[10] Managers in these firms will need to travel or be assigned to companies in less familiar environments. Such an investment strategy will be well-suited for targets that are under-performing, have succession issues, or are family businesses. The cost of remoteness is likely to be more severe for these PE firms. Indeed, in a related study, Chemmanur et al. (2014) find that access to the target country through direct flights is an important determinant of deal success for PE firms. We predict this channel to be especially important for those firms that take an active role in the management of portfolio companies. While on-site management is likely to help alleviate agency costs, this strategy will be more costly to implement and less effective in culturally dissimilar environments.

The third group is market positioning, which suggests that the PE firms prefer targets with good market positions and a defined market niche, coupled with a diverse customer base. Extant research suggests a trade-off between geographic and product diversity, whereby firms that remain concentrated on the product dimension are better able to diversify geographically, at least in the short run (Kumar, 2009). Similarly, we believe that PE firms with skills in selecting and improving targets with narrow, but strong, market positions, will be better able to mitigate the geographic and cultural costs of cross-border ownership. Given the targets' strong market positions, the value added by going private is more likely to be driven by financial restructuring and tax-related gains than by operational improvements.

The fourth group is called idea-core. The PE firms in this group are likely to prefer

[10]There is rich literature that shows VC is a very local business (Sorenson & Stuart, 2001, Powell, Koput, Bowie, & Smith-Doerr, 2002 and Glaeser & Kerr, 2009) – silicon valley VCs rarely leave the bay area for investments and biotech funds in Boston tend to hover around Harvard/MIT (San Diego and San Francisco are also superb in life sciences). This again supports the idea that a hands-on strategy is more reflective of a locally-bound engagement.

targets with unique technology and patents. We believe this strategy will increase the cost of cross-border transactions. First, intellectual property is intangible and subject to legal risks. Reducing this risk is likely to result in more costly contract negotiations, particularly in foreign markets with different legal and institutional notions of intellectual property protection. Second, unique technology and patents can be sensitive assets to national security, and are difficult to acquire for foreign buyers. For example, the Committee on Foreign Investment in the United States (CFIUS) reviews the national security implications of foreign investments in U.S. companies or operations, and some cross-border transactions are not approved. The contingency of value on the protection of intellectual property increases the risk – and consequently the cost to mitigate this risk – for PE firms.

The fifth group is financial related. The preference for positive and stable cash flow has at least two implications. First, the PE firms may prefer low-risk investments, possibly because risk management is not a strength of the PE firm. If that is the case, these firms will likely find the risks of international investment particularly onerous. Second, it may also imply that the PE firms rely on a high leverage in their LBO deals, and the target companies need to generate stable cash flow to cover the debt payments. It may be difficult to finance such a highly leveraged deal in a foreign country domestically, and the PE firms may not have strong connections with the local banks in the target country. PE firms that look to maintain shareholder liquidity might need to take more costly actions in foreign countries where they have fewer business connections in order for their portfolio to remain liquid. All of these reasons would increase the cost of transactions in foreign markets. Most practitioners believe that a broad dichotomy in the investment strategies of PE firm managers is driven by their backgrounds. The first type consists of former management consultants and corporate managers who emphasize operations and managerial engagements, which are more sensitive to distance and local settings, as their overarching value-adding proposition. The second type consists of former investment bankers and investment managers who emphasize financial engineering as their primary value-adding proposition. While the

focus on stable cash flow and shareholder liquidity are financial in nature, they represent conservative financial strategies, which might be more likely adopted by the "consulting" side of the industry rather than the financial engineers.

Cost mitigation index. The strategies are not mutually exclusive and a PE firm's strategy profile is a vector of dummies, one for each possible strategy. To summarize the degree to which the firm's strategic profiles mitigate transaction costs, we define a cost mitigation index (CMI_i) based on the strategy profiles, using the formula

$$CMI_i = \sum_j I_j \mathbb{1}_{ij} \,, \tag{7}$$

where I_j is equal to 1 if the impact on cost mitigation of strategy j is negative, and equal to -1 if the impact is positive, and $\mathbb{1}_{ij}$ is equal to 1 if PE firm i employs strategy j and zero otherwise. For expositional purposes, we scale the index so that the minimum value is equal to zero and the maximum is equal to one. The scaled measure is obtained by the linear transformation, $\widetilde{CMI}_i = (CMI_i - CMI_{min}) \,/\, (CMI_{max} - CMI_{min})$, where CMI_{min} and CMI_{max} refer to the minimum and maximum value of CMI_i. We subsequently refer to the scaled measure as simply CMI_i.

Based on our *ex ante* predictions above, we define the CMI_i as

$$CMI_i = \mathbb{1}_{i,idea-core} + \mathbb{1}_{i,management} + \mathbb{1}_{i,financial} - \mathbb{1}_{i,consolidation} - \mathbb{1}_{i,positioning} \,. \tag{8}$$

Additional control variables. In addition to our main variables of interest, we include several potentially relevant controls. The first, syndicate, measures the propensity of the PE firm to partner with other buyers to carry out a deal. In cross-section regressions, it is equal to the number of deals the firm completed with syndicate partners over the total number of deals completed by the firm, with both totals calculated over the entire sample period. In panel regressions, the ratio for each firm is calculated for each period.

Following Cumming, Schmidt, & Walz (2010) and Cumming & Walz (2010), we include

a legality index, constructed by Berkowitz, Pistor, & Richard (2003), which is a weighted average of the following factors: efficiency of judicial system, rule of law, corruption, risk of expropriation, and risk of contract repudiation. All of these constituent measures are defined in La Porta, Lopez-de Silanes, Shleifer, & Vishny (1998).[11] To construct a bilateral variable, we take the difference between the home country's index and the target country's index. A positive coefficient on this bilateral variable would suggest that firms from countries with strong legal institutions are more likely to acquire targets in countries with weaker legal institutions.

Cumming & Dai (2010) study the determinants of local bias for U.S. VC firms. They construct an average distance variable at the VC level by averaging the geographic distance between the VC and each of its portfolio companies. We construct an analogous variable for our set of PE firms and their global buyout targets, and include it as a control for unobserved local bias. In panel regressions, average distance is calculated for each period.

Finally, we control for PE firm size, which we measure in the cross section by the average assets under management (AUM) over the sample period. In panel regressions, size is measured as AUM for each period. In the U.S. venture capital context, Cumming & Dai (2011) find a convex relationship between firm valuations and fund size, and a concave relationship between the probability of successful exit and fund size, by including both (log) size and its square. We similarly allow for a non-linear effect of size on deal counts.

5.4. Illustrating examples

To make these ideas more concrete, we provide examples of how several PE firms are coded in the data, and how this compares with the firms' public profiles. The firm coded as having the least transaction-cost mitigation (a CMI score of 1) is Wayzata Investment Partners, headquartered in Minnesota. While the firm has offices in London and Mumbai, it is primarily focused on the U.S. market. None of the firm's leveraged buyouts in our sample

[11] Those variables are available on Raphael La Porta's website.

were cross-border. Wayzata's CMI score of 1 suggests its strategic orientation is operational and hands on, rather than primarily financial. This is consistent with the firm's stated investment strategy, which is a "hands-on approach to sourcing distressed opportunities, working through the complexities of the restructuring process, stabilizing (deleveraging) the restructured business, focusing on strategies to enhance internal growth and then identifying potential acquisition candidates." [12]

On the opposite end of the spectrum is The Carlyle Group, headquartered in Washington, D.C. It has a CMI score of 0, indicating a high transaction-cost mitigation orientation. Indeed, the firm's mission statement calls for its professionals to work seamlessly across geographies to create value for its investors. Carlyle has offices in 23 countries across six continents, and all three founders have a background in investment banking, an expertise consistent with the strategic orientation coded in our data. Moreover, the firm carried out more than 80% as many cross-border deals as domestic deals in our sample. According to the firm's website, more than half of the employees of portfolio companies reside outside the United States.[13] Similarly, Advent International, out of Boston, has a CMI score of 0 and a ratio of cross-border to domestic deals over three.

6. Results

For the first set of results, we cumulate the data over the period 1986 to 2013 to obtain the number of acquisitions by each PE firm in each target country. The full sample includes 663 firms from 47 home countries investing in 84 target countries, for a total of 55,692 observations at the firm-target country level. However, only 1,760 of these observations are non-zero in the sample. This represents the maximum number of observations available for our OLS specification, which uses the logarithm of the deal count as the dependent variable. A total of 29,873 observations are associated with country pairs for which at least one PE firm

[12] www.wayzatainvestmentpartners.com

[13] www.carlyle.com

from the home country invested in the target country. This represents the maximum number of observations available for our Poisson Maximum Likelihood specifications. Discrepancies from these figures in each regression are due to missing data for some of the independent variables.

6.1. Regression analysis: strategy groups

We first report results of estimating equation (5) using ordinary least squares with home- and target-country fixed effects. Standard errors are adjusted for clustering at the firm level. In Table 3, we allow each proxy for transaction costs to enter separately, along with its interaction with dummy variables for each of the strategies. Firm performance enters every specification with a positive and significant coefficient, and each of the proxies for transaction costs enter with negative and significant coefficients. These results suggest that LBO deals are influenced by some of the same forces that shape strategic M&As.

Turning to the interaction effects, we generally find negative coefficients on management, financial, and idea-core, and positive coefficients on consolidation. The signs of these coefficients are all consistent with our *ex ante* predictions. The interaction effects of the cost proxies with the financial and positioning strategy dummies are negative and positive, respectively, also consistent with our predictions, but statistical significance is marginal.

All of the control variables enter significantly except average distance. Firms that tend to participate in syndicate deals make fewer acquisitions, while larger firms complete more deals, with marginal evidence of concavity in size. Large firms can invest their assets by completing more deals and/or undertaking larger acquisitions. An increasing, concave relationship would suggest both of these margins are adjusting with size. Moreover, results strongly suggest that more deals occur between buyers from countries with strong legal institutions and targets in countries with weak legal institutions, even controlling for home- and target-country fixed effects.

Table 4 reports results for estimation of equation (4) using Poisson pseudo-maximum

Table 3

OLS deal count regression I

	(1)	(2)	(3)	(4)	(5)
performance	1.319***	1.175***	1.334***	1.392***	1.438***
	(5.14)	(4.83)	(5.52)	(5.81)	(5.92)
cross-border	-1.644***				
	(-19.00)				
ln distance		-0.564***			
		(-13.56)			
diff. language			-1.188***		
			(-10.11)		
diff. legal origin				-1.170***	
				(-10.15)	
cost index					-0.362***
					(-11.89)
syndicate	-0.376***	-0.321***	-0.300**	-0.318***	-0.292**
	(-3.09)	(-2.60)	(-2.53)	(-2.70)	(-2.36)
diff. legality	1.874***	0.757	2.826***	2.611***	3.211***
	(2.61)	(1.03)	(3.88)	(3.73)	(4.07)
avg. distance	0.055	0.103*	-0.057	-0.061	-0.008
	(1.14)	(1.94)	(-1.16)	(-1.24)	(-0.16)
ln size	0.750***	0.581***	0.386**	0.374*	0.483**
	(4.00)	(2.91)	(2.01)	(1.94)	(2.49)
$(\text{ln size})^2$	-0.036**	-0.027*	-0.014	-0.013	-0.020
	(-2.57)	(-1.76)	(-0.97)	(-0.89)	(-1.33)
consolidation x cost proxy	0.141*	0.026***	0.154	0.211**	0.034
	(1.84)	(3.07)	(1.48)	(2.07)	(1.34)
management x cost proxy	-0.167**	-0.013*	-0.259***	-0.290***	-0.071***
	(-2.40)	(-1.71)	(-2.81)	(-3.28)	(-3.33)
financial x cost proxy	-0.050	-0.007	-0.154*	-0.196**	-0.040*
	(-0.75)	(-0.92)	(-1.73)	(-2.20)	(-1.86)
positioning x cost proxy	0.097	0.021**	0.025	0.022	0.007
	(1.16)	(2.43)	(0.21)	(0.19)	(0.28)
idea-core x cost proxy	0.026	-0.017**	-0.058	-0.115	-0.023
	(0.41)	(-2.15)	(-0.72)	(-1.43)	(-1.21)
Target Country FE	Yes	Yes	Yes	Yes	Yes
Home Country FE	Yes	Yes	Yes	Yes	Yes
N	1403	1403	1403	1403	1403
R^2	0.514	0.471	0.398	0.398	0.446

Dependent variable is the logarithm of the number of deals completed in destination country d by PE firm i. The strategy groups are defined in Table 2. The details of control variables are provided in Appendix I. Cost index is defined in equation (6). All errors are clustered at the PE firm level. t statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

Table 4

PMLE deal count regression I

	(1)	(2)	(3)	(4)	(5)
performance	1.733***	1.543***	1.758***	1.774***	1.766***
	(5.45)	(4.85)	(5.48)	(5.54)	(5.52)
cross-border	-3.270***				
	(-16.75)				
ln distance		-1.428***			
		(-19.02)			
diff. language			-3.039***		
			(-10.26)		
diff. legal origin				-2.906***	
				(-9.51)	
cost index					-1.271***
					(-9.29)
syndicate	-0.478***	-0.447**	-0.489***	-0.478***	-0.492***
	(-2.75)	(-2.56)	(-2.80)	(-2.74)	(-2.83)
diff. legality	-0.245***	0.113*	6.674***	6.259***	12.384***
	(-3.85)	(1.74)	(4.81)	(4.53)	(7.65)
avg. distance	-0.031	-0.022	-0.046	-0.047	-0.033
	(-0.38)	(-0.29)	(-0.57)	(-0.57)	(-0.40)
ln size	0.338	0.313	0.298	0.318	0.370
	(1.10)	(0.98)	(0.98)	(1.04)	(1.18)
$(\text{ln size})^2$	0.013	0.015	0.017	0.015	0.011
	(0.57)	(0.59)	(0.73)	(0.66)	(0.46)
consolidation x cost proxy	0.344	0.058***	0.310	0.401	0.124
	(1.57)	(3.34)	(1.02)	(1.31)	(1.44)
management x cost proxy	-0.302	-0.028*	-0.404	-0.462*	-0.149*
	(-1.41)	(-1.84)	(-1.54)	(-1.73)	(-1.87)
financial x cost proxy	-0.389**	-0.029**	-0.539**	-0.665***	-0.183**
	(-2.13)	(-2.25)	(-2.24)	(-2.59)	(-2.51)
positioning x cost proxy	0.695***	0.055***	0.820**	0.887**	0.263**
	(2.70)	(3.18)	(2.31)	(2.46)	(2.57)
idea-core x cost proxy	-0.546***	-0.031**	-0.668***	-0.927***	-0.238***
	(-2.92)	(-2.03)	(-2.75)	(-3.42)	(-3.17)
Target Country FE	Yes	Yes	Yes	Yes	Yes
Home Country FE	Yes	Yes	Yes	Yes	Yes
N	16713	16713	16713	16713	16713
pseudo R^2	0.698	0.700	0.616	0.608	0.673

Dependent variable is the number of deals completed in destination country d by PE firm i. The strategy groups are defined in Table 2. The details of control variables are provided in Appendix I. Cost index is defined in equation (6). All errors are clustered at the PE firm level. t statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

likelihood estimation (PMLE). Results are qualitatively very similar to the OLS results reported in Table 3. In each specification, performance enters positively and significantly, and the six transaction cost proxies (including the cost index) enter negatively and significantly. Moreover, each of the interaction terms with PE firm strategies enters consistently with the results of Table 3. In the PMLE regressions, the consolidation and management interactions lack robust statistical significance, but statistical significance is strengthened for the financial and positioning strategies.

While the qualitative results are largely unchanged between the OLS and PMLE specifications, the magnitudes of the estimated coefficients are larger in absolute value in Table 4. One possible explanation is that the OLS coefficients are biased toward zero because of selection bias. PE Firms with low performance, with strategy profiles implying low transaction-cost mitigation, and paired with target countries that are remote from the home country, are likely to have no deals. These zeros are dropped in the OLS regressions, but they are explained by the independent variables. Dropping them would thus tend to lower the estimated effect of the independent variables. The PMLE regressions allow the data to explain the zeros so they do not suffer from this bias. Helpman et al. (2008) implement a two-step procedure to account for zero trade flows between country pairs. Their method is similar to the Heckman (1979) two-step procedure, and requires a variable that explains zeros but is excluded from the main count/volume regression for identification. Ideally, a measure of one-time fixed costs for a PE firm to enter each new market would serve this purpose, but finding a convincing variable in practice is difficult. In addition to this issue, a comparison of the PMLE results with the literature on other economic flows suggest they are in the right ball park. For example, the coefficient on ln distance is typically found to equal approximately -1 in studies on trade flows and FDI (Head & Mayer, 2013). We thus consider our PMLE regressions to be the preferred specification.

6.2. Regression analysis: cost mitigation index

In Tables 5 and 6 we proxy transaction costs with each component in the cost index, namely, the cross-border dummy, the logarithm of distance, the different official language dummy, and the different legal origins dummy. We test their interactions with the cost mitigation index (CMI) in columns (2) to (5). Firm performance, the cost proxies, and interactions between cost proxies and the CMI are all statistically significant and of the expected signs. Inspecting column (1) of Table 6, we see that crossing an international border reduces the number of deals by a factor of $1 - \exp(-1.161) = 0.687$ on average. Inspecting column (2), we see that for firms with high cost mitigation ($CMI_i = 0$), this effect reduces to $1 - \exp(-0.397) = 0.328$, while for firms with low cost mitigation ($CMI_i = 1$) this effect increases to $1 - \exp(-0.397 - 2.194) = 0.925$. These calculations illustrate how the strategy profiles of PE firms are important determinants of the incidence of transaction costs on the number of cross-border deals in each country. Though unreported, we computed the change in (pseudo) R^2 from the specification in column (1) to one including only home-country and target-country fixed effects. The R^2 drops by about 20 percentage points (to 0.25) in the OLS model and the pseudo R^2 drops by about 15 percentage points (to 0.5) in the PMLE model. The parsimonious set of variables in the model provide reasonably high explanatory power for the number of LBOs for each firm-target country pair.

6.3. Robustness checks

We perform a number of robustness tests to check whether issues related to some of the assumptions and data samples in our study are driving the results.

Endogenous strategies and performance. The first test addresses a concern of endogenous strategies and performance. If the choice of managerial strategy is influenced by unique conditions in target countries or the choice to go abroad for acquisitions, our core regression specification will not properly test the theoretical model in equation (5). For

Table 5

OLS deal count regression II

	(1)	(2)	(3)	(4)	(5)	(6)
performance	1.438***	1.398***	1.355***	1.258***	1.412***	1.360***
	(5.78)	(5.58)	(5.49)	(5.38)	(5.69)	(5.60)
cross-border	-1.162***	-0.971***	-1.167***	-1.647***	-1.170***	
	(-10.95)	(-7.11)	(-11.04)	(-21.09)	(-11.11)	
ln distance	-0.117***	-0.116***	-0.085*	-0.002	-0.112**	
	(-2.61)	(-2.59)	(-1.89)	(-0.05)	(-2.52)	
diff. language	-0.041	-0.012	-0.021	0.511**	-0.013	
	(-0.24)	(-0.07)	(-0.12)	(2.34)	(-0.08)	
diff. legal origin	-0.428***	-0.470***	-0.465***	-0.452**	-0.171	
	(-2.60)	(-2.86)	(-2.85)	(-2.53)	(-1.01)	
cost index						-0.323***
						(-10.03)
syndicate	-0.349***	-0.332***	-0.300**	-0.327***	-0.327***	-0.278**
	(-2.79)	(-2.73)	(-2.51)	(-2.87)	(-2.69)	(-2.28)
diff. legality	2.243***	2.366***	2.470***	-0.013*	2.198***	3.254***
	(3.04)	(3.23)	(3.59)	(-1.75)	(3.01)	(4.11)
avg. distance	0.078	0.077	0.068	0.054	0.076	-0.002
	(1.48)	(1.52)	(1.36)	(1.14)	(1.52)	(-0.04)
ln size	0.760***	0.757***	0.727***	0.795***	0.755***	0.515***
	(4.05)	(4.04)	(3.78)	(4.41)	(4.07)	(2.71)
(ln size)^2	-0.037***	-0.037***	-0.035**	-0.041***	-0.037***	-0.022
	(-2.64)	(-2.63)	(-2.41)	(-3.06)	(-2.66)	(-1.55)
CMI x cross-border		-0.516**				
		(-2.55)				
CMI x ln distance			-0.085***			
			(-3.92)			
CMI x diff. language				-0.578***		
				(-2.60)		
CMI x diff. legal origin					-0.814***	
					(-3.45)	
CMI x cost index						-0.188***
						(-2.94)
Target Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Home Country FE	Yes	Yes	Yes	Yes	Yes	Yes
N	1403	1403	1403	1403	1403	1403
R^2	0.522	0.527	0.535	0.476	0.530	0.443

Dependent variable is the logarithm of the number of deals completed in destination country d by PE firm i. The strategy groups are defined in Table 2. The details of control variables are provided in Appendix I. Cost index is defined in equation (6). Cost mitigating index (CMI) is defined in equation (7), which is an aggregate measure of strategies used in Table 3. All errors are clustered at the PE firm level. t statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

Table 6

PMLE deal count regression II

	(1)	(2)	(3)	(4)	(5)	(6)
performance	1.850***	1.784***	1.664***	1.800***	1.814***	1.800***
	(5.69)	(5.52)	(5.00)	(5.56)	(5.62)	(5.55)
cross-border	-1.161***	-0.397	-1.160***	-1.216***	-1.230***	
	(-5.69)	(-1.45)	(-5.70)	(-5.96)	(-6.48)	
ln distance	-0.697***	-0.687***	-0.633***	-0.669***	-0.662***	
	(-7.32)	(-7.26)	(-6.33)	(-7.08)	(-7.34)	
diff. language	-0.491**	-0.519**	-0.491**	0.348	-0.461**	
	(-1.98)	(-2.26)	(-1.99)	(1.07)	(-2.10)	
cost index						-0.883***
						(-6.13)
diff. legal origin	-0.452*	-0.472**	-0.455*	-0.454*	0.491*	
	(-1.79)	(-2.06)	(-1.83)	(-1.79)	(1.74)	
syndicate	-0.511***	-0.477***	-0.430**	-0.492***	-0.485***	-0.492***
	(-2.89)	(-2.74)	(-2.41)	(-2.81)	(-2.78)	(-2.82)
diff. legality	5.789***	6.151***	6.056***	5.776***	5.808***	12.388***
	(5.04)	(5.08)	(5.23)	(5.02)	(5.01)	(7.67)
avg. distance	-0.047	-0.036	-0.050	-0.039	-0.036	-0.036
	(-0.55)	(-0.44)	(-0.64)	(-0.48)	(-0.44)	(-0.44)
ln size	0.321	0.332	0.240	0.323	0.347	0.361
	(1.06)	(1.07)	(0.75)	(1.06)	(1.12)	(1.15)
(ln size)^2	0.016	0.014	0.020	0.015	0.013	0.012
	(0.71)	(0.60)	(0.82)	(0.64)	(0.56)	(0.49)
CMI x cross-border		-2.194***				
		(-3.49)				
CMI x ln distance			-0.187***			
			(-3.63)			
CMI x diff. language				-2.525***		
				(-3.44)		
CMI x diff. legal origin					-3.058***	
					(-4.07)	
CMI x cost index						-0.941***
						(-3.89)
Target Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Home Country FE	Yes	Yes	Yes	Yes	Yes	Yes
N	16713	16713	16713	16713	16713	16713
pseudo R^2	0.702	0.708	0.711	0.707	0.709	0.673

Dependent variable is the number of deals completed in destination country d by PE firm i. The strategy groups are defined in Table 2. The details of control variables are provided in Appendix I. Cost index is defined in equation (6). Cost mitigating index (CMI) is defined in equation (7), which is an aggregate measure of strategies used in Table 3. All errors are clustered at the PE firm level. t statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

example, because London and Paris are major financial capitals with advanced financial institutions, the numerous acquisitions in UK and France, as shown in Table 1, may be implemented by managers choosing financial engineering techniques for strategic engagements with the markets. Additionally, if the broader investment opportunity set including cross-border targets enhances PE firms' performance, our regression specification will be misguided.

Following Acharya et al. (2013), and Bottazzi, Da Rin, & Hellmann (2008), we employ human capital-based managerial expertise as instruments for both applied strategies of funds and performance. Fig. 4 provides the distribution of the nine expertise reported by PE firm managers according to Preqin. These instruments intuitively map to each of five strategy groups in Table 2 used in the aggregated cost-mitigation index. Networking and industry knowledge link with consolidation and growth strategies; recruiting, operational and management advice link with management/human resources strategies; financial expertise link with financial strategies; market and strategic advice link with market positioning; and technical expertise link with idea-core strategies.

Then in a properly designed two-stage least squares model, the estimated coefficients will measure the exogenous moderating effects of cost-mitigating strategies on the effect of transaction costs on the expected number of leveraged buyout deals, as intended to estimate equation (5). Table 7 shows consistency of signs and significance levels with generally larger magnitudes, suggesting correlated unobserved factors that have tended to bias the key coefficient estimates on the interaction terms towards zero.[14]

Alternative variables and sample. In Table 8 we allow for alternative measures of performance and legal institutions. In columns (1) and (5), which estimate OLS and PMLE regressions, respectively, we replace the IRR measure of performance with the average multiple on investment, another standard measure of performance in the private equity

[14]Note that in each of the six specifications, nine expertise over-identify performance and the aggregated cost-mitigating index formulated using the five strategy groups as described in Table 2. First stage F-statistics are very large for all instrumented regressors.

Table 7

2SLS deal count regression II

	(1)	(2)	(3)	(4)	(5)	(6)
performance	2.618***	2.957***	2.780***	3.274***	3.168***	2.898***
	(2.81)	(2.95)	(2.81)	(3.10)	(3.11)	(3.05)
cross-border	-1.181***	-0.427	-1.202***	-1.182***	-1.225***	
	(-11.21)	(-1.32)	(-11.06)	(-9.60)	(-10.44)	
ln distance	-0.132***	-0.127***	-0.049	-0.118**	-0.108**	
	(-2.92)	(-2.74)	(-0.89)	(-2.38)	(-2.22)	
diff. language	-0.030	0.075	0.012	1.169**	0.070	
	(-0.17)	(0.39)	(0.06)	(2.07)	(0.46)	
diff. legal origin	-0.462***	-0.629***	-0.556***	-0.628**	0.460	
	(-2.64)	(-3.16)	(-3.08)	(-2.57)	(1.20)	
syndicate	-0.105	-0.039	-0.024	0.004	-0.010	0.012
	(-0.76)	(-0.24)	(-0.15)	(0.02)	(-0.06)	(0.08)
diff. legality	2.577***	3.150***	3.203***	2.504***	2.544***	3.705***
	(3.66)	(4.37)	(4.42)	(3.59)	(3.64)	(4.57)
avg. distance	0.081	0.078	0.058	0.081	0.077	-0.002
	(1.44)	(1.32)	(0.97)	(1.41)	(1.35)	(-0.05)
ln size	0.986***	0.997***	0.906***	1.000***	0.997***	0.734***
	(4.33)	(3.49)	(3.13)	(3.47)	(3.56)	(2.80)
$(\text{ln size})^2$	-0.055***	-0.056**	-0.049**	-0.057**	-0.056**	-0.040*
	(-3.20)	(-2.49)	(-2.17)	(-2.53)	(-2.57)	(-1.94)
CMI x cross-border		-2.094**				
		(-2.54)				
CMI x ln distance			-0.224***			
			(-2.70)			
CMI x diff. language				-3.115**		
				(-2.45)		
CMI x diff. legal origin					-3.030**	
					(-2.51)	
CMI x cost index						-0.514**
						(-2.11)
cost index						-0.233***
						(-2.78)
Target Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Home Country FE	Yes	Yes	Yes	Yes	Yes	Yes
N	1352	1352	1352	1352	1352	1352
R^2	0.524	0.470	0.488	0.434	0.455	0.406

Dependent variable is the logarithm of the number of deals completed in destination country d by PE firm i. The strategy groups are defined in Table 2. The details of control variables are provided in Appendix I. Cost index is defined in equation (6). Cost mitigating index (CMI) is defined in equation (7), which is an aggregate measure of strategies used in Table 3. Performance and CMI are instrumented using nine managerial expertise data, which are available in Fig. 4. All errors are clustered at the PE firm level. t statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

Table 8

Deal count regression: robustness

	OLS				PMLE		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
multiple	0.349***				0.593***		
	(4.82)				(6.70)		
performance		1.046***	1.360***	1.360***		1.800***	1.800***
		(3.34)	(5.60)	(5.60)		(5.55)	(5.55)
cost index	-0.296***	-0.268***	-0.323***	-0.323***	-0.882***	-0.883***	-0.883***
	(-10.00)	(-4.87)	(-10.03)	(-10.03)	(-6.49)	(-6.13)	(-6.13)
CMI x cost index	-0.190***	-0.270***	-0.188***	-0.188***	-0.858***	-0.941***	-0.941***
	(-3.16)	(-3.00)	(-2.94)	(-2.94)	(-3.71)	(-3.89)	(-3.89)
syndicate	-0.340***	-0.142	-0.278**	-0.278**	-0.537***	-0.492***	-0.492***
	(-3.07)	(-0.88)	(-2.28)	(-2.28)	(-3.31)	(-2.82)	(-2.82)
diff. legality	2.958***	0.096*		3.254***	11.388***		12.388***
	(3.75)	(1.67)		(4.11)	(6.27)		(7.67)
avg. distance	-0.041	0.066	-0.002	-0.002	-0.053	-0.036	-0.036
	(-0.86)	(1.08)	(-0.04)	(-0.04)	(-0.70)	(-0.44)	(-0.44)
ln size	0.481***	0.432	0.515***	0.515***	0.231	0.361	0.361
	(2.68)	(1.61)	(2.71)	(2.71)	(0.79)	(1.15)	(1.15)
$(\text{ln size})^2$	-0.018	-0.018	-0.022	-0.022	0.024	0.012	0.012
	(-1.34)	(-0.92)	(-1.55)	(-1.55)	(1.06)	(0.49)	(0.49)
diff. anti_dir			11.353***	10.729***		43.559***	41.184***
			(4.15)	(4.16)		(7.87)	(7.88)
diff. efficiency			5.474***			20.839***	
			(4.11)			(7.67)	
Target Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Home Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1520	734	1403	1403	18444	16713	16713
R^2	0.419	0.495	0.443	0.443			
pseudo R^2					0.664	0.673	0.673

Dependent variable is the number of deals completed in destination country d by PE firm i (in logarithm for OLS specifications). The strategy groups are defined in Table 2. The details of control variables are provided in Appendix I. Cost index is defined in equation (6). Cost mitigating index (CMI) is defined in equation (7), which is an aggregate measure of strategies used in Table 3. All errors are clustered at the PE firm level. t statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

industry. The baseline specification for the regressions is column (6) from Tables 5 and 6, which includes the aggregate cost index and its interaction with the CMI. Replacing IRR with multiple has no consequential impact on results, and the alternative measure of performance also enters with a positive and significant coefficient.

In column (2) of Table 8, using the same baseline specification, we restrict the sample to firm-target country pairs for which the number of deals between the home country and target country is between the tenth and ninetieth percentiles among all country pairs. This restriction reduces the sample size considerably, but allows us to test whether results are being driven by outlier country pairs. Results suggest this is not the case. The coefficients of interest, on performance, cost index, and the interaction between cost index and CMI, are largely unchanged and remain statistically significant. Note that the sample size is reduced by more than half because the distribution of deal counts is skewed; removing the top tenth percentile results in a large drop in non-zero deal counts. In unreported regressions, we replicate all of our specifications on a restricted sample that drops all country-pairs with fewer than 10 deals between them. We also replicate our results on a sample where all U.S. firms are dropped. We retain statistical significance on all coefficients of interest.

In the remaining columns we control for alternative measures of differences in legal institutions. Following Cumming & Knill (2012), we consider anti-director rights, defined in Djankov, La Porta, Lopez-de Silanes, & Shleifer (2008), and the general efficiency of the judicial process, defined in La Porta et al. (1998). Both measures are available from Raphael La Porta's website. We include the difference between home and target country measure to create a bilateral variable. Once again, key results are largely unchanged using these alternative controls.

Panel regressions. All results so far have been based on a cross section of PE firm-target country pairs. The dependent variable has been the aggregate number of deals completed by each firm in each target country over the course of the sample period. The main reason for this specification is the sparsity of deals at the firm-country level. In Tables 9 and 10, we test

Table 9

Deal count regression: panel

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
performance	0.769***	0.764***	0.768***	0.767***	0.767***	0.839***	0.739***
	(3.46)	(3.42)	(3.55)	(3.46)	(3.44)	(4.66)	(3.51)
cross-border	-0.603***	-0.490***	-0.611***	-0.604***	-0.615***		
	(-3.09)	(-2.71)	(-3.07)	(-3.09)	(-3.17)		
ln distance	-0.172***	-0.170***	-0.155***	-0.171***	-0.167***		
	(-7.42)	(-7.33)	(-6.69)	(-7.24)	(-7.50)		
diff. language	-0.201*	-0.176	-0.189*	-0.071	-0.179*		
	(-1.71)	(-1.54)	(-1.66)	(-0.52)	(-1.66)		
diff. legal origin	-0.075	-0.114	-0.102	-0.096	0.053		
	(-0.76)	(-1.12)	(-0.98)	(-0.87)	(0.67)		
diff. legality	0.115***	0.122***	0.127***	0.115***	0.117***		0.188***
	(9.08)	(10.33)	(10.38)	(9.10)	(9.08)		(17.17)
syndicate	-0.131**	-0.139**	-0.137**	-0.140***	-0.140***		-0.123**
	(-2.18)	(-2.48)	(-2.47)	(-2.61)	(-2.66)		(-2.56)
reputation	0.960***	0.913***	0.899***	0.928***	0.934***		1.274***
	(6.28)	(6.30)	(6.31)	(6.14)	(6.45)		(9.62)
avg. distance	0.076***	0.074***	0.071***	0.074***	0.074***		0.045***
	(3.30)	(3.53)	(3.66)	(3.47)	(3.53)		(2.66)
ln size	0.607***	0.592***	0.565***	0.591***	0.592***		0.548***
	(4.74)	(4.70)	(4.42)	(4.71)	(4.74)		(4.27)
$(\text{ln size})^2$	-0.036***	-0.035***	-0.033***	-0.035***	-0.035***		-0.033***
	(-3.77)	(-3.64)	(-3.35)	(-3.68)	(-3.69)		(-3.47)
experience	0.098*	0.082	0.083	0.087	0.081		0.158**
	(1.72)	(1.48)	(1.51)	(1.54)	(1.41)		(2.37)
CMI x cross-border		-0.346**					
		(-2.57)					
CMI x ln distance			-0.045**				
			(-2.47)				
CMI x diff. language				-0.355**			
				(-2.57)			
CMI x diff. legal origin					-0.477***		
					(-3.88)		
cost index						-0.197***	-0.246***
						(-7.15)	(-5.90)
CMI x cost index						-0.128***	-0.126***
						(-3.82)	(-3.92)
Target-Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Home-Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Two way clustering	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1763	1763	1763	1763	1763	2818	1763
R^2	0.534	0.537	0.539	0.536	0.537	0.369	0.488

Dependent variable is the logarithm of the number of deals completed in destination country d by PE firm i in each period. There are six periods corresponding to the years 1986–1990, 1991–1995, 1996–2000, 2001–2005, 2006–2010, and 2011–2013. The strategy groups are defined in Table 2. The details of control variables are provided in Appendix I. Cost index is defined in equation (6). Cost mitigating index (CMI) is defined in equation (7), which is an aggregate measure of strategies used in Table 3. All errors are two-way clustered by PE firm and period. t statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

whether results are robust to a panel specification, where time is represented by five-year periods starting in 1986. Thus, there are six periods corresponding to the years 1986–1990, 1991–1995, 1996–2000, 2001–2005, 2006–2010, and 2011–2013, where the last period lasts only three years since we run into the end of the sample.

With the panel structure, the dependent variable becomes the (log) number of deals completed by each firm in each target country within the five-year period. In addition to time-varying versions of our cross-sectional controls, we can control for two new time-varying variables. The first is reputation, defined as the cumulative number of deals completed by a firm in a target country up to period t divided by the total cumulative number of deals completed in the target country up to period t. The definition is in the spirit of the reputation variable in Nahata (2008), who looks at a similar ratio of firm versus total investment in the domestic VC industry. The variable measures the historical prominence of the firm in the target country. Target companies are likely to be more receptive to take-overs by well-known firms, and we thus predict this variable to enter with a positive coefficient. The second new variable is experience, which is a dummy equal to 1 if the firm has ever completed a deal in the target country prior to period t. To the extent that transaction costs of remote ownership are actually due to fixed costs of foreign market entry, controlling for experience would overturn our results on the importance of transaction costs and transaction cost mitigation. All time-varying control variables, except experience, are lagged by one period in all specifications.

In Table 9 we run panel versions of Table 5, including both reputation and experience, and controlling for home country-time and target country-time fixed effects. Standard errors are two-way clustered along firm and time dimensions. Results are very similar to the cross-section specifications. In particular, performance and the interaction between transaction costs and CMI are significant and of the expected sign. Reputation strongly enters all specifications with a positive sign, while the statistical significance of experience is not robust across specifications. The other control variables all enter significantly in the panel regressions. We observe an increasing and concave relationship between size and deal counts;

firms that tend to participate in syndicates complete fewer deals; firms from countries with strong legal institutions investing in countries with weak legal institutions carry out more deals; and firms that invest further afield, as measured by the average distance to their targets, complete more deals.

In Table 10 we test the robustness of the panel results. For brevity, we report results for the OLS specification only. In column (1), we replace the IRR measure of performance with the firms' multiples, without additional controls. Multiple, cost index and the interaction between cost index and CMI are all significant. In column (2), we add the set of control variables, and the cost index and its interaction with CMI remain significant, while multiple loses significance. Thus, performance as measured by firms' multiples appears to be a noisier proxy for ability, consistent with the simplified definition compared to IRR. In column (3), we return to measuring performance by IRR, and replace the difference in legality index with differences in anti-director rights and judicial efficiency measures. Except for difference in anti-director rights, all variables enter significantly with the expected signs. In column (4) we drop judicial efficiency and add difference in legality index, with no change to results. In column (5), we test whether results are robust to different sample periods. We define the early sample as the first four periods, running from 1986 to 2005, with the late sample comprising the last two periods, from 2005 to 2013. Due to a high degree of sparseness in the early part of the sample, we pool all periods together but allow for different coefficients on the key variables of interest. In particular, we interact a dummy for the early period with performance, cost index, and the interaction between the cost index and the CMI. Results suggest performance was not a significant determinant of deal counts in the early period, after accounting for all other controls: the effect of performance on deal counts is driven by the late period. By contrast, there is no significant difference in the effect of the cost index across periods, and, while the CMI interaction remains significant for the late period, it is significantly more negative for the early period. This suggests that heterogeneity in the salience of transaction costs across firms is robust across the sample period, though it was

Table 10

Deal count panel regression: robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
multiple	0.180***	0.077					
	(3.69)	(1.57)					
cost index	-0.185***	-0.237***	-0.246***	-0.246***	-0.220***	-0.231***	-0.236***
	(-6.95)	(-5.58)	(-5.90)	(-5.90)	(-4.40)	(-5.43)	(-5.92)
CMI x cost index	-0.123***	-0.110***	-0.126***	-0.126***	-0.091***	-0.115***	-0.112***
	(-3.76)	(-3.56)	(-3.92)	(-3.92)	(-3.04)	(-3.28)	(-3.07)
diff. legality		0.176***		0.190***	0.164***	0.179***	0.176***
		(16.90)		(67.47)	(2.68)	(2.73)	(2.69)
syndicate		-0.145***	-0.123**	-0.123**	-0.010	-0.127	-0.111
		(-3.27)	(-2.56)	(-2.56)	(-0.60)	(-1.56)	(-1.53)
reputation		1.382***	1.274***	1.274***	0.853***	1.051***	0.931***
		(8.19)	(9.62)	(9.62)	(5.97)	(4.41)	(4.73)
avg. distance		0.036*	0.045***	0.045***	-0.001	0.013	0.023*
		(1.78)	(2.66)	(2.66)	(-0.12)	(0.85)	(1.74)
ln size		0.601***	0.548***	0.548***	0.481***	0.533***	0.558***
		(4.79)	(4.27)	(4.27)	(4.92)	(4.42)	(4.70)
$(\text{ln size})^2$		-0.037***	-0.033***	-0.033***	-0.028***	-0.031***	-0.034***
		(-3.90)	(-3.47)	(-3.47)	(-3.86)	(-3.45)	(-3.82)
experience		0.154**	0.158**	0.158**	0.158***	0.133**	0.140**
		(2.34)	(2.37)	(2.37)	(2.59)	(2.07)	(2.27)
performance			0.739***	0.739***	0.775***	0.758***	0.735***
			(3.51)	(3.51)	(4.69)	(3.81)	(3.62)
diff. anti_dir			-0.139	0.012			
			(-1.58)	(0.26)			
diff. efficiency			0.202***				
			(13.82)				
early					0.339		
					(1.50)		
early x performance					-0.871**		
					(-2.27)		
early x cost index					-0.034		
					(-1.04)		
early x CMI x cost index					-0.042***		
					(-3.57)		
market ret						-0.522***	
						(-2.91)	
recession							0.423***
							(7.09)
Target-Time FE	Yes	Yes	Yes	Yes	Target FE	Target FE	Target FE
Home-Time FE	Yes	Yes	Yes	Yes	Home FE	Home FE	Home FE
Two way clustering	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3014	1835	1763	1763	1763	1763	1763
R^2	0.347	0.474	0.488	0.488	0.396	0.430	0.439

Dependent variable is the logarithm of the number of deals completed in destination country d by PE firm i in each period. There are six periods corresponding to the years 1986–1990, 1991–1995, 1996–2000, 2001–2005, 2006–2010, and 2011–2013. The strategy groups are defined in Table 2. The details of control variables are provided in Appendix I. Cost index is defined in equation (6). Cost mitigating index (CMI) is defined in equation (7), which is an aggregate measure of strategies used in Table 3. All errors are two-way clustered by PE firm and period. t statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively.

more important in the early years of the global private equity industry than it has become of late. Note that in this specification we drop county-time fixed effects and instead include simply home- and target-country fixed effects due to collinearity issues. In columns (6) and (7) we control, respectively, for the market return in the U.S. stock market over each period, using data from Kenneth French, and a dummy for whether or not a recession occurred in the U.S. during each period, as defined by the NBER. Given the time-varying fixed effects in the other panel regressions, these two variables are already controlled for in those specifications, but here we investigate the extent to which they affect deal counts. The number of deals is decreasing in the U.S. stock market return and, correspondingly, increasing in the years of U.S. recessions. This could be a result of private equity firms using market downturns as buying opportunities.[15] The experience variable enters with a positive and significant coefficient across specifications.

Firm strategies and target industries. PE firms may invest in particular industries, and it is possible that our results are driven by a correlation between strategy profile and industry focus. To rule this out, we investigate how our strategy groups are related to target industries.

In Table 11, we show the distribution of strategies in each target industry. Preqin provides the primary industry of the target. However, the industry classification does not follow any standard method, and there are 73 industries in the original database. We group those industries into 12 broad categories, and Table 12 provides the details. Column (1) of Table 11 shows the percentage of targets in each industry category, out of the total number of deals of 8,815 at the PE firm level. The top 3 target industries are industrial (21.84%), consumer services (14.34%), and business services (9.53%). In columns (2) to (6), we show the percentage of strategy groups in each industry category, and they are largely consistent with the overall target percentage in column (1). For example, column (2) shows that 7,229

[15]Whether or not PE firms would be able to exploit periods of low prices to make cheap acquisitions is unclear, however, as credit conditions also tighten during downturns. While our results are suggestive, this is a complex question best left for future research.

Table 11

PE firms' strategy and industry

Target Industry		Consolidation & Growth	Management & HR	Financial Related	Market Positioning	Idea-core
	(1)	(2)	(3)	(4)	(5)	(6)
Business Service	9.53%	9.82%	8.88%	10.59%	9.59%	8.72%
Communications	8.18%	8.48%	8.84%	9.26%	8.59%	8.99%
Consumer Service	14.34%	14.26%	14.96%	14.39%	14.61%	14.90%
Energy & Utility	5.81%	5.13%	4.76%	4.73%	5.44%	7.12%
Products	5.15%	5.28%	5.41%	4.88%	5.44%	5.44%
Finance and Real Estate	6.09%	5.91%	5.35%	5.50%	5.06%	4.73%
General Technology	5.35%	5.44%	5.08%	5.44%	4.89%	5.24%
Health	9.40%	9.60%	9.27%	9.94%	9.34%	9.39%
Industrial	21.84%	21.80%	22.27%	21.28%	22.65%	23.11%
Leisure	2.94%	3.00%	3.24%	3.40%	3.27%	2.27%
Transportation	6.72%	6.79%	7.49%	6.27%	6.77%	6.37%
Other	4.65%	4.48%	4.43%	4.32%	4.35%	3.72%
Total	8815	7229	5100	3238	5934	2557

This table presents the PE firms' strategy groups and target industries. The sample of PE firms from 1986 to 2013 is collected from Preqin 2013. The observation is at the deal level. Column (1) shows the percentage of targets in each industry category. The total number of deals is 8,815. Columns (2) to (6) show the percentage of strategy groups in each industry category.

deals involve the strategy of consolidation and growth. Among those 7229 deals, there are respectively 21.80%, 14.26%, and 9.82% deals in the industry category of industrial, consumer service, and business service. This pattern is robust to different industry classification methods. It suggests that those strategies do not cluster in certain particular industries.

Foreign local establishments. In all of the regression analyses described above, we define the home country of each PE firm to be the country of its headquarters. Of the 663 PE firms in our sample, 222, or one third of the PE firms, have at least one foreign local establishment ("local office"). The number of local offices is highly skewed: roughly two thirds of PE firms with local offices have just one, while one PE firm has offices in 23 different foreign countries. PE firms with (more) foreign offices tend to have higher performance and to carry out more deals, and they are more likely to have local offices in countries that are closer to their home countries. If the rationale for setting up a local office is to reduce distance-related agency costs, then this last fact is somewhat surprising: the benefits of a local office would be increasing in distance. This puzzle can be explained if the costs of operating a foreign office are also increasing in distance—perhaps because of within-firm agency costs—and by the fact that the existence of a local office does not render distance to the PE firm's headquarters irrelevant.

In unreported regressions, we find that (i) the presence of a local office is associated with a larger number of deals in a country, and (ii) the marginal effect of distance on the number of deals is about one third as large for cases where a PE firm has a local office compared to cases where a PE firm does not have a local office in a country. These results are obtained by adding a local-office dummy variable and its interaction with distance to specification (1) of Table 6. Because PE firms are choosing if and where to operate local offices, we do not want to attach a causal interpretation to the finding that local offices are positively correlated with more deals. The estimated coefficient should be seen as a composite effect of an orientation of the PE firm toward the given market, and an actual effect of having a local office on the propensity to win deals in the market. Indeed, it is quite likely that firms will

Table 12

Industry classification

Health	Pharmaceuticals	Business Service	Business Services
	Medical Technologies		Computer Services
	Medical Instruments		Environmental Services
	Medical Devices		Marketing
	Healthcare		Advertising
	Healthcare IT		Outsourcing
	Life Sciences		Engineering
	Biotechnology		Information Services
Energy & Utility	Clean Technology	Consumer Service	Retail
	Mining		Restaurants
	Oil & Gas		Food
	Natural Resources		Education / Training
	Renewable Energy		Consumer Services
	Timber		Beverages
	Energy		
	Utilities	Finance and Real Estate	Financial Services
	Power		Insurance
			Property
Communications	Communications		Hotels and Offices
	Digital Media		
	Internet	Leisure	Entertainment
	Media		Gambling
	Network		Gaming
	Publishing		Leisure
	Telecom Media		
	Telecoms	Products	Electronics
	Wireless		Hardware
			Semiconductors
Transportation	Transportation		Consumer Products
	Distribution		
	Logistics	Industrial	Industrial
	Shipping		Production
			Manufacturing
General Technology	High-Tech		
	IT	Other	Aerospace
	IT Infrastructure		Agriculture
	IT Security		Materials
	Technology		Chemicals
	Software		Construction
			Defence
			Infrastructure

This table presents the target industry classification. The sample of PE firms from 1986 to 2013 is collected from Preqin 2013. There are 73 industries in the original data set. We group those industries into 12 broad categories.

have unobserved orientations toward some markets for a number of reasons; for example, a general partner might be an immigrant from the country. We do, however, want to ensure that controlling for the local offices does not overturn our results regarding the interaction between transaction costs and cost mitigation. The inclusion of the local office dummy and its interaction with distance does not appreciably change the results in columns (2) to (6) of Table 6; in particular, the interaction effects between the cost mitigation index and the transaction cost variables remain statistically and economically significant.

6.4. Managerial implications

For funds looking to venture beyond their national borders, our research implies a need for appropriate expertise and resources that are often limited to large, established funds to be successful. Though a broader geographic scope will give access to a larger opportunity set that can yield higher expected returns, managers should be aware of the significant transaction costs to overcome cross-border barriers. One possibility of overcoming these challenges appears to be recruiting partners with experience and background in the local markets, and ability to coordinate with the foreign general partnership.

Indeed, the management profiles of the most successful funds engaged in cross-border sponsorships reveal a pattern of strong local leadership. In mainland China, the evolution of the PE industry since the first entry of large foreign funds attests to this. In 1998, Carlyle Group launched their first Asia Buyout Fund I in Hong Kong, then expanded into the mainland, establishing offices in Shanghai and Beijing. All except for five investment professionals in its Asia team are of Asian descent, three of the five caucasian professionals are based in Syndney, Australia and the remaining two are based in Hong Kong. Draper Fisher Jurvetson, a classic Silicon Valley VC firm, established DFJ Dragon Fund China in 2006. In the recent years, DFJ spun-out the fund, giving majority of the ownership of the general partnership to its local management, and retained a small portion as a form of royalty payment for use of its brand. Similar trends can be observed for Kohlberg, Kravis

and Roberts, Sequoia Capital and IDG Capital Partners.

7. Conclusions

In this paper we study the PE firm- and country-level determinants of cross-border leveraged buyouts. We find supporting evidence that macroeconomic variables relating to geography, culture, and institutions are correlated with the number of LBO deals occurring between country pairs. These results suggest that LBO deals are subject to many of the same frictions as other international economic flows, including trade in goods and services, direct investment by manufacturing firms, portfolio investment, and migration.

Using a detailed database of PE firm characteristics, we investigate how PE firm heterogeneity across strategy and performance affects the number of target acquisitions in different countries. PE firms that consistently produce higher returns are better able to absorb the higher transactions costs of investing across borders. PE firms employing strategies that tend to mitigate the transaction costs of remote ownership obtain a competitive advantage in the international market for corporate control. The results are consistent with a stylized model of an international competition for control and ownership of potential target companies. While the proximity-ability trade off is well-known, little attention has been paid to the ability of firms to circumvent costs of remote ownership through their strategic orientation. We believe the LBO context provides a relatively clean context in which to investigate this possibility.

Appendix I. Variable details

Variable	Definition
performance	The average (net of fees) internal rate or return (IRR) of buyout funds within each PE firm.
multiple	The average net multiple of buyout funds within each PE firm
ln distance	The logarithm of population-weighted distance between two countries. This distance is not zero even if the home and target countries are the same. The data are from CEPII gravity database.

Variable	Definition
diff. language	Different language dummy that equals 1 if home and target country speak different languages. The data are from CEPII gravity database.
diff. legal origin	Different legal origin dummy that equals 1 if home and target country have different legal origins. The data are from CEPII gravity database.
diff. legality	The difference of the legality index between home and target country. Following Berkowitz et al. (2003), the legality index is the weighted average of the following factors: efficiency of judicial system, rule of law, corruption, risk of expropriation, risk of contract repudiation. Each of these factors is defined in La Porta et al. (1998) and can be downloaded from the website of Rafael La Porta. Higher values indicate better legal systems.
diff. anti_dir	The difference of the Anti-Director Rights index between home and target country. The variable is defined in Djankov et al. (2008) and can be downloaded from the website of Rafael La Porta. Higher numbers indicate stronger shareholder rights.
diff. efficiency	The difference of the efficiency of judicial system between home and target country. The variable is defined in La Porta et al. (1998) and can be downloaded from the website of Rafael La Porta. Higher numbers indicate higher efficiency of judiciary system.
syndicate	The PE firm's propensity to syndicate with other PE firms. For each PE firm, we calculate the number of deals involved with more than one PE firm and divide it by the total number of deals that this PE firm completes. This ratio is calculated for each period in the panel tests.
avg. distance	The average distance to buyout targets for a PE firm. Following the spirit of Cumming & Dai (2010), we calculate the average distance between the PE firm's home country and target firm's country. We scale this number by the average distance of buyout deals in the sample. This ratio is calculated for each period in the panel tests.
size	The average of buyout fund assets under management (AUM) within each PE firm. This ratio is calculated for each period in the panel tests.
reputation	PE firm reputation. Following the spirit of Nahata (2008), we first calculate the total number of deals by a PE firm in a target country as of the previous period. Then we divide this number by the total number of deals in the target country as of that period.
experience	A dummy variable that equals 1 if a PE firm invested in a target country in any prior period.
market ret	U.S. stock market return in each period. The data are from the website of Kenneth French.

Variable	Definition
recession	U.S. recession dummy that equals 1 if the period contains a recession defined by the National Bureau of Economic Research (NBER).
early	A dummy that equals 1 if the years are from 1986 to 2005.

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