Horizontal, Vertical, and Conglomerate FDI: Evidence from Cross Border Acquisitions*

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Abstract

This paper explores the distribution of horizontal and vertical foreign direct investment (FDI) using data on cross-border acquisitions (CBAs). The dataset is at the firm level, contains detailed information about the industries in which acquirer and target operate, and has an almost universal coverage of all deals around the world since the early 1990s. Based on a measure of vertical relatedness, we can classify whether each of the 165,000 acquisitions in our panel is horizontal or vertical and test directly the underlying theoretical models of FDI. The paper highlights two additional features of FDI that have not been identified in the literature to date. First, a considerable proportion of FDI in the world economy involves conglomerate acquisitions. Second, during the last decades, the wave-like growth of FDI has primarily been sustained by changes in conglomerate CBA activity which respond indeed markedly to mis-pricing developments in financial markets.

JEL classification: F15, F21, F23, F33

Keywords: Cross-Border Acquisitions, Horizontal FDI, Vertical FDI, Conglomerate FDI

1 Introduction

By coordinating international trade, handling and controlling the funding of complex investment projects in distant places, or facilitating the international transfer of technology, multinational enterprises (MNEs) are an important protagonist of international economic integration. The international economics literature distinguishes between two broad strategies, termed horizontal and vertical FDI, to identify the competitive advantage of firms with plants in several countries. Horizontal FDI rests on a firms' desire to access a foreign market by replicating production activities abroad. Vertical FDI involves the fragmentation of the supply chain to place production stages using a factor relatively intensively to locations that are well endowed with it. The outsourcing of labor intensive production stages to low wage countries is a prime example for this.[1]

How to empirically identify forms of FDI in the data has proved to be challenging and unresolved. For example, Markusen and Maskus (2002, p.694) "overwhelmingly reject the vertical model" whilst Braconier *et al.* (2005, p.466) find "strong support for vertical FDI". Alfaro and Charlton (2009) have recently made significant progress on the empirical separation of FDI motives; they suggest that an accurate identification of FDI strategies requires

[1]Some authors like Brainard (1997, pp.520-521) refer to horizontal FDI with the "proximity concentration trade-off hypothesis" and to vertical FDI with "factor proportions hypothesis". See also Markusen and Maskus (2002, p.707).

detailed information about the industry segments and the vertical relatedness of the different subsidiaries forming a MNE. Using firm level data from 205 countries around the world for the year 2005, Alfaro and Charlton (2009) highlighted the following observations: (a) vertical FDI is more important than previously thought, (b) it occurs commonly between developed countries, and (c) is largely intra-industry in terms of involving parent and subsidiary firms on slightly different stages of the supply chain, but within the same, broadly defined (2 digit SIC), industry.

This paper differs from previous research by uncovering the empirical importance of horizontal and vertical strategies from cross border acquisitions (CBAs) sourced from the SDC Platinum database of Thomson Reuters. Aside from being the most important form of FDI[2], the main benefit of our CBAs data is that each deal is reported with detailed information about the industries (in terms of four-digit SIC codes) in which the acquiring and target firm are operating. This provides the stepping stone to directly infer the horizontal and vertical linkages at the disaggregated level, that is between the merging firms for each reported deal. To establish the vertical connections through the supply chain, our method is similar to that of in terms of drawing on the value flows in the input-output tables.

The resulting distribution of FDI strategies across our worldwide sample is consistent with some of the key findings of the previous literature. In particular, market size, but not wage (e.g. factor price) differences, matter for horizontal CBAs and vice versa for vertical CBAs. This is consistent with the theoretical models of FDI strategies. Furthermore, a substantial proportion of CBAs involves intra-industry vertical FDI. However, we also find that substantial parts of CBA activity do not fit into the established distinction in the international economics literature between horizontal and vertical FDI. In particular, depending on the parametrisation to determine vertical relatedness, around 10 to 20 percent of deals involve some combination of horizontal and vertical motives whereas between 20 and 40 percent of all deals seem to be conglomerate, that is the acquiring and target firms are neither connected by sharing the industries nor by being linked through the supply chain.

In contrast to Alfaro and Charlton (2009), our CBA data come in form of a dated panel covering the 1990 to 2010 period and, hence, provide evidence about the development of the different FDI strategies across time. This gives rise to several observations that have, to our knowledge, hitherto not been made in the literature. Specifically, despite the substantial overall fluctuations in FDI (and CBAs), horizontal and vertical FDI has remained remarkably stable. Conversely, more pronounced fluctuations arise in conglomerate CBAs. This is perhaps not surprising since our data suggest that financial firms are heavily involved in conglomerate CBAs, which are consequently closely associated with financial developments and react, in particular, to cross-border arbitrage opportunities arising due to the mis-pricing motive for acquisitions proposed by Shleifer and Vishny (2003).

The paper is organized as follows. Section 2 comments briefly on the related literature. The method to distinguish horizontal and vertical strategies from CBA data is outlined in Section 3 while Section 4 provides a descriptive overview of the resulting pattern of FDI strategies. Section 5 outlines the empirical strategy that forms a direct test of horizontal and vertical FDI. Section 6 presents the results and explores the role of financial factors in determining conglomerate acquisitions. Section 7 summarizes and concludes.

2 Related Literature

The characterisation of FDI relates to two broad strategies: horizontal FDI which involves replicating production facilities across countries in order to seek access to markets and

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[2]See Di Giovanni (2005), Head and Ries (2008), and Hijzen *et al.*, (2008) for evidence on the dominance of CBAs to establish an ownership stake in foreign firms.

vertical FDI which involves fragmenting stages in the production process in order to access relatively cheaper factor inputs. Notable landmarks on these issues include; Brainard, (1997), Markusen and Venebles, (1998) and Helpman (1984), among many others. The earlier work on these alternative strategies was brought together in a unified framework known as the Knowledge-Capital-model as summarized in Markusen (2002), which suggests that a combination of market size, trade costs, and relative factor endowments determines the pattern of horizontal and vertical FDI strategies: in a nutshell, horizontal FDI should commonly arise between countries with relatively similar factor endowments and relatively similar market size (and hence dominate between developed countries) and vertical FDI should arise between countries with relatively different factor endowments, which give rise to differences in e.g. labor cost.

What proportion of FDI around the world is motivated by horizontal and vertical strategies? Is the theoretical prediction that horizontal FDI is driven by market access considerations whilst vertical FDI rests on to exploit international differences in factor (labor) cost supported by the data? The empirical FDI literature investigating such questions has mainly relied on data about the aggregate sales of plants in a given host country that are affiliated to MNEs headquartered in a given source country. Maybe, several caveats arise when comparing the role of horizontal and vertical FDI with such data. Above all, a direct distinction between sales arising from horizontal and vertical strategies of FDI has hitherto not appeared in the literature. To nevertheless gauge the importance of different FDI strategies, Carr *et al.* (2001) have suggested an indirect test where specifications involving horizontal determinants such as market size or vertical determinants such as factor endowments/costs are regressed onto the same affiliated sales variable. The results of such a "horse-race" determining which of the competing models fits the data better has not always been conclusive. Carr *et al.* (2001) and Markusen and Maskus (2002) found support for the horizontal strategy, which they find not surprising since the biggest proportion of FDI occurs between developed countries with relatively similar economic conditions. Conversely, using detailed wage data to calculate skilled wage cost premia, Braconier *et al.* (2005) have partly revised this result by finding that a large part of local sales are also driven by determinants of vertical FDI .

A recent exception to the horse-race tests is Alfaro and Charlton (2009) where they use disaggregated firm-level data in combination with a measure of vertical relatedness. This approach has raised considerable doubt on the deduction that horizontal FDI dominates since the preponderance of aggregate sales involves plants located in the developed world. Rather, direct measures of vertical relatedness suggests the different parts of a MNE operate often on *slightly* different stages of the supply chain and are, hence, prone to be misclassified as horizontal FDI. To avoid this, we follow the recommendation of Alfaro and Charlton (2009) and rely on detailed information about the industries of the merging firms when disentangling horizontal and vertical CBAs in section 3.

Another advantage of using CBAs data is that Head and Ries (2008) have developed a theoretical framework where, as is commonplace in the finance literature, MNEs are thought to compete with other firms over the acquisition of a foreign target. This implies that CBAs can be thought as FDI that is an outcome of the (international) market for corporate control. Specifically, insofar as an MNE must place the highest bid when it wants to take over a target firm abroad, the probability of observing a CBA between firms located in a given source and host country ought to follow an extreme value distribution. As discussed in section 5, within the present context, the Head and Ries model provides the foundation for our econometric strategy since the modelling of a bidding contest within the market for corporate control maps naturally into the conditional logit framework to model the location choices of the MNE encapsulated in a CBA deal. In turn, Guimarães *et al.* (2003) shows that the conditional logit model is closely related with the Poisson regression, which has proven to be an increasingly popular framework to analyse the empirical distribution of

CBAs (Kessing *et al.*, 2007; Herger *et al.*, 2008; Hijzen *et al.*, 2008; Coerdacier *et al.*, 2009; and Erel *et al.*, 2012).

3   Distinguishing Horizontal and Vertical CBAs

Key to uncovering the distribution of the different strategies pursued by MNEs is to develop a methodology identifying the commercial relationship between the parent firm and the foreign subsidiary where FDI takes place. To obtain an overview of the different strategies, we have extracted all cross-border acquisitions (CBAs) from Thomson Reuter's SDC Platinum Database, which claims to have recorded virtually all transactions and mergers and acquisition deals between companies around the world since 1990. SDC Platinum data has been used elsewhere in Rossi and Volpin (2004), Kessing *et al.* (2007), Herger *et al.* (2008), Hijzen *et al.* (2008), Coerdacier *et al.* (2009), Erel *et al.* (2012), and Garfinkel and Hankins (2011) to study various aspects of CBAs.

SDC Platinum reports the standard industry classification (SIC) codes of the acquiring and target, denoted here by, respectively, SIC_α and SIC_τ, which provides the basis to identify the horizontal and vertical linkages between the merging firms. In particular, in case $SIC_\alpha = SIC_\tau$, a deal occurs between firms sharing the same industry—a characteristic feature of a horizontal strategy were MNEs replicate the production of goods and services in several countries. However, to delimit different industries, the SIC classification system offers more or less aggregate categories ranging from broadly defined sectors such as agriculture, mining, manufacturing, transportation, distribution, finance, and services at the one-digit level to a much more nuanced classification encompassing around 1'500 different economic activities when considering the four-digit level. To get a sufficiently detailed picture of the economic activities pursued by MNEs, Alfaro and Charlton (2009) advocate the usage of the relatively detailed four-digit value of SIC-codes. Arguably, this avoids the misclassification of a substantial number of deals as horizontal where the merging firms operate in the same two-digit SIC, but are active in slightly different stages of the supply chain which can only be detected at a highly disaggregated level. For the substantial proportion of multinational integration along the supply chain that can only be unveiled with four-digit SIC-codes, Alfaro and Charlton (2009) have coined the expression of "intra-industry" (as opposed to "inter-industry") vertical FDI.

Even a detailed industry classification remains uninformative about the extent of vertical integration. To see why, note that a scenario where an acquisition occurs across industries, that is $SIC_\alpha \neq SIC_\tau$, does not automatically imply that firms are connected through the supply chain, since such a deal could also involve an acquirer and target that have, with respect to the industries in which they operate, nothing in common. To establish whether merging firms are indeed vertically integrated necessitates additional information on the upstream and downstream linkages across industries. For this, we draw on the results of Fan and Lang (2000) as well as Fan and Goyal (2006) who—following earlier work of McGuckin (1991) and Matsusaka (1996)—have established the vertical relatedness for a matrix containing around 500 industries based on the upstream and downstream value flows between them. In particular, from US input-output tables, they have calculated a so-called coefficient of vertical relatedness, denoted here by $V_{\alpha\tau}$, in terms of the fraction the input industry a contributes in added-value to the output of industry τ.[3] We match this coefficient of vertical relatedness with the four-digit SIC codes of the acquiring and target firm for each deal we extract from SDC Platinum. This methodology is similar to the one

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[3]The US input-output tables are updated every 5 years to account for industrial and technological changes. However, Fan and Goyal (2006, p.882) find that the usage of input:output tables of different years has only a modest impact upon their results. Using US input:output tables to define the vertical relatedness for a worldwide sample of MNEs, as is also one in Acemoglu *et al.* (2009), raises the issue whether this accurately reflects the technological conditions around the globe. To account for this, our results in section 5 will contain robustness checks with a sub-samples containing only US MNEs.

used in Alfaro and Charlton (2009) to classify the vertical relationship between plant level observations recorded in the WorldBase database as well as by Acemoglu *et al.* (2009) and Garfinkel and Hankins (2011) in addressing the factors that determine vertical integration.[4] However, the classification of our CBA deals necessitates the specification of a cutoff value, denoted by $\overline{V}_{\alpha\tau}$, above which industries would be deemed vertically related. Fan and Goyal (2006, pp.882-883) consider a cutoff of 1% as well as a stricter value of 5% whilst Alfaro and Charleton (2009) and Acemoglu *et al.* (2009) use 5% and 10% to define vertical relatedness. Garfinkel and Hankins (2011) consider only the relatively low 1% cutoff level. Our baseline results will draw on the intermediate value of 5%. To trace out the effect on the distribution of different FDI strategies, as robustness checks, the results will be replicated with the alternative cutoff values.

Within a given supply chain, vertical relatedness can arise due to commodity flows with upstream $v_{\alpha\tau}^u$ and/or downstream activities $v_{\alpha\tau}^d$. Following Fan and Goyal (2006, p.881), in our baseline scenario, no distinction will be made between these cases in the sense that the maximum value determines the coefficient of vertical relatedness, that is $V_{\alpha\tau} = max(v_{\alpha\tau}^u, v_{\alpha\tau}^d)$. Nevertheless, as a robustness check, the differences between forward and backward integration along the supply chain will also be considered.

Another challenge in determining horizontal and vertical strategies is that the acquiring or target firms often operate in several industries. Within the present context, accounting for the possibility of multi-segment business activity is maybe important since MNEs are often large and operate already in several industries. In our sample, the acquiring firms are more diversified than the target firms in terms of reporting, on average, activity in more around three and around two industries. Therefore, although the SDC database reports a primary SIC, we cannot be sure that, say, the absence of an overlap between these (primary) codes rules out a horizontal relationship, since a replication of production activities could also occur with some other industry segment of a diversified firm. To account for this, we search for a horizontal and vertical connections between all permutations of the up to 6 different SIC codes reported for each deal by SDC Platinum.[5] Taken together, as with Alfaro and Charlton (2009), comparing the industries as well as drawing on the vertical relatedness between the acquiring and target firm provides a direct way to identify the importance of alternative strategies of multinational integration. Specifically, denoting up to 6 industries of the acquiring firm with $\rho = \{1, 2, 3, 4, 5, 6\}$ and the industries of the target firm with $\sigma = \{1, 2, 3, 4, 5, 6\}$, gives rise to up to 36 pairs to establish a horizontal, that is $SIC_\alpha^\rho = SIC_\tau^\sigma$ or vertical relationship, that is $V_{\alpha\tau}^{\rho\sigma} > \overline{V}_{\alpha\tau}$. These pairs define the following strategies:

- **Pure Horizontal**, that is deals where the firms share at least one pair of the same four-digit SIC code, but are never vertically related;

- **Pure Vertical**, that is deals where the acquirer and target operate in different industries, but share at least one pair of SIC codes exceeding the threshold value defining vertical relatedness;

- **Conglomerate**, where, across all the 36 possible combinations of SIC codes, a deal involves firms that neither share the same industries nor are vertically-related; and a

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[4]Common to the studies by Alfaro and Charlton (2009) and Acemoglu *et al.* (2009), we apply the vertical relationship coefficient to all countries in our sample on the assumption that the technology is consistent across all countries. In the sensitivity analysis, we consider confining the sample only to deals involving a US multinational as acquirer or target where is may be more obvious that this assumption will apply. In addition, we assume that these vertical relatedness coefficients hold over time which is consistent with the recent work of Alfaro *et al.* (2012).

[5]Another possibility to avoid the pitfalls when MNEs operate in several industries is to focus on CBA deals where both the acquirer and target firm report only one SIC code. This approach entails a dramatic reduction in the number of deals whereby less than 20 per cent of our sample involve single business acquirer and target firms. Hence, we will consider this only for our sensitivity analysis.

- **Residual**, where it is not clear whether a deal is driven by a horizontal or vertical motive (or both).

Table 1 summarizes the definition of the various FDI strategies that can be identified by means of our CBA data.

Table 1: Strategies of Cross-Border Acquisition

Strategy	Horizontal Relatedness	Vertical Relatedness	Description
Pure Horizontal	$\exists r,s \vert SIC_\alpha^\rho = SIC_\tau^\sigma$	$V_{at}^{\rho\sigma} < \overline{V}_{\alpha\tau}^{\rho\sigma} \; \forall \rho,\sigma$	Replication of production by acquiring a foreign facility in the same industry and on the same stage of the supply-chain.
Pure Vertical	$SIC_\alpha^\rho \neq SIC_\tau^\sigma \; \forall \rho,\sigma$	$\exists \rho,\sigma \vert V_{\alpha\tau}^{\rho\sigma} > \overline{V}_{\alpha\tau}^{\rho\sigma}$	Fragmentation of production by acquiring a foreign facility in a different industry and production stage but located within the same value-chain.
Conglomerate	$SIC_\alpha^\rho \neq SIC_\tau^\sigma \; \forall r,s$	$V_{\alpha\tau}^{\rho\sigma} < \overline{V}_{\alpha\tau}^{\rho\sigma} \; \forall \rho,\sigma$	The merging firms are neither horizontally related through sharing the same industry nor are they vertically connected through the supply-chain.
Residual	$\exists \rho,\sigma \vert SIC_\alpha^\rho = SIC_\tau^\sigma$	$\exists \rho,\sigma \vert V_{\alpha\tau}^{\rho\sigma} > \overline{V}_{\alpha\tau}^{\rho\sigma}$	Cases where either the classification is unclear (or the multinational firm pursues a complex strategy).

Inevitably, the definition of horizontal and vertical strategies of Table 1 is not unambiguous, but, as discussed above, depends on such things as the adopted cutoff value defining vertical relatedness or the level of detail of the industry classification. Furthermore, besides the pure cases of horizontal and vertical deals that are commonly discussed in the international economics literature, other contingencies arise that do not reflect the unambiguous distinction between uniquely market-access and endowment-seeking driven acquisition. Specifically, this encompasses a conglomerate case where no industrial relationship could be found. Furthermore, based on our classification method, deals can exhibit both a horizontal and a vertical relationship. This case arises since we are looking for industrial connections across all combinations of SIC reported by the acquiring and target firm involved in a given deal. Since this might reflect a scenario where our classification is not clear cut, this possibility is referred to as a "residual".[6,7]

4 An Overview of CBAs between 1990 and 2011

For the 1990 to 2011 period, this section provides a descriptive overview of our sample with 165,106 CBAs reported SDC Platinum during that period. The following descriptive overview of the data, as well as the econometric analysis of sections 4 and 5, focuses on the number of observed deals rather than their value. This is because in more than half of the cases, the deal value has not been disclosed by the merging companies[8], so the coverage of number of observed deals is more complete. The number of deals follows by and large the

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[6]A strand of the FDI literature starting with Yeaple (2003) has suggested that MNEs could pursue complex FDI strategies combining horizontal and vertical motives. This would provide an additional explanation for finding deals where some SIC-codes overlap and some relationship through the supply chain can be found.

[7]Considering deals between single business firms discussed in footnote 5 eliminates again the contingency of finding acquisitions meeting both criteria defining horizontal and vertical FDI.

[8]See also Di Giovanni (2005, p.134).

observed pattern of the value data and the econometric insights are also robust to specifying the dependent variable as a count or value. For the sake of brevity, the results with value data are not reported here, but are available on request.

Our sample includes all deals by MNEs headquartered in one of the 31 source countries[9] listed in the data appendix. These source countries account for more than 95 per cent of the all deals reported in SDC during the period under consideration. The left column of the top panel of Table 2 reports the top 10 source countries for CBAs. A handful of large and developed source countries including the United States, the United Kingdom, Canada, Germany, and France account already for more than 50 per cent of all deals. Furthermore, some small, but economically and financially highly developed countries such as the Netherlands, Sweden, or Switzerland, are also important sources of international merger activity. Comparing the top 10 source with the largest host countries at the bottom left of Table 2 reveals a similar degree of concentration and a noteworthy overlap that has also been documented with other FDI data (see e.g. Brainard, 1997, pp.525-526, Markusen, 2002, p.6). The main difference between the most important source and host countries is that emerging markets such as China and some large southern European countries such as Spain and Italy replace the above mentioned small developed countries when contemplating the biggest recipients of CBAs.

Following the classification procedure outlined in section 3, Table 3 shows the distribution of CBA deals in our sample across the different FDI strategies. As regards the debate whether horizontal (Carr *et al.*, 2001) or vertical (Alfaro and Charleton, 2009) motives dominate when MNEs integrate foreign affiliates, our sample suggests that this depends crucially on the cutoff value V_{at}^{rs} defining vertical relatedness. In particular, with a relatively strict value of 10 per cent, horizontal deals dominate. The opposite result arises when considering a cutoff of 1 per cent, where 55 per cent of all deals are considered to be vertical, which coincides with the proportion reported by Garfinkel and Hankins (2011, p.520) for a sample with US multinationals. The shifts in the empirical importance of FDI strategies across different values of V_{at}^{rs} underscores the need to considers alternatives to 5 per cent (or any other) benchmark to check the robustness the subsequent results.

What is maybe surprising in view of the theoretical dominance of horizontal and vertical FDI in the international economics literature is that, regardless the criterion to define vertical relatedness, Table 3 shows that such strategies arise only in about one half of the deals in our sample of CBAs. Cases with a combination between horizontal motives, or conglomerate deals where no replication of activities or connection through the supply chain can be identified are no exception. In particular, even when using a lenient 1 per cent cutoff for V_{at}^{rs}, about one fifth of the deals are still considered to be conglomerate with much higher proportions arising with stricter values. To our knowledge, the international economics literature has by and large ignored the possibility that a considerable proportion of deals could be conglomerate in nature.

Figure 1 summarizes the distribution of CBAs across industries. In particular, the y-axis relates to the two-digit primary SIC code of the acquiring firm plotted against the two-digit primary SIC code for the target firm on the x-axis. The surface of the marker represents the proportional weight of number of CBAs in a given combination of industries relative to the total number of CBAs. Intra-industry deals, that do not cross the two-digit SIC code between acquiring and target firm are located on the main diagonal and are marked with boldface circles. Off-diagonal markers, with normal circles, indicate the importance of inter-industry deals occurring between broadly defined activities or even across sectors. The

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[9]Since a target could be acquired through an ownership chain, that is through an intermediate company that has e.g. been to lower the tax burden of an acquisition, the country where a MNE is headquartered is here is here considered to be the *ultimate* source country reported in SDC. However, in around 80 per cent of the deals in our sample, the immediate and ultimate source country are identical.

Table 2: Top 10 Source and Host Countries

Source Countries

Rank	# All CBAs		# Horizontal CBAs		#Vertical CBAs		#Mixed CBAs		#Conglomerate CBAs	
1.	United States	40,209	United States	6,548	United States	11,944	United States	6,593	United States	15,124
2.	United Kingdom	20,973	United Kingdom	4,367	United Kingdom	5,416	United Kingdom	3,065	United Kingdom	8,125
3.	Canada	13,053	France	2,902	Canada	4,339	Canada	2,773	Canada	3,917
4.	Germany	11,520	Germany	2,347	Germany	3,309	Germany	1,997	Germany	3,867
5.	France	11,111	Canada	2,024	France	2,929	France	1,974	France	3,306
6.	Netherlands	7,452	Netherlands	1,562	Japan	2,237	Japan	1,224	Netherlands	2,586
7.	Japan	6,690	Sweden	1,424	Netherlands	2,162	Netherlands	1,124	Japan	2,411
8.	Sweden	5,931	Switzerland	1,165	Switzerland	1,596	Australia	1,096	Hong Kong	2,346
9.	Switzerland	5,757	Italy	895	Sweden	1,583	Sweden	1,053	Switzerland	2,010
10.	Australia	5,117	Australia	842	Australia	1,485	Switzerland	986	Sweden	1,871
	...		...		...		...		...	
	Total	165,106	Total	31,772	Total	40,093	Total	34,425	Total	58,816

Host Countries

Rank	# All CBAs		# Horizontal CBAs		#Vertical CBAs		#Mixed CBAs		#Conglomerate CBAs	
1.	United States	26,100	United States	4,746	United States	7,968	United States	4,487	United States	8,899
2.	United Kingdom	15,695	United Kingdom	3,038	United Kingdom	4,726	United Kingdom	2,600	United Kingdom	5,331
3.	Germany	12,144	Germany	2,246	Germany	3,514	Germany	1,899	Germany	4,485
4.	Canada	9,342	France	1,687	Canada	2,611	Canada	1,599	Canada	3,521
5.	France	8,639	Canada	1,611	France	2,372	France	1,363	France	3,217
6.	China	5,923	Spain	1,228	China	1,662	China	993	China	2,575
7.	Australia	4,925	Italy	992	Australia	1,472	Italy	803	Australia	1,972
8.	Spain	4,924	Sweden	897	Netherlands	1,334	Spain	758	Italy	1,766
9.	Italy	4,838	Netherlands	861	Italy	1,277	Australia	737	Spain	1,724
10.	Netherlands	4519	Australia	744	Sweden	1,237	Netherlands	733	Netherlands	1,591
	...		...		...		...		...	
	Total	165,106	Total	31,772	Total	40,093	Total	34,425	Total	58,816

Table 3: Proportion of FDI Strategies across different values of $\overline{V}_{at}^{rs}$

Cutoff ($\overline{V}_{at}^{rs}$)	Pure Horizontal	Pure Vertical	Conglomerate	Residual
1%	8%	55%	20%	17%
5%	19%	24%	36%	21%
10%	35%	11%	44%	10%

industries are arranged according to the value of the SIC code meaning that the primary sector—that is agriculture, mining, and construction—appears on the bottom left followed by the manufacturing sector, transportation, wholesaling and retailing (distribution), financial services, and other services at the top right. Alfaro and Charlton (2009, p.2111) contains a similar figure though their sample encompasses only the manufacturing sector. Perhaps this provides an incomplete picture since, in our sample, a considerable proportion of the deals involves firms outside manufacturing. An example for this are acquisitions by investment offices (SIC 67) in the finance sector. Business services (SIC 73), engineering and accounting firms (SIC 87), communication (SIC 48), and certain parts of wholesaling (SIC 50-51) are also important in acquiring foreign firms. Note that with the exception of financial firms, most of these acquisitions follow the pattern of the manufacturing in terms of being mainly intra-industry. Conversely, relatively few deals occur in the primary sector, with particularly scant activity in agriculture (compare Herger *et al.* 2008), as well as transportation, and personal services such as hotels (SIC 79), health care (SIC 80), or legal (SIC 81) and educational (SIC 82) services.

Figure 1: Industrial Composition of CBAs, All Deals (165,106 Deals)

Data Source: SDC Platinum
Note: 5 % cutoff to define vertical relatendess
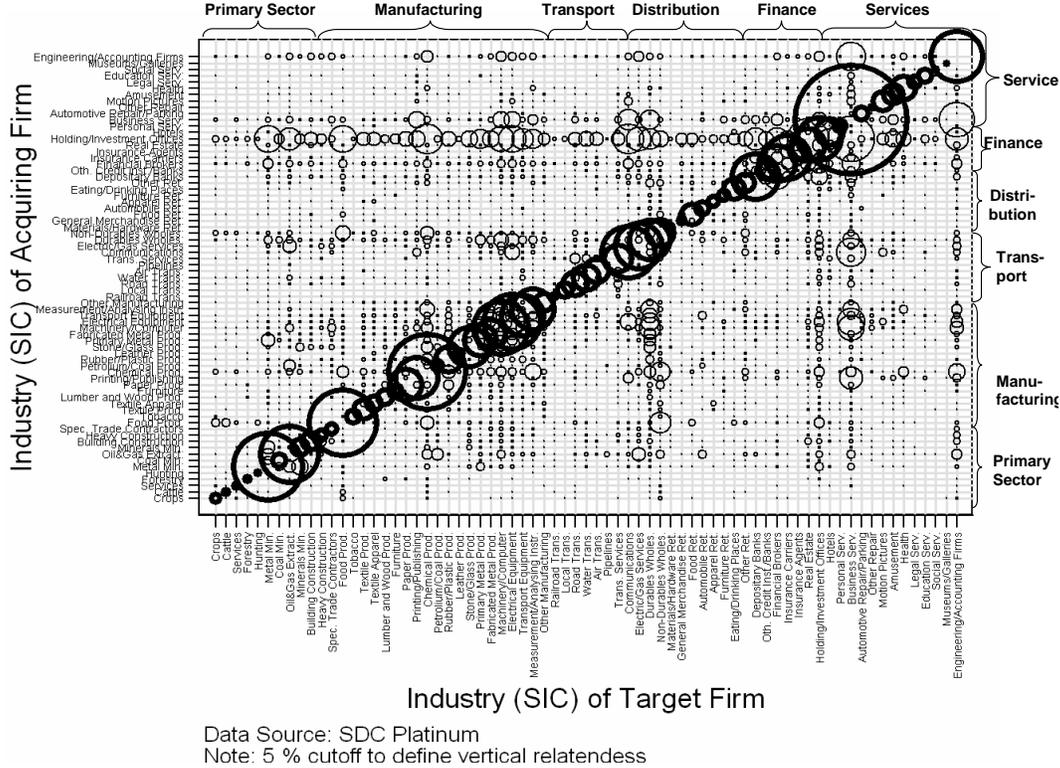
As regards the group of pure horizontal deals, Table 2 reports the corresponding top 10

source and host countries. Remarkably, compared with the full sample, the ranking changes barely with pure horizontal CBAs involving again mainly large developed countries. The main exceptions are that Japan is replaced by Italy and China by Sweden in the list of, respectively, the 10 most important source and host countries. Within the context of the literature of FDI strategies discussed at the outset, this dominance of large and developed countries is perhaps not surprising since horizontal FDI is primarily thought to be market-seeking meaning that countries with similar factor endowments and large domestic markets ought to be the primary target for multinational integration.

With the surface of the markers representing again the weight relative to the total number of deals, Figure 2 displays the industrial composition of CBAs classified according to the method of section 3 as 'pure horizontal'. Intuitively, the bulk these deals lies on the diagonal; that is they are intra-industry in terms of occurring between firms sharing the same two-digit primary SIC code. Though horizontal deals off the main diagonal can arise since the overlapping industries could also involve business segments that are not the primary activity of an acquiring or target firm, within the current sample, this scenario is empirically unimportant. In manufacturing, horizontal deals within food production (SIC 20), chemical products (SIC 28), measurement and precision instruments (SIC 38), commercial machinery (SIC 35), and electrical equipment (SIC 36) are the most important. Though the manufacturing sector accounts for a substantial share of horizontal CBAs, this strategy is also pursued elsewhere. In particular, a substantial amount of acquisitions in firms replicating activities abroad arise also with business services (SIC 73), engineering and accounting firms (SIC 87), and hotels (SIC 70) in the services sector, depository banks (SIC 60) and insurance carriers (SIC 63) in finance, wholesaling (SIC 50, 51) in the distribution sector, electric, gas and sanitary services (SIC 49) in the transportation and public utilities sector, or oil and gas extraction (SIC 13) in the primary sector.

Less consistent with conventional theories of the MNE is that, as shown in Table 2, economically developed source *and* host countries dominate in CBAs involving acquiring and target firms that operate on different stages of the same supply chain. Conversely, theories about vertical integration such as that of Helpman (1984) or Markusen (2002) suggest such CBAs to be driven by the desire the to exploit relative endowment differences and, hence, should mainly involve host countries with different factor endowments and lower wage cost. By and large, the top 10 hosts for vertical deals reported in Table 2 do not fall into the group of low-wage countries. The only exception is China that might attract deals motivated by the desire to outsource labor intensive production stages. This pattern concurs with the findings in Alfaro and Charlton (2009), who concluded that a larger fraction of FDI between developed countries than previously thought might be driven by a vertical strategy.

Figure 3 depicts the industrial composition of the deals classified as pure vertical according to the method of section 3 using again the 5 per cent cutoff level. Though, compared with horizontal CBAs, the markers are slightly more dispersed, the bulk of deals involving firms that operate on different stages of the same supply chain still lies on the main diagonal marked by the bold circles representing intra-industry activity. For the case of vertical acquisitions, these are firms that operate on slightly different production stages within the same two-digit SIC code. The empirical dominance of intra-industry vertical FDI was first observed by Alfaro and Charleton (2009) by looking at the manufacturing sector. However, in our more comprehensive sample, intra-industry CBAs do not only arise in large numbers in the manufacturing sector—mainly within chemical products (SIC 28), electrical equipment (SIC 36), printing and publishing (SIC 27), or food production (SIC 20)—but also elsewhere, including in business services (SIC 73), communications (SIC 49), metal mining (SIC 10), or financial brokers (SIC 62) and holding companies (SIC 67) in the finance industry.[10]

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[10]CBAs involving the distribution and retailing sector are relatively rare, which manifests itself in a gap in the markers along the diagonal of Figure 2. Referring back to the observation of section 2 that a vertical

Figure 2: Industrial Composition of Horizontal CBAs (31,771 Deals)

Data Source: SDC Platinum
Note: 5 % cutoff to define vertical relatendess
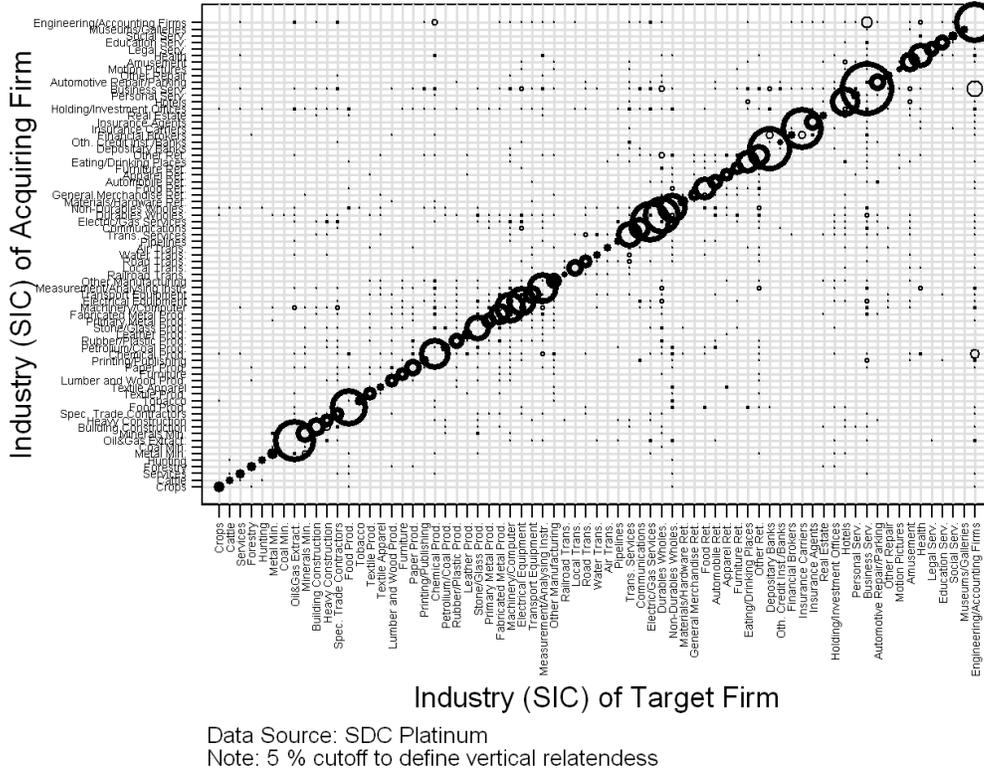
As noted above, most of the international economics literature focuses on the distinction between horizontal and vertical FDI whereas conglomerate strategies draw rarely attention. In contrast, against the background of an alleged conglomerate merger wave during the 1960s and 1970s (see e.g. Matsusaka, 1996), the possibility of diversifying mergers and acquisitions has only received broad attention in some of the older finance and industrial economics literature. Instead of exploiting synergies between industries when replicating production processes in several locations or outsourcing production stages to low wage countries, financial frictions (e.g. Williamson, 1970) or corporate governance problems manifesting themselves in agency issues between shareholders and management (e.g. Amihud and Lev, 1981; Williamson 1981, pp.1557ff.; Mueller, 1969) provide, arguably, motives that could also lead to conglomerate mergers and acquisitions. When analysing the empirical distribution of CBAs, as far as we are aware, financial and corporate governance motives have by and large been neglected. Exceptions to this include Rossi and Volpin (2004), who suggest that acquisitions involve often host countries with poorer shareholder protection than the source country and, hence provides a vehicle to export high corporate governance standards. Furthermore, Erel *et al.* (2011) suggest that CBAs can be a reflection of financial arbitrage arising in incompletely integrated capital markets. Owing to their size, MNEs could indeed

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relationship can arise with the upstream and the downstream activities, this may matter: Conventional theories of the multinational firm summarised in the 'knowledge-capital' model (Markusen, 2002) connect the motives for vertical integration with endowment-seeking. However, the (forward) integration of a distribution network might be driven by market access considerations that have more in common with motives that are usually attributed to horizontal strategies of FDI. Though such cases are empirically unimportant, a robustness check will be carried out in section 5 distinguishing between cases where the vertical relationship arises only with, respectively, the upstream and downstream stages of the supply chain.

Figure 3: Industrial Composition of Vertical CBAs (40,093 Deals)

Data Source: SDC Platinum
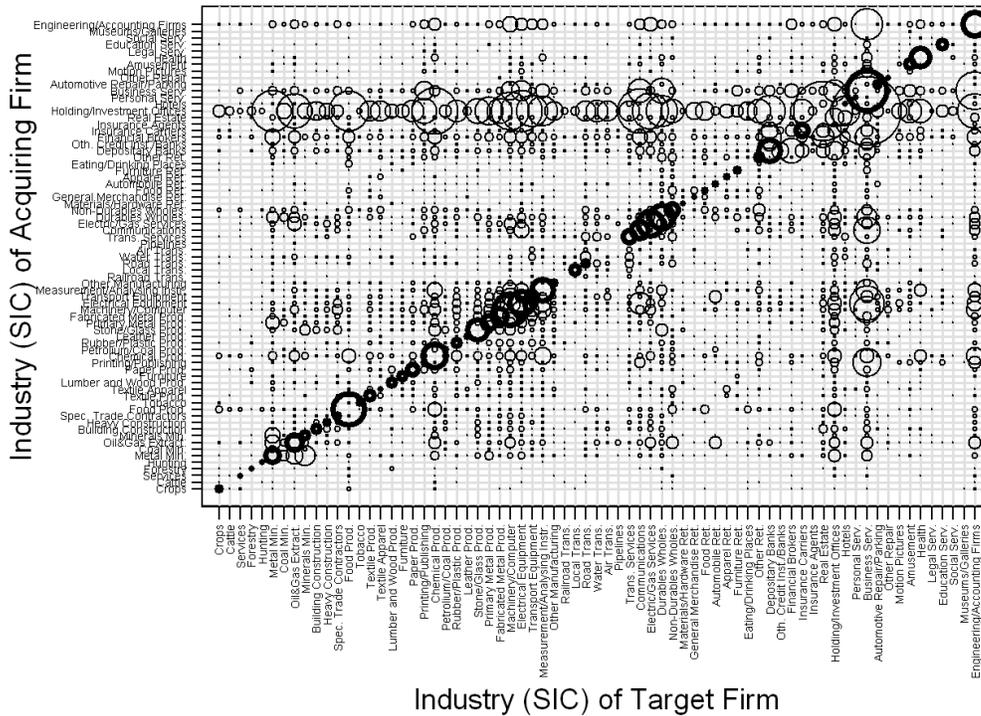Note: 5 % cutoff to define vertical relatendess
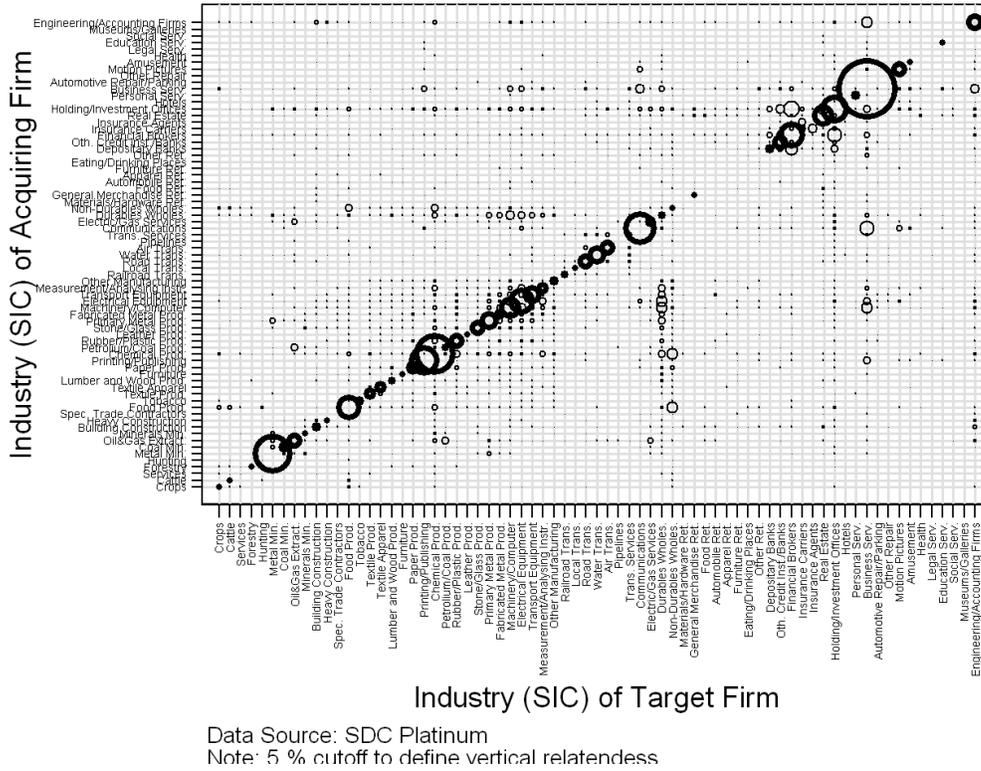
play a role in acquiring undervalued firms abroad (see also Baker *et al.*, 2008). However, neither of these papers suggests that corporate governance or valuation effects could be particulary relevant to explain conglomerate CBAs that, by definition, cannot give rise to industrial synergies.

As summarised in Table 1, an empirical identification of conglomerate acquisitions is not trivial and necessitates information for all permutations of the industries the acquirer and target operate in that (a) a deal occurs across industries (b.) that these industries are not connected through the supply chain (compare Matsusaka, 1996). Yet, due to integrating a subsidiary in a different industry and country, the scope for diversification might be particularly large in FDI. In spite of this, to the best of our knowledge, hitherto no systematic empirical study has uncovered the importance of conglomerate CBAs controlling for all these features.

Recall from Table 3 that a substantial number of our CBA deals seem to be conglomerate in nature. Using the method of section 2 with the 5 percent cutoff level, Figure 4 displays the industrial composition of the more than 58,000 deals classified as conglomerate. In general, compared to horizontal and vertical CBAs, the resulting pattern exhibits more dispersion across different sectors and industries and involves substantial inter-industry activity. This is perhaps not surprising since the distinctive feature of conglomerate strategies is diversification in terms of combining firms that operate in entirely different industries. Compared with the previous figures, another obvious difference is that a large proportion of conglomerate deals involve the finance sector. Particularly dominant are holdings and investment offices (SIC 67) as an acquirer with targets located across all sectors.

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Figure 4: Industrial Composition of Conglomerate CBAs (58,816 Deals)

Data Source: SDC Platinum
Note: 5 % cutoff to define vertical relatendess

One advantage of our panel data on CBAs is that, in contrast to the cross section data employed by Alfaro and Charlton (2009), the evolution of different FDI strategies can be traced over time. One of the features of globalisation in recent decades has been the wave-like growth of FDI. It is worth noting that that international merger waves are unlikely to be explained by changes underlying determinants associated with horizontal or vertical FDI such as, respectively, market size and differences in factor endowments or cost. Figure 5 depicts the wave-like growth in the number of CBAs over the period 1990-2011 with surges peaking in the year 2000 with the bursting of the Dotcom bubble and again in 2007 before with the outbreak of the global financial crisis.

Contemplating the contribution of different strategy of multinational integration (here we also include the residual category so that we report total CBAs in our data), Figure 5 shows that horizontal and vertical FDI have been relatively constant over the whole period. There were around 600 to 800 horizontal deals per year at the beginning of the 1990 which doubled to around 1500 deals at the end of the sample period. Vertical deals grew even less from around 600 deals per year to around 1000 deals during the period under consideration. Conversely, conglomerate acquisitions more than doubled from around 1000 deals to around 2500 deals. Also, conglomerate deals contributed most to the merger waves with an increase of more than 200 per cent between 1990 and 2000 and almost 100 per cent between 2002 and 2007.[11]

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[11]These observations are more evident if we were to report the, highly incomplete, data on the observed deal values.

Figure 5: Merger Waves and their Composition (1990 to 2011)
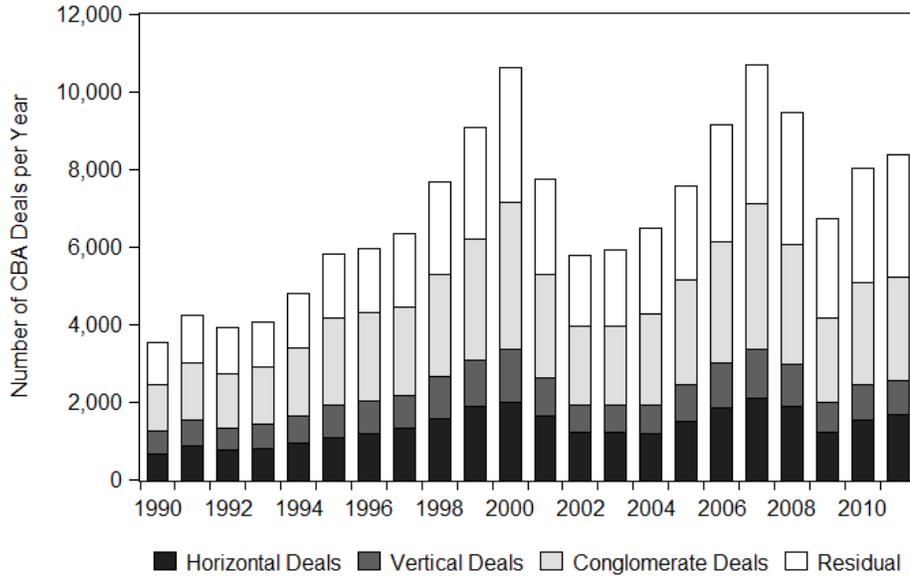
5 Econometric Strategy: Location Choice and the International Market for Corporate Control

5.1 Background

As discussed above, CBAs are by far the most common form of FDI and the data on corresponding deals—that are henceforth indexed with $i = 1, \ldots, N$—are available on an almost universal basis. Also, the acquisition of a foreign firm can be seen as an event uncovering a location choice. To formalize such choices, Head and Ries (2008) model FDI as an outcome of the (international) market for corporate control. Specifically, to be able to outpay potential rivals during a bidding contest in year t, an acquiring MNE headquartered in source country s should derive the highest value $\nu_{sh,t}^i$ from taking over a target firm in host country h. This implies that the probability of a CBA deal between a given source and host country follows an extreme value distribution, such as the multinomial logit distribution used in Head and Ries (2008), to identify the MNE with the highest ability to pay. Hence, as shown in this section, modelling FDI as an outcome of the market for corporate control connects naturally with the conditional logit framework that is commonly used to empirically analyze the firms' location choice problem (see e.g. Guimarães *et al.*, 2003; Schmidheiny and Brülhart, 2011).

Assume that the value $v_{sh,t}^i$ that an MNE headquartered in source country s can obtain from a CBA deal i in year t with a target firm located in host country h depends, among other things, on a set of variables $x_{sh,t}$ according to the equation

$$\nu_{sh,t}^i = x_{sh,t}\beta + \delta_s + \delta_h + \delta_t + \delta_i + \epsilon_{sh,t}^i \quad \text{with} \quad \begin{aligned} &i = 1, \ldots, N; \\ &s = 1, \ldots, S; \\ &h = 1, \ldots, H; \\ &t = 1, \ldots, T \end{aligned} \quad (1)$$

where β are coefficients measuring the direction and magnitude of the impact. Here, $\epsilon^i_{sh,t}$ is a deal specific error term, to be specified below, that accounts for the stochastic uncertainty when an MNE gauges the future value of acquiring a foreign firm. To accommodate for panel data, (1) includes a full set of constants that are specific to the firms involved in a given deal δ_i, source country δ_s, host country δ_h, and year δ_t.

To directly test the differences between FDI strategies, $x_{sh,t}$ includes variables reflecting the motives for horizontal and vertical integration. Here, the real GDP of the host country is thought to capture the market access motive. For FDI driven by a horizontal strategy, GDP is expected to produce a positive sign.[12] Conversely, differences in the cost and endowment of production factors such as labor provide the determinant associated with vertical FDI strategies. To capture this, Carr *et al.* (2001) employ international skill differences measured by an index of occupational categories. Arguably, this approach suffers from several caveats. Firstly, the sign reversals between cases where the source or host country is skill abundant make it difficult to interpret the coefficient of international skill differences (Blonigen *et al.*, 2003). Secondly, national idiosyncracies in labor market regulations, taxation, or social security contributions could drive a wedge between factor endowments and the factor costs that, ultimately, affect an MNEs decision to relocate a production stage. Based on this observation, Braconier *et al.* (2005, pp.451ff.) connect vertical FDI directly with international wage differences between skilled and unskilled labor. Thereto, they draw on the Prices and Earnings data of UBS (various years) which provides a unique survey of the salaries of various professions in the capital city or financial center across a large number of countries. Following Braconier *et al.* (2005, pp.451ff.), for each host country, we have calculated the skilled wage premium SWP by taking the ratio between the wage of a skilled profession—taken to be engineers—and an unskilled profession—taken to be a toolmaker in the metal industry. A high value of SWP indicates that skilled labor is relatively scarce and, in turn, expensive compared with unskilled labor. For vertical deals, SWP is expected to have a positive effect indicating that countries with relatively cheap unskilled labor lend themselves to hosting labor intensive stages of the supply chain.[13]

The following variables control for other determinants that might affect a MNEs' desire to acquire a foreign subsidiary. Since it is arguably less costly to monitor affiliates in nearby countries (Head and Ries, 2008), geographic proximity, measured by the DISTANCE between capital cities, and cultural proximity, measured by common LANGUAGE dummy variable, is thought to foster CBAs. Furthermore, trade cost and regional economic integration also matters though the corresponding effect is ambiguous. In particular, a reduction in trade barriers increases the scope to serve a market by exports instead of local production, and hence undermines (horizontal) FDI/CBAs (e.g. Brainard, 1997), whilst economic integration facilitates the fragmentation of a production process and ship intermediate goods across the border, which would foster (vertical) FDI/CBAs. We control for such effects by introducing a dummy variable for country-pairs located within the same customs union (CU) as well as a measure of TRADE FREEDOM within a given host country to proxy for the existence of formal and informal trade barriers. The political and legal environment matters in the sense that MNEs are probably reluctant to invest in countries with weak property

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[12]Several alternative variables have been suggested in the literature to capture the horizontal motive for FDI. Carr *et al.* (2001) use the sum of the GDP between of the source and host country to capture the joint market size. However, our specification includes a source country dummy variable δ_s absorbing the effect of the home market size. Empirical models replicating the KK-theory of the MNE sometimes also include the squared difference of GDP. This is expected to impact negatively upon FDI since a large discrepancy in market size arguably favors the establishment of a single plant (or national) firm located in the larger country and exporting the goods to the other country instead. Furthermore, interactive variables between the differences in market size and factor cost are sometimes included to account for the nonlinearities in FDI (Carr *et al.*, 2001, Markusen and Maskus, 2002). However, the essence of the results reported in section 6 is robust to including these variables.

[13]UBS (various years) also reports an index summarizing the labor cost across all 13 surveyed professions. This WAGE INDEX will be used as robustness check when testing the nexus between labour cost and vertical CBAs in section 6.

rights for foreign investors, which is measured by an index on INVESTMENT FREEDOM. Aside from the quality of formal rules protecting foreign investors, their enforcement might also matter. Wei (2000) finds indeed evidence that endemic CORRUPTION deters FDI.[14] High CORPORATE TAXES in the host country relative to the source country could deter CBAs. The real EXCHANGE RATE affects the relative price of a foreign acquisition (Froot and Stein, 1991). In particular, the cost of a CBA increase with the relative value of the host country currency meaning that the expected effect is negative. Finally, the period under consideration has witnessed the creation of the EURO zone, for which we control with a dummy variable. The data appendix contains an overview and a detailed description of all variables.

Since the possibility of diversification is largely ignored in the international economics literature, we are agnostic about the theoretical priors for some FDI determinants when considering their impact on conglomerate acquisitions. For example, economic integration or improving institutional quality could facilitate the acquisition of foreign subsidiaries, but also eliminate some of the frictions creating arbitrage opportunities for MNEs. Likewise, economically large countries have more firms that providing cross-border arbitrage opportunities, but also imply that MNEs must compete with more domestic firms, with better access to information about the local economic and political conditions, when making an acquisition. Furthermore, the identification of undervalued firms that lend themselves to financial arbitrage via CBAs is maybe a skill-labor intensive activity and could hence respond to international wage differences. As noted in section 4, financial firms that are probably often located in financial centers with an abundant supply of skilled labor are indeed the dominant acquirers in conglomerate CBAs. However, to uncover evidence on the conjecture that financial arbitrage is a particularly important motive for conglomerate CBAs, we will follow the work of Erel *et al.* (2011) and employ the difference of the average market-equity-to-book-equity value ratio of publicly traded companies—or in short market-to-book ratio (MtB)—between source and host country. The expectation is that this yields a positive effect on CBAs, since a higher valuation of the source country companies puts them into the position to outpay foreign rivals when bidding for a target firm abroad. Difference in valuation can arguably arise from two sources. A first component MtB^m reflects mis-pricing arising from errors in the valuation as suggested by Shleifer and Vishny (2003). A second unexpected component MtB^w reflects surprising developments that should come from real wealth effects featuring in Froot and Stein (1991) as an explanation for the pattern of FDI. To calculate these different components, we follow the method of Baker *et al.* (2008) who regress the current MtB onto the future stock market returns.[15] The corresponding fitted value determines MtB^m whilst the residual determines MtB^w. Finally, to uncover the empirical role of corporate governance, Erel *et al.* (2011) and Rossi and Volpin (2004) calculate the difference of a proxy variable for SHAREHOLDER RIGHTS. The effect is positive when CBAs tend to involve source countries with better corporate governance standards than the host country.

5.2   Location Choices in a Conditional Logit Framework

Equation (1) forms the basis for our empirical strategy. However, only scant data is available on the expected value $\nu_{sh,t}^i$ of an acquisition. Though the price paid for a target firm could provide a proxy for $\nu_{sh,t}^i$, in more than half of the deals, such information has not been reported to SDC Platinum (Di Giovanni, 2005, p.134). Instead, the observation of Head and Ries (2008) that merger deals encapsulate a location choice within the market for corporate control can be used to avoid this missing data problem. Indeed, insofar as a CBA deal

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[14]In general, the empirical literature has related FDI to a large number of so-called institutional quality variables. However, most of these dimensions are closely correlated (Daude and Stein, 2007, pp.321ff.) and seem to measure similar effects of whether or not a country has put in place economic, legal, or political mechanisms protecting investors.

[15]REPORT THE REGRESSION RESULT.

identifies the MNE of source country s deriving the highest expected value ν_{sht}^i of investing in host country h in year t, this implies that

$$d_{sh,t}^i = \begin{cases} 1 & \nu_{sh,t}^i > \nu_{s'h',t'}^i \\ 0 & \text{otherwise,} \end{cases} \tag{2}$$

where s', h', t' denotes the choice set of, respectively, alternative source countries, hosts countries, or years to invest. Hence, location choices $d_{sh,t}$ constitute an almost universally observed variable to uncover the impact of the set of explanatory variables $x_{sh,t}$ upon CBAs. Econometric models that are capable to handle discrete choices include the conditional logit model, where $d_{sh,t}$ of (2) is the dependent variable (see e.g. Guimarães *et al.*, 2003; Schmidheiny and Brülhart, 2011). Consistent with the theoretical framework of Head and Ries (2008), conditional logit models draw on the notion that a CBA identifies the MNE with the highest bid ν_{sht}^i implying that stochastic component $\epsilon_{sh,t}$ of (1) follows a (type I) extreme value distribution. Within the present context, the probability $P_{sh,t}$ of an acquisition involving source country s and host country h during year t is then of the multinomial logit form, that is

$$P_{sh,t}^i = \frac{\exp(x_{sh,t}\beta + \delta_h)}{\sum_{s=1}^{S} \sum_{h=1}^{H} \sum_{t=1}^{T} \exp\left(x_{sh,t}\beta + \delta_h\right)}. \tag{3}$$

Owing to the exponential form of (3), all components δ_i, δ_s and δ_t that are specific to, respectively, a deal i, source country s, or year t drop out. Thus, only variables enter $x_{sh,t}$ that differ across alternative host countries h. The joint distribution over all deals i, source countries s, host countries h, and years t under consideration defines the log likelihood function $\ln L_{cl} = \sum_{i=1}^{N} \sum_{s=1}^{S} \sum_{h=1}^{H} \sum_{t=1}^{T} \ln(P_{sh,t}^i)$. A symmetric treatment of deals implies that $P_{sh,t}^i = P_{sh,t}$, such that $n_{sh,t}$ can be factored out, that is $L_{cl} = \sum_{s=1}^{S} \sum_{h=1}^{H} \sum_{t=1}^{T} n_{sh,t} P_{sh,t}$. Inserting (3) yields

$$\ln L_{cl} = \sum_{s=1}^{S} \sum_{h=1}^{H} \sum_{t=1}^{T} n_{sh,t}(x_{sh,t}\beta) - \sum_{s=1}^{S} \sum_{h=1}^{H} \sum_{t=1}^{T} \left[n_{sh,t} \ln \left(\sum_{s=1}^{S} \sum_{h=1}^{H} \sum_{t=1}^{T} \exp(x_{sh,t}\beta) \right) \right], \tag{4}$$

from which the coefficients β can be estimated.

According to Guimarães *et al.* (2003), a drawback of the conditional logit model is that the estimation of (4) is unpractical when a large number of firms can choose to locate activities in a large number of countries. Indeed, since our sample contains tens of thousands of CBA deals which uncover the discrete choice from dozens of potential host countries, the estimation of a conditional logit model would be burdensome, since it requires the handling of a dataset with millions of observations.[16]

5.3 Empirical Implementation with Poisson Regressions

To avoid the caveats of the conditional logit model, the count variable $n_{sh,t}$ containing the number of deals between source s and host country h during year t can be used as dependent variable instead of the discrete choice indicator $d_{sh,t}^i$ per CBA deal i (Guimarães *et al.*, 2003). Basic count regressions impose a Poisson distribution on $n_{sh,t}$, that is

$$Prob[n = n_{sh,t}] = \frac{\exp(-\lambda_{sh,t})\lambda_{sh,t}^{n_{sh,t}}}{n_{sh,t}!}, \tag{5}$$

where $\lambda_{sh,t}$ is the Poisson parameter. Count distributions give rise to a preponderance of zero-valued observations that account naturally for the skewed distribution of FDI. Indeed,

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[16]Specifically, the number of observations is given by the product between the total number of deals N and the set of host countries H.

within the present context, more than 50 per cent of source-host country pairs in our sample did not witness any CBA deal during a given year. Furthermore, since a number $n_{sh,t}$ of acquisition events cannot adopt a negative value, Poisson regressions employ an exponential mean transformation to connect the Poisson parameter with the explanatory variables. For the present case with panel data containing $x_{sh,t}$ as explanatory variables and the source country δ_s, host country δ_h, and year δ_t specific constants, this yields

$$E[n_{sh,t}] = \lambda_{sh,t} = \exp(x'_{sh,t}\beta + \delta_s + \delta_h + \delta_t) = \alpha_{s,t}\exp(x'_{sh,t}\beta + \delta_h). \tag{6}$$

The (random or fixed) effect $\alpha_{s,t} = \exp(\delta_s + \delta_t)$ absorbs the heterogeneity between pairs of source countries s and years t. As shown by Guimarães $et\ al.$ (2003), specifying $\alpha_{s,t}$ as fixed effect[17] and conditioning this out of the joint distribution of (6) and (5) over all source countries s, host countries h, and years t yields the (concentrated) log likelihood function

$$\ln L_{pc} = \sum_{s=1}^{S}\sum_{h=1}^{H}\sum_{t=1}^{T} n_{sh,t}(x_{sh,t}\beta) - \sum_{s=1}^{S}\sum_{h=1}^{H}\sum_{t=1}^{T}\left[n_{sh,t}\ln\left(\sum_{s=1}^{S}\sum_{h=1}^{H}\sum_{t=1}^{T}\exp(x_{sh,t}\beta)\right)\right] + C. \tag{7}$$

Since this differs from (4) only as regards the constant C, the estimates of the coefficients β of such a panel Poisson regression are identical to those of the conditional logit model (Guimarães $et\ al.$, 2003).[18] Note that the equivalence between conditional logit model and Poisson regression requires that the source country δ_s and year specific δ_t constant contained in $\alpha_{s,t}$ are treated as fixed effect in (6) and conditioned out to obtain (7). The key advantage of using a Poisson regression to uncover the impact of variables $x_{sh,t}$ upon the propensity of an MNE to acquire a subsidiary in a given host country h is that the aggregation of CBA deals into a count variable $n_{sh,t}$ entails a dramatic reduction in the number of observations required for estimation.

Owing different asymptotic assumptions, the overlap between the conditional logit model and the Poisson count regression does not extent to the estimated standard deviations of β. A discussion of this can be found in Schmidheiny and Brülhart (2011, p.219). They show that clustering at the group level produces identical standard errors that can be estimated by block-wise bootstrapping, that is taking draws from blocks defined by α_{st}.

It is well known that the coefficients β of a (nonlinear) Poisson regression are not an estimate for the marginal effect. Rather, uncovering the marginal effect of a given variable $x^k_{sh,t}$ upon the expected number $E[n_{sh,t}]$ of CBAs warrants the calculation the elasticity $\eta_{sh,t}$. In general, for the Poisson regression, the elasticity equals $\eta_{sh,t} = \beta x^k_{sh,t}$, which differs across observations of $\widetilde{x}^k_{sh,t}$. To facilitate the interpretation of our coefficients, all variables will be transformed into deviations from their average values, that is $x^k_{sh,t} = \widetilde{x}_{sh,t}/\overline{x}_{sh,t}$ such that the value of β reports directly the elasticity of the Poisson count regression calculated at the average conditions where $x^k_{sh,t} = 1$.

6   Econometric Results

Based on the empirical strategy of section 5, Table 4 reports the results of Poisson regressions upon the number $n_{sh,t}$ of CBAs between pairs of source and host countries during a given year. Column (1) uses the full sample of CBAs whilst, for the 5 per cent value of $\overline{V}_{at}$, the remaining columns contain only the number of deals associated with, respectively, the horizontal, vertical, and conglomerate acquisition strategies defined in section 3. The

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[17]Instead, α_t can also be thought of as introducing additional randomness, which leads to the random effects Poisson count model. As in the case with linear models for panel data, the Hausman-test statistic H_{fe} provides the basis to decide whether or not the usage of fixed effects (fe) or effects (re) is warranted. See Cameron and Trivedi (1998, ch.9) for an excellent textbook discussion of panel data count regressions.

[18]A derivation of this result is made available on request

common sample covers the 1995 to 2010 period (mainly since the variables INVESTMENT FREEDOM, TRADE FREEDOM, and CORRUPTION only date back to 1995) and involves an unbalanced panel with 25,447 observations across the 31 source s and 58 host h countries listed in the data appendix. All specifications include the fixed effects α_{st}, which are favored over the usage of random effects at any conventional level of rejection according to the Hausman-test statistic H_{fe} reported at the bottom of Table 4. All specifications include a full set of host-country dummy variables δ_h.

Column (1) of Table 4 contains the results using all CBAs as the dependent variable. In total, the common sample includes 126,481 deals. Recall that the interpretation of the coefficients is not straightforward when their theoretical effect changes within a sample where CBAs are driven by various investment strategies. For example, SKP, but not GDP has a significant effect which would be consistent with vertical rather than horizontal motives for multinational integration. Likewise, the significantly positive impact of customs unions (CU) suggest that, across all deals, economic integration leads to more foreign acquisitions, which is again consistent with vertical FDI where the MNE exploits the possibility to ship goods between the different plants of a geographically fragmented supply chain. Aside from TRADE FREEDOM, and INVESTMENT COST, the other variables are significant with plausible effects in the sense that an MNE is more likely to acquire a firm in nearby host countries, that share a common language and currency, have low levels of corporate taxation and corruption, and a cheap currency.

The differences in significance of the explanatory variables provide us with a "plausibility check" of our method to disentangle the various FDI strategies from CBA deals. In particular, the theoretical FDI literature ties horizontal strategies with the MNEs' desire to access markets whilst vertical FDI is thought to encapsulate the desire to outsource production stages to low wage countries. This differential effect lies clearly in evidence when comparing the results of columns (2) and (3) of Table 4. In particular, column (2) with horizontal CBAs yields a highly significant entry on GDP, but an insignificant entry of SWP, whilst, as expected, the converse situation arises in column (3) with vertical deals. The coefficients of Table 4 provide direct evidence that the differences between horizontal and vertical FDI stipulated by established theories of the MNE manifest themselves in the data. As far as we know, such direct evidence has hitherto not appeared in the FDI literature. In general, at any conventional level of rejection, a likelihood ratio test between the values of $\ln L$ for the Poisson regression with all, horizontal, and vertical CBAs as dependent variable suggests that these econometric specifications differ in statistically significant manner.

The differential impact of market size and the wage difference variable on horizontal and vertical CBAs turns out to be robust to several changes in the sample and specification to estimate the results of columns (2) and (3) of Table 4. Specifically, though the descriptive overview of section 4 gave rise to a substantial shift in the proportion of horizontal and vertical deals when lowering the cutoff value $\overline{V}_{at}^{rs}$ to 1 per cent, this yields again coefficients that are consistent with the theoretical priors. Conversely, with the 10 per cent cutoff for $\overline{V}_{at}^{rs}$, SWP also significantly affects deals classified to be horizontal. This might suggest that the 10 per cent cutoff to define vertical relatedness is too strict implying that some deals are classified as horizontal even though the acquiring and target firm are connected through the supply chain. The essence of our results is unaffected by considering different samples containing only deals with US firms as acquirer or target, to reflect that the technology inherent in the input-output tables to define vertical relatedness in section 3 refers to the US. As mentioned in section 3, deals between firms operating only in one industry, where ambiguities of finding multiple horizontal or vertical overlaps cannot arise, account only for a small fraction of the sample. In particular, in the 4,349 horizontal deals involving single industry firms, the market size effect is again significantly positive whilst the effect of the skilled wage premium is insignificant. Conversely, both effects are insignificant for the case of vertical deals between single industry firms. The reason might be that this group only

Table 4: Determinants of CBAs

	All CBAs	Horizontal CBAs	Vertical CBAs	Conglomerate CBA
	(1)	(2)	(3)	(4)
GDP	0.011	0.075***	0.009	-0.029
	(0.018)	(0.024)	(0.023)	(0.021)
SWP	0.781***	0.283	1.030***	0.820***
	(0.156)	(0.193)	(0.209)	(0.185)
Distance	-1.101***	-1.253***	-1.035***	-1.114***
	(0.033)	(0.036)	(0.035)	(0.041)
Language	0.092***	0.104***	0.086***	0.094***
	(0.003)	(0.004)	(0.004)	(0.003)
CU	0.056***	0.008	0.052***	0.088***
	(0.009)	(0.012)	(0.009)	(0.011)
Trade Freedom	0.034	0.014	0.068	0.007
	(0.043)	(0.053)	(0.074)	(0.053)
Investment Fd.	0.008	-0.069	0.011	-0.040
	(0.080)	(0.087)	(0.107)	(0.108)
Corruption	-0.156**	-0.105	-0.099	-0.172**
	(0.063)	(0.070)	(0.076)	(0.086)
Corporate Taxes	-0.329***	-0.209**	-0.315***	-0.412***
	(0.085)	(0.097)	(0.096)	(0.104)
Exchange Rate	-0.438***	-0.511***	-0.455***	-0.427***
	(0.067)	(0.075)	(0.077)	(0.076)
Euro	0.006**	0.009***	0.010***	-0.001
	(0.002)	(0.003)	(0.003)	(0.003)
α_{st}	yes	yes	yes	yes
δ_h	yes	yes	yes	yes
#cba	126,481	24,133	36,334	45,251
#obs	25,446	25,446	25,446	25,446
$\ln L$	-49,116	-19,107	-22,967	-26,402
$H_{\alpha_{st}}$	30.53	63.89	60.90	61.13

Notes: The dependent variable is the number (count) of CBAs $n_{sh,t}$. Estimation of the panel Poisson regression with fixed effect α_{st} is by maximum likelihood. All explanatory variables have been transformed into deviations from their mean. Hence, the coefficient estimates represent an elasticity, that is the percentage change of $n_{sh,t}$ when an explanatory variable, at its average value, changes by one percent. The 5% cutoff level is used for $\overline{V}_{at}$ to define FDI strategies reported columns (2) to (4) (see section 3). The data cover a common sample of CBAs for the 1995 to 2010 period and include observations from 31 source and 58 host countries. Furthermore, #cba is the number of deals, #obs is the number of observations, and $\ln L$ the value of the log likelihood function. H_{fe} is the Hausman test statistic between the random and fixed effects Poisson regression. Block bootstrapped robust standard errors are reported in paranatheses; 100 replications (blocks defined by α_{st}). * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

contains 1,462 deals or less than 5 per cent of all vertical deals included in column (3) of Table 4. Further to the discussion of section 3, we have also distinguished between cases where vertical integration arises with the upstream and downstream stages of the supply chain. Again a significantly negative effect on the SKP but not on the market size variable arises regardless whether a forward or backward vertical integration is considered. Finally, the key distinction between horizontal and vertical CBAs holds also when we consider the somewhat broader defined WAGE INDEX to reflect international differences in labor cost. For the sake of brevity, the detailed results of these robustness checks are not reported here, but are available on request.

Differences in the effects of the control variable on horizontal and vertical CBAs are also intuitive. In particular, in column (2) of Table 4, the CU dummy variable is insignificant with respect to horizontal CBAs, whilst a significantly positive effect on vertical CBAs in column (3). Furthermore, the effect of TRADE FREEDOM, though insignificant, is almost four times larger for vertical deals. This provides some support for the hypothesis that economic integration fosters endowment seeking CBAs, which becomes more attractive when it is easier to trade intermediate across borders, but not necessarily market-access seeking CBAs, which can be replaced by exports when markets are more open to trade.

Several notable differences arise also for CBA deals that neither follow a horizontal nor a vertical strategy. Specifically, the conglomerate deals of column (3), which are with 45,251 deals the biggest subgroup of CBAs, the skilled wage premium (SWP), but not market size has a significant effect. Maybe, the financial and managerial motives driving diversifying acquisitions the requires usage of skilled labor.[19] Furthermore, in contrast to horizontal and vertical deals, the creation of the EURO has had no effect on conglomerate deals. This coincides with the findings of Coerdacier et al. (2008, p.88) that the creation of a common European currency has affected mainly CBA activity "within the same sector of activity, rather than boosting the formation of conglomerate activities between sectors". Finally, the negative effect of CORPORATE TAXES and CORRUPTION appears to be more important for conglomerate deals. Apparently, a high tax burden or endemic bribery have a disproportional effect on CBAs that do not offer industrial synergies from replicating a production process or fragmenting a supply chain.

Table 5 adds explanatory variables measuring the differences in market-to-book (MtB) between source and host country to reflect the possibility of financial arbitrage considered by Erel et al. (2011) and the differences in SHAREHOLDER RIGHTS to reflect the governance motive of CBAs considered by Rossi and Volpin (2004). Recall that the market-to-book ratio was split into a component reflecting misvaluation (MtB^m) and a component reflecting a relative wealth effect (MtB^w). The corresponding data is only available for 18 countries (Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Italy, Japan, Netherlands, Norway, Singapore, Spain, Sweden, United Kingdom, United States). Hence, the sample with which we can test the financial arbitrage and governance motive contains only about one fifth of the observations used to calculate the results of Table 4 above. Nevertheless, aside from the lower significance of some coefficients that can be attributed reduced heterogeneity within a sample containing only developed countries, the impact of the common coefficients between the Table 4 and Table 5 is by and large similar. One notable difference is that a slightly significant effect arises with the skilled wage premium with horizontal CBAs in column 2 of Table 4. However, when considering the 1 per cent benchmark for $\overline{V}_{at}$, which is a stricter criterion to identify horizontal deals, the significant effect of GDP and insignificant effect of SKP arises that concurs with the theoretical expectation.

The results of column (1) of Table 5 suggest that the effect of mis-valuation is significant upon the number of CBAs. Within the spirit of finance driven acquisitions proposed by

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[19]However, the significant entry vanishes when measuring the impact of labour cost with the more comprehensive WAGE INDEX.

Table 5: Adding Financial Arbitrage and Governance Motives

	All CBA	Horizontal CBA	Vertical CBA	Conglomerate CBA
	(1)	(2)	(3)	(4)
GDP	-0.005	0.130**	0.031	-0.138**
	(0.045)	(0.061)	(0.055)	(0.051)
SWP	0.201***	0.176*	0.284***	0.165*
	(0.060)	(0.090)	(0.080)	(0.085)
Distance	-0.883***	-0.964***	-0.858***	-0.904***
	(0.037)	(0.048)	(0.036)	(0.041)
Language	0.160***	0.179***	0.157***	0.157***
	(0.005)	(0.007)	(0.006)	(0.006)
CU	0.127***	0.069*	0.086***	0.190***
	(0.028)	(0.027)	(0.030)	(0.030)
Trade Freedom	-0.496	0.543	-0.571	-0.955*
	(0.550)	(0.714)	(0.649)	(0.525)
Investment Fd.	0.040	-0.232	0.113	0.078
	(0.148)	(0.185)	(0.154)	(0.174)
Corruption	0.057	0.096	0.132	-0.012
	(0.102)	(0.137)	(0.109)	(0.104)
Corporate Taxes	-0.273*	-0.145	-0.131	-0.381**
	(0.141)	(0.155)	(0.135)	(0.156)
Exchange Rate	-0.626***	-0.725***	-0.841***	-0.512**
	(0.178)	(0.184)	(0.213)	(0.217)
Euro	0.026***	0.039***	0.036***	0.011
	(0.007)	(0.008)	(0.009)	(0.009)
MtB^m	0.929*	0.769	0.533	1.318**
	(0.496)	(0.537)	(0.457)	(0.647)
MtB^w	0.0001	0.0005	-0.0001	0.00002
	(0.0004)	(0.0004)	(0.0004)	(0.000)
Shareh. Rights	0.138***	0.115**	0.176***	0.135**
	(0.045)	(0.053)	(0.056)	(0.056)
α_{st}	yes	yes	yes	yes
δ_h	yes	yes	yes	yes
#cba	81,121	15,329	23,859	29,092
#obs$_{pc}$	4,896	4,896	4,896	4,896
ln L_{pc}	-16,851	-7,018	-8,697	-9,811
H$_{\alpha_{st}}$	57.23	192.4	57.9	142.0

Notes: The dependent variable is the number (count) of CBAs $n_{sh,t}$. Estimation of the panel Poisson regression with fixed effect α_{st} is by maximum likelihood. All explanatory variables have been transformed into deviations from their mean. Hence, the coefficient estimates represent an elasticity, that is the percentage change of $n_{sh,t}$ when an explanatory variable, at its average value, changes by one percent. The 5% cutoff level is used for $\overline{V}_{at}$ to define FDI strategies reported columns (2) to (4) (see section 3). The data cover a common sample of CBAs for the 1995 to 2010 period and include observations from 18 (source and host) countries. Furthermore, #cba is the number of deals, #obs is the number of observations, and ln L the value of the log likelihood function. H_{fe} is the Hausman test statistic between the random and fixed effects Poisson count regression. Block bootstrapped robust standard errors are reported in parantheses; 100 replications (blocks defined by α_{st}). * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

Shleifer and Vishny (1993), aside from the conventional economic and geographical variables introduced above, CBAs can also reflect the desire of MNEs to exploit the relative undervaluation of target firms abroad. Contemplating the differences between columns (2) to (4), it is perhaps not surprising that effect of MtB^m arises primarily with conglomerate deals, where the coefficient is highly significant and economically large. Recall from Figure 4 that a large share of such diversifying CBAs involve financial sector acquirers which, apparently, target undervalued firms abroad and could make profits by arbitrage away the valuation differences within an imperfectly integrated capital market. The effect of MtB^m is also consistent with the discussion around Figure 5, according to which merger waves manifest themselves primarily in the changes of conglomerate CBA activity. Through the mis-pricing effect, fluctuations on the stock market might entail substantial knock-on effects on the international market for corporate control. Conversely, the relative wealth effects inherent in MtB^w are neither significant nor are they economically important. Maybe, relative wealth effects are more important for specific firms and sectors, but average out across aggregated counts of CBAs used here as the dependent variable. Finally, the corporate governance motive seems to matter regardless the pursued FDI strategy in the sense that CBAs are likely to involve source countries offering relatively higher investor protection than the host country.

7 Summary and Conclusion

An intense debate in the research about foreign direct investment (FDI) is concerned with the question whether horizontal, that is market-access driven, or vertical, that is endowment driven, strategies provide the main motive for multinational enterprises (MNEs) to locate economic activities abroad. Hitherto, the prevailing view is that horizontal strategies should mainly involve developed countries, in particular when their domestic market is large, whilst vertical strategies should dominate between high and low income countries that differ in terms of economic size and labor cost.

We have shown that this pattern arises indeed when identifying horizontal and vertical strategies from cross-border acquisitions (CBAs). Concurring with the theoretical prediction of the conventional models of FDI, the number of horizontal CBAs, where target and acquiring firm operate within identical industries that are unrelated through the supply chain, tends to increase with the market size of the involved countries. Conversely, international differences in labor cost affect vertical CBAs, where the acquiring and target firms operate in different industries that are connected through the supply chain.

Strategies that neither involve a horizontal nor a vertical motive have by and large been ignored by the empirical literature on FDI. However, CBAs can in principle also occur between unrelated firms that neither share industries nor are connected through a supply chain. Empirically, such conglomerate investment strategies are far from uncommon and, even with generous definitions for horizontal and vertical relatedness, accounted for more than one fifth of the CBA deals in our sample. CBAs could indeed be driven by other motives than the synergies involved in replicating or outsourcing production. These include the possibility that CBA deals represent financial arbitrage by MNEs e.g. between countries with over- and undervalued stock markets. Such financial variables, that are often lacking in the conventional gravity equations to explain the distribution and growth of FDI around the world, exhibit indeed large effects on conglomerate CBAs.

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Country Coverage

The common sample covers the following countries. Wage data of UBS (various years) refer to the cities in parentheses:

<u>As source:</u> Australia (Sydney), Austria (Vienna), Belgium (Brussels), Brazil (Sao Paulo), Canada (Toronto), China (Shanghai), Czech Republic (Prague), Denmark (Copenhagen), Finland (Helsinki), France (Paris), Germany (Frankfurt), Greece (Athens), Hongkong (Hongkong), Hungary (Budapest), Indonesia (Djakarta), Ireland (Dublin), Italy (Milan), Japan (Tokyo), Mexico (Mexico City), Netherlands (Amsterdam), Norway (Oslo), Poland (Warsaw), Portugal (Lisbon), Russia (Moscow), Singapore (Singapore), South Africa (Johannesburg), Spain (Madrid), Sweden (Stockholm), Switzerland (Zurich), United Kingdom (London), United States (Washington).

The common sample covers the following host countries. Wage data of UBS (various years) refer to the cities in parentheses:

<u>As host:</u> Argentina (Buenos Aires), Australia (Sydney), Austria (Vienna), Bahrain (Manama), Belgium (Brussels), Brazil (Sao Paulo), Bulgaria (Sofia), Canada (Toronto), Chile (Santiago de Chile), China (Shanghai), Colombia (Bogota), Czech Republic (Prague), Cyprus (Nikosia), Denmark (Copenhagen), Estonia (Tallinn), Finland (Helsinki), France (Paris), Germany (Frankfurt), Greece (Athens), Hongkong(Hongkong), Hungary (Budapest), India (Mumbai), Indonesia (Djakarta), Ireland (Dublin), Israel (Tel Aviv), Italy (Milan), Japan (Tokyo), Kenya (Nairobi), Korea (Seoul), Latvia (Riga), Lithuania (Vilnius), Luxembourg (Luxembour), Malaysia (Kuala Lumpur), Mexico (Mexico City), Netherlands (Amsterdam), New Zealand (Auckland), Norway (Oslo), Panama (Panama), Peru (Lima), Philippines (Manila), Poland (Warsaw), Portugal (Lisbon), Romania (Bucharest), Russia (Moscow), Singapore (Singapore), Slovak Republic (Bratislava), Slovenia (Ljubliana), South Africa (Johannesburg), Spain (Madrid), Sweden (Stockholm), Switzerland (Zurich), Thailand (Bangkok), Turkey (Istanbul), Ukraine (Kiev), United Arab Emirates (Dubai), United Kingdom (London), United States (Washington), Venezuela (Caracas).

Table 6: Description of the Data Set

This table provides an overview of the data. Variables cover an (unbalanced) panel of 37 target countries (indexed with j) and the years between 1990 and 2004 (indexed with t).

Variable	*Description*	*Source*
Dependent Variables:		
$CBA_{sh,t}$	Number of international merger deals between the source country s and host countries h during year t. The horizontal, vertical, and conglomerate modes defined in this are described in the text.	Compiled from SDC Platinum of Thomson Financial.
Covariates:		
$CORRUPTION_{h,t}$	Corruption index on a scale from 10 to 90. Original values have been reversed such that higher values mean more corruption. For the year 1995 the values for Belgium, Finland, Netherlands and Norway are not available and the values of 1996 have been used.	Heritage Foundation.
$CU_{sh,t}$	Nominal variable for source and host countries that are member of a customs union	Compiled.
$DISTANCE_{sh}$	Great circular distance between Washington DC and the capital city of the host country in terms of logarithmically transformed thousand Km.	Compiled.
$EURO_{sh,t}$	Nominal variable for source and host countries sharing the Euro as common currency.	Compiled.
EXCHANGE $RATE_{sh,t}$	Real exchange rate (an increase is an appreciation of the source country currency). Calculated from by dividing the nominal exchange rate with with the PPP factor over GDP.	Penn World Tables.
$GDP_{h,t}$	Market size of the source and host country as measured by the real Gross Domestic Product denominated in US$ with base year 2000.	Compiled from World Development Indicators (WDI) of the World Bank.
INVESTMENT $FREEDOM_{h,t}$	Index of freedom of investment referring to whether there is a foreign investment code that defines the country's investment laws and procedures; whether the government encourages foreign investment through fair and equitable treatment of investors; whether there are restrictions on access to foreign exchange; whether foreign firms are treated the same as domestic firms under the law whether the government imposes restrictions on payments, transfers, and capital transactions; and whether specific industries are closed to foreign investment. For the year 1995 the values for Belgium, Finland, Netherlands and Norway are not available and the values of 1996 have been used. Higher values mean more freedom.	Heritage Foundation.

Further Co-variates:		
LANGUAGE$_{sh}$	Countries sharing a common official language.	Compiled.
MtB$^m_{sh,t}$	Difference in the mis-valuation component of market to book ration between source and host country. Mis-valuation is calculated by regressing the future stock market return on current values of the MtB and calculating the fitted values. See Baker et al. (2008) for the details of this method	Compiled from..
MtB$^w_{sh,t}$	Difference in the wealth component of market to book ration between source and host country. The wealth component is calculated by regressing the future stock market return on current values of the MtB and calculating the residual. See Baker et al. (2008) for the details of this method	Compiled from..
SHAREHOLDER RIGHTS$_{sh}$	Difference in shareholder rights between the source and host country. Shareholder rights are measured by an anti-directors rights index reflecting (i) the possibility of shareholders to mail their proxy vote, (ii) whether shareholders are required to deposit their shares prior to the General Shareholders Meeting (iii) whether cumulative voting is allowed (iv) an oppressed minorities mechanism exists (5) whether the minimum stake allowing shareholders to call for an extraordinary shareholders meeting is more or less than 10%. Higher values mean more power for shareholders.	Porta et al. (1998)
SWP$_{h,t}$	Skilled wage premium in host host country. Wages of skilled and unskilled labor refer to the hourly salaries of, respectively, department heads and factory workers as paid in the capital city or the financial center of a country. Data are published on a tri-annual basis (1994, 1997, 2000, 2003, 2006, 2009). Values of missing years have been filled with the closest observation.	Braconier et al. (2005), UBS Prices and Earnings (various years).
TRADE FREEDOM$_{h,t}$	Index of freedom of international trade (tariff and non-tariff barriers) on a scale from 10 to 90. For the year 1995 the values for Belgium, Finland, Netherlands and Norway are not available and the values of 1996 have been used. Higher values mean more freedom.	Heritage Foundation.