Determinants of Cross-Border Mergers and Acquisitions

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ABSTRACT

The vast majority of cross-border mergers involve private firms outside of the United States. We analyze a sample of 56,978 cross-border mergers between 1990 and 2007. We find that geography, the quality of accounting disclosure, and bilateral trade increase the likelihood of mergers between two countries. Valuation appears to play a role in motivating mergers: firms in countries whose stock market has increased in value, whose currency has recently appreciated, and that have a relatively high market-to-book value tend to be purchasers, while firms from weaker-performing economies tend to be targets.

THE VOLUME OF CROSS-BORDER acquisitions has been growing worldwide, from 23% of total merger volume in 1998 to 45% in 2007. Conceptually, cross-border mergers occur for the same reasons as domestic ones: two firms will merge when their combination increases value (or utility) from the perception of the acquiring firm's managers. However, national borders add an extra element to the calculus of domestic mergers because they are associated with an additional set of frictions that can impede or facilitate mergers. For example, cultural or geographic differences can increase the costs of combining two firms. Governance-related differences across countries can motivate a merger if the combined firm has better protection for target-firm shareholders because of higher governance standards in the country of the acquiring firm. Perhaps more importantly, imperfect integration of capital markets across countries can lead to a merger in which a higher-valued acquirer purchases a relatively inexpensive target following changes in exchange rates or stock market valuations in local currency.

In this paper, we evaluate the extent to which these international factors influence the decision of firms to merge. Using a sample of 56,978 cross-border mergers occurring between 1990 and 2007, we estimate the factors that affect the likelihood that firms from any pair of countries merge in a particular year.

The analysis focuses on factors that potentially affect cross-border mergers but are not present to the same extent in domestic mergers, such as cultural differences, geographic differences, country-level governance differences, and international tax effects. Of particular interest are differences in valuation, which can vary substantially over time for any pair of countries through fluctuations in exchange rates, stock market movements, and macroeconomic changes.

Our sample reflects the universe of cross-border mergers, the majority of which involve private firms from outside the United States. In our sample, 80% of completed cross-border deals between 1990 and 2007 targeted a non-U.S. firm, and 75% of the acquirers are from outside the United States. Furthermore, the vast majority of cross-border mergers involve private firms as either bidder or target: 96% of the deals involve a private target, 26% involve a private acquirer, and 97% have either a private acquirer or target.

We first document the manner in which international factors affect the cross-sectional pattern of mergers. Geography clearly matters; holding other things constant, the shorter the distance between two countries, the more likely we are to observe acquisitions between the two countries. In addition, mergers are likely to occur between firms of countries that trade more commonly with one another, since they are more likely to have synergies and also a common cultural background. Purchasers are usually, but not always, from developed countries and they tend to purchase firms in countries with lower accounting standards. These findings are consistent with governance arguments, because development and accounting standards are likely to be correlated with better corporate governance. Finally, taxes appear to affect cross-border merger decisions, since acquirers are more likely to be from countries with higher corporate income tax rates than the countries in which targets are located.

We next examine the idea that firms' values change because of both firm-specific and country-specific factors, and these valuation changes are a potential source of mergers. To do so, we first use country-level measures of valuation, since the vast majority of mergers involve at least one private firm, for which firm-specific measures are unavailable. We compare changes in the exchange rate between the acquirer and target countries' currencies prior to the merger, changes in the two countries' stock market valuations, as well as differences the two countries' market-to-book ratios. In univariate comparisons of premerger performance between bidders and targets, acquirers outperform targets by all measures. The exchange rate of the acquirer tends to appreciate relative to that of the target by 1.12%, 2.13%, and 3.43% in the 12, 24, and 36 months before the deal, respectively. Similarly, the country-level stock return of the acquirer in local currency is 0.3% higher during the 12 months, 0.92% higher during the 24 months, and 2.12% higher during the 36 months before the deal occurs. Not surprisingly, given this pattern of stock price movements, the market-to-book ratio of acquirers' countries is 9.93% higher at the time of the deal.

When we restrict the sample to public acquirers and targets to compare firm-level returns, we again find that acquirers outperform targets prior to the acquisitions. The difference in firm-level stock returns in local currency is 10.38%, 19.34%, and 23.36% for the 12, 24, and 36 months prior to the

acquisition, respectively. In addition, the average market-to-book ratio is higher for acquirers than for targets, mirroring prior findings for domestic mergers (see Rhodes-Kropf, Robinson, and Viswanathan (2005)).

In a third set of tests, we estimate multivariate models predicting the number of cross-border deals for particular pairs of countries. Our results suggest that differences in exchange rate returns as well as country-level stock returns in local currency predict the volume of mergers between particular country pairs. In addition, differences in country-level market-to-book ratios affect cross-border merger volume as well. We also examine factors that affect the relation between the intensity of cross-border mergers and valuation differences. One possibility is that these mergers represent a pure financial arbitrage, in which case the incremental effect of valuation on merger likelihoods should be approximately the same regardless of the countries involved. Alternatively, changes in valuation could lead to mergers by incrementally changing the calculus of a merger decision for a potential pairing of firms that makes sense for other reasons.

Our results suggest that there is a strong pattern in the country pairs that are affected by valuation, and that in each case changes in valuation have the largest impact on country pairs for which mergers are more likely for other reasons. Consequently, our results are consistent with the view that changes in valuation affect mergers by making otherwise economically sensible mergers more attractive. Hence cross-border mergers should not be thought of as a pure financial arbitrage. For example, we find that currency movements are important factors affecting mergers, especially when firms are in countries that are geographically close to each other or when the acquiring firm's country is wealthier than that of the target firm. We also find that the relation between differences in country-level stock market performance and mergers is strongest when the acquiring country is wealthier than the target, consistent with the view that firms in wealthier countries purchase foreign firms following a decline in the poorer country's stock market.

There are two potential (not mutually exclusive) explanations for the pre-acquisition stock return differences between acquirer and targets. First, returns can affect the relative wealth of the two countries, leading firms in the wealthier countries to purchase firms in the poorer countries. This pattern could occur either because the increase in wealth lowers the potential acquirer's cost of capital (Froot and Stein (1991)), or because imperfect integration of capital markets means that firms in the poorer country are inexpensive relative to other potential investments for the acquiring firm. Alternatively, as suggested by Shleifer and Vishny (2003), either overpricing of the acquiring firm or underpricing of the target firm could lead to a potentially profitable investment for the acquiring firm. Baker, Foley, and Wurgler (2009) suggest a test to distinguish between the two explanations based on the implication that, following acquisitions due to mispricing, valuations will tend to revert to their true values. We perform a similar test to that in Baker, Foley, and Wurgler (2009) and find that the wealth explanation better explains the relation between valuation differences and cross-border mergers than the mispricing explanation.

Finally, we examine at the deal level whether valuation differences affect the likelihood of cross-border mergers. We find that differences in firm-level stock returns (in a common currency) are associated with a higher likelihood of cross-border deals compared to domestic deals. We further decompose valuation differences between acquiring and target firms into three components: the differences in returns of the two countries' currencies, the differences in local stock market or industry indices, and the differences in firm-level excess returns relative to the market or industry indices. All three of these factors lead to a higher likelihood of a particular merger being cross-border than domestic, although statistical significance varies depending on the specification used. These firm-level results confirm our country-level results, and are consistent with the view that valuation is an important factor that determines merger likelihoods.

The remainder of the paper proceeds as follows. Section I discusses previous literature on cross-country mergers, including relevant papers on foreign direct investment (FDI). Section II describes the data, while Section III presents the results. Section IV concludes.

I. Cross-Border Mergers and Acquisitions

Despite the fact that a large proportion of worldwide merger activity involves firms from different countries, the voluminous literature on mergers focuses primarily on domestic deals between publicly traded firms in the United States. While this literature is also relevant to understanding international mergers, it does not address a number of factors related to country-based differences between firms, such as cultural or geographic variables or factors associated with the economy of the firm's home country. In addition, public U.S. firms are unrepresentative of mergers more generally, since the majority of worldwide mergers involve non-U.S. firms, many of which are private.[1]

A. *Factors that Potentially Affect the Likelihood of Cross-Border Mergers*

National boundaries are likely to be associated with many frictions that determine firm boundaries. In general, mergers occur when the managers of an acquiring firm perceive that the value of the combined firm is greater than the sum of the values of the separate firms.[2] This change in value can occur for a number of reasons. For instance, contracting costs can be lower within than across firms, creating production efficiencies in combining firms. Mergers can also create market power since it is legal for post-merger combined firms

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[1] One recent study using a much more representative sample of mergers than is typical in merger studies is Netter, Stegemoller, and Wintoki (2011), whose primary focus, unlike ours, is on domestic mergers. These authors present evidence suggesting that filters that researchers commonly use in obtaining mergers and acquisitions data lead to samples containing a small subset of the entire mergers universe, usually oversampling larger transactions by publicly held companies.

[2] See Jensen and Ruback (1983), Jarrell, Brickley, and Netter (1988), and Andrade, Mitchell, and Stafford (2001) for surveys of the enormous literature on mergers.

to charge profit-maximizing prices but not for the premerger separate firms to collude to do so collectively. Mergers can further lower the combined tax liability of the two firms if they allow one firm to use tax shields that another firm possesses but cannot use. Finally, agency considerations can lead managers to make value-decreasing acquisitions that nonetheless increase managers' individual utilities. All of these factors are relevant both domestically and internationally.

National borders are also associated with factors that are likely to affect the costs and benefits of a merger. First, countries have their own cultural identities. People in different countries often speak different languages, have different religions, and sometimes have longstanding feuds, all of which increase the contracting costs associated with combining two firms across borders (see Ahern, Daminelli, and Fracassi (2012)). Second, similar to the "gravity" literature in international trade, physical distance can increase the costs of combining two firms (see Rose (2000)). Both cultural differences and geographic distance should therefore decrease the likelihood that, holding other factors constant, two firms in different countries choose to merge. Third, corporate governance considerations can also affect cross-border mergers. If merging can increase the legal protection of minority shareholders in target firms by providing them some of the rights of acquiring firms' shareholders, then value can be created through the acquisition. In general, corporate governance arguments predict that firms in countries that promote governance through better legal or accounting standards will tend to acquire firms in countries with lower-quality governance.[3] The level of market development is another factor that could affect cross-border mergers. In particular, developed-market acquirers are likely to benefit more from weaker contracting environments in emerging markets.[4]

Another potentially important factor in international mergers is valuation. Given that markets in different countries are not perfectly integrated, valuation differences across markets can motivate cross-border mergers. Suppose, for example, that a firm's currency rises for some exogenous reason unrelated to the firm's profitability. This firm would find potential targets in other countries relatively inexpensive, leading some potential acquisitions to be profitable that would not have been profitable under the old exchange rates. We therefore expect to observe more firms from this country to engage in acquisitions, since they will be paying for these acquisitions in an inflated currency.[5]

The logic by which valuation differences can lead to cross-border acquisitions depends on whether participants believe these movements to be temporary or permanent. If the valuation differences are temporary, then cross-border acquisitions effectively arbitrage these differences, leading to expected profits for the

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[3] Rossi and Volpin (2004), Bris and Cabolis (2008), and Bris, Brisley, and Cabolis (2008) provide support for this argument using samples of publicly traded firms.

[4] See Chari, Ouimet, and Tesar (2009) for more discussion and evidence on this point.

[5] A recent example of this phenomenon occurred when the Japanese yen appreciated relative to other major currencies in the summer of 2010, leading Japanese firms to increase their number of cross-border acquisitions substantially (see *The Economist*, August 5, 2010 or *The New York Times*, September 15, 2010, p. B1).

acquirers. Shleifer and Vishny (2003) develop a behavioral model in which firm values deviate from their fundamentals. Managers of an overvalued acquirer consequently have incentives to issue shares at inflated prices to buy assets of an undervalued or at least a less overvalued target. This transaction transfers value to the shareholders of the acquiring firm by arbitraging the price difference between the firms' stock prices. The key component of this model is that the source of the valuation difference is private information owned by managers.[6] While it is implausible that one particular firm's managers have superior information about the valuation of the overall market or any particular currency, Baker, Foley, and Wurgler (2009) argue that cross-border acquisitions could similarly occur because of mispricing of securities from fluctuations in local investors' risk aversion or from irrational expectations about a market's value (each accompanied by limited arbitrage), implying that managers of the target company would be willing to accept payment in a temporarily depreciated currency or overvalued stock.

If the valuation differences are permanent, the attractiveness of acquisitions, especially those that involve targets with cash flows in local currency, would be unaffected by the valuation movements. However, there are a number of channels through which even permanent valuation differences can affect merger propensities. As Kindleberger (1969) originally observes, cross-border acquisitions can occur because, under foreign control, either expected earnings are higher or the cost of capital is lower. For example, if domestic firms produce goods for sale overseas or compete in their domestic market with overseas competitors, then domestic firms' profits potentially increase following permanent currency depreciations, making these firms attractive to potential foreign acquirers. Alternatively, when a foreign firm's value increases relative to that of a domestic one, for example, through unhedged exchange rate changes or stock market fluctuations, its cost of capital declines relative to that of a domestic firm because of a reduction in the magnitude of the information problems it faces in raising capital (see Froot and Stein (1991)). This argument implies that permanent changes in valuation can lead to cross-border mergers because the value changes lead to a lower cost of capital under foreign control, allowing potential foreign acquirers to bid more aggressively for domestic assets than domestic rival bidders. Because this explanation for a relation between currency movements and cross-border mergers is based on asymmetric information, it is likely to be particularly relevant in the case of private targets, for which asymmetric information tends to be high relative to otherwise similar public targets. Overall, we expect to observe cross-border mergers following changes in the relative valuation in two countries, regardless of whether they occur through currency or stock price movements, and regardless of whether they are temporary or permanent.

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[6] A similar argument in which a firm's managers have better information about rational stock movements than other market participants has been proposed by Rhodes-Kropf and Viswanathan (2004). Using a sample of U.S. domestic mergers, Rhodes-Kropf, Robinson, and Viswanathan (2005) provide empirical support for this argument.

B. FDI

A parallel literature to that on cross-border mergers concerns FDI. FDI includes cross-border mergers plus other investments in a particular country (including "green field" investments), as well as retained earnings by foreign subsidiaries and loans from parent companies to their foreign subsidiaries. An alternative to using data on specific acquisitions would be to use data on FDI, which includes mergers. Indeed, in related work, Klein and Rosengren (1994), Dewenter (1995), and Klein, Peek, and Rosengren (2002) use FDI inflows and outflows from the United States to examine whether FDI increases following exchange rate movements.

In this paper, we focus our empirical work on mergers and acquisitions rather than all FDI due to data quality. FDI contains components other than investment such as inter-company loans and retained earnings. In addition, the nonmerger component of FDI is measured differently across countries, making cross-country comparisons problematic. To compile data on FDI, a number of countries use "administrative" data from exchange-control or investment-control authorities' approvals of investment. However, there are often substantial time lags between approval and actual investment, and sometimes an approved investment never actually occurs. In addition, countries differ in their definition of foreign investment capital or income. For example, some use an all-inclusive measure of earnings while others exclude realized or unrealized capital gains or losses as well as exchange rate gains or losses. Finally, the geographic breakdowns of inward and outward FDI flows are not comprehensive. A number of countries do not report a detailed breakdown of FDI flows, limiting the extent to which one can measure bilateral FDI flows.[7]

Krugman (2000) introduces the notion of "Fire-Sale FDI," which captures the extent to which, during a financial crisis, firms from crisis countries are sold to firms from more developed economies at prices lower than fundamental values. Aguiar and Gopinath (2005), Acharya, Shin, and Yorulmazer (2010), and Alquist, Mukherjee, and Tesar (2010) examine FDI in the context of the 1997–1998 East Asian Financial Crisis and document large foreign purchases of East Asian firms during this crisis. Makaew (2010) argues that purchasing relatively cheap assets from countries not performing well is not typical of most cross-border mergers, with most cross-border mergers occurring when both the acquirer and the target are in booming economies. Our paper considers the issue more generally by looking at the extent to which currency and market movements affect the magnitude of cross-border merger activity.[8]

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[7] The discussions on FDI measurement issues are based on the 2001 International Monetary Fund (IMF) report "Foreign Direct Investment Statistics" and the *IMF Balance of Payments Manual*, 5th edition.

[8] Other related work on cross-border mergers and acquisitions includes Ferreira, Massa, and Matos (2009), who find that foreign institutional ownership is positively associated with the intensity of cross-border mergers and acquisitions activity worldwide. This relation could occur for a number of reasons, including foreign ownership facilitating the transfer, foreign ownership being correlated with more professionally managed companies, or foreign owners being more likely to

II. Data

Our merger sample is taken from Security Data Corporation's (SDC) Mergers and Corporate Transactions database and includes deals announced between 1990 and 2007 and completed by the end of 2007. We exclude LBOs, spin-offs, recapitalizations, self-tender offers, exchange offers, repurchases, partial equity stake purchases, acquisitions of remaining interest, and privatizations, as well as deals in which the target or the acquirer is a government agency or in the financial or utilities industry. We further omit deals from countries with incomplete stock market data between 1990 and 2007.[9] After excluding these deals, we end up with a sample of 187,841 mergers covering 48 countries with a total transaction value of $7.54 trillion, 56,978 of which are cross-border mergers with a total transaction value of $2.21 trillion.

We collect a number of data items from SDC, including the announcement and completion dates, the target's name, public status, primary industry measured by the four-digit Standard Industrial Classification code, country of domicile, as well as the acquirer's name, ultimate parents, public status, primary industry, and country of domicile. We collect the deal value in dollar terms when available, the fraction of the target firms owned by the acquirer after the acquisition, as well as other deal characteristics such as the method of payment made by the acquirer.

We acquire monthly firm-level, industry-level, and country-level stock returns both in local currency and in U.S. dollars from Datastream. We also obtain the national exchange rates from WM/Reuters through Datastream, whose quotes are from 4:00 P.M. Greenwich Mean Time. We then calculate nominal exchange rate returns by taking the first difference of the monthly natural logarithm of the national exchange rates. To calculate real stock market returns and real exchange rate returns, we obtain from Datastream the monthly consumer price index (CPI) for each country in each month and convert all nominal returns to the 1990 price level.[10] When calculating real exchange rate returns for the Economic and Monetary Union (EMU) countries, we use the euro and the corresponding CPI for EMU countries after 1999. This approach implies that all EMU countries have the same exchange rate movements in our database after 1999.

We obtain ratings on the quality of accounting disclosure from the 1990 annual report of the Center for International Financial Analysis and Research as well as a newly assembled anti-self dealing index from Djankov, La Porta, Lopez-de-Silanes, and Shleifer (DLLS, 2008). Our culture variables, language

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sell to foreign buyers than local owners. Finally, Coeurdacier, DeSantis, and Aviat (2009) use a database on bilateral cross-border mergers and acquisitions at the sector level (in manufacturing and services) over the period 1985 to 2004, and find that institutional and financial developments, especially the European Integration process, promote cross-border mergers and acquisitions.

[9] This filter on dropping deals from countries without stock market returns excludes 4,061 deals worth cumulatively $145 billion, or 2% of the original sample count.

[10] For Australia and New Zealand, we only have quarterly prices. When extrapolating to monthly prices, we assume that prices are as of the end of the month/quarter.

(English, Spanish, or Others) and religion (Protestant, Catholic, Muslim, Buddhist, or Others), are from Stulz and Williamson (2003). We obtain the latitude and longitude of capital cities of each country from mapsofworld.com and calculate the great circle distance between a country pair.[11] Data on the average corporate income tax rates are from the Organisation for Economic Co-operation and Development (OECD). We obtain annual GDP (in U.S. dollars) normalized by population and the annual real growth rate of GDP from the World Development Indicator. To control for the volume of business between a country pair, we include bilateral trade flows, calculated as the maximum of bilateral imports and exports between the two countries. Bilateral imports (exports) is calculated as the value of imports (exports) by the target country from (to) the acquirer country as a percentage of total imports (exports) by the target country, all of which are from the United Nations Commodity Trade Statistics database (see Ferreira, Massa, and Matos (2009)). Following Bekaert, Harvey, and Lundblad (2005) and Bekaert et al. (2007), we construct an index of the quality of a country's institutions based on the sum of the International Country Risk Guide (ICRG) political risk subcomponents: Corruption, Law and Order, and Bureaucratic Quality. We also use the investment profile subcategory in the ICRG political risk ratings as a measure of the state of a country's investment environment.

For the public firms in our mergers sample, we obtain accounting and ownership information from Worldscope/Datastream. In particular, we use firm size (book value of total assets), book leverage (long-term debt divided by total assets), cash ratio (cash holdings divided by total assets), the 2-year geometric average of sales growth, and return on equity as well as the market-to-book ratio. To calculate country-level market-to-book ratios, we follow Fama and French (1998) and sum the market value of equity for all public firms in a country. We then divide this figure by the sum of all public firms' book values. Details on the definitions of these variables can be found in the Appendix.

III. Results

A. Stylized Facts about Cross-Border Mergers

Mergers involving acquirers and targets from different countries are substantial, both in terms of absolute numbers, and as a fraction of worldwide mergers activity. Figure 1 plots the number (Panel A) and dollar value (Panel B) of cross-border deals over our sample period. Both panels show similar patterns. The volume of cross-border mergers increases throughout the 1990s, declines after the stock market crash of 2000, and then increases again from 2002 until 2007. As a fraction of the total value of worldwide mergers, cross-border mergers typically amount to between 20% and 40%. The fraction of cross-border deals follows the overall level of the stock market: it drops in the early 1990s,

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[11] The standard formula to calculate Great Circle Distance is: 3963.0 * arcos [sin(lat1) * sin(lat2) + cos (lat1) * cos (lat2) * cos (lon2 − lon1)], where lon and lat are the longitudes and latitudes of the capital cities of the acquirer and the target country locations, respectively.

Panel A

Panel B

Figure 1. Total value of cross-border mergers and acquisitions. This figure plots the number (ratio) (Panel A) and the value (ratio) (Panel B) of cross-border deals with deal value larger than $1 million between 1990 and 2007. Bars represent numbers or values in a given year while solid lines represent the fraction of cross-border acquisitions relative to the total number or deal value of all acquisitions in a given year, including domestic ones. All values are in 1990 dollars.

increases in the later 1990s to a peak in 2000, and then increases with the stock market again between 2004 and 2007.

Table I characterizes the pattern of cross-country acquisitions during our sample period. The columns represent the countries of the acquiring companies while the rows represent those of the target companies. The diagonal entries

Table I
Number of Mergers by Country Pair

The columns represent the countries of the acquiring companies while the rows represent those of the target companies. The diagonal entries of the matrix are therefore the number of domestic mergers for a particular country and the off-diagonal entries are the number of deals in a particular country pair. The totals exclude domestic mergers and hence represent the number of cross-border mergers to and from a particular country. Our sample period is from 1990 to 2007.

Destination	AR	AS	AU	BL	BR	CA	CC	CE	CH	CO	CT	CY	DN	FN	FR	GR	HK	HU	ID	IN	IR	IS	IT	JP	LX	MA	MX	NO	NT	NZ	PE	PH	PL	PO	RU	SA	SG	SK	SP	SW	SZ	TH	TK	TW	UK	US	VE	WG	Total
Argentina (AR)	201	1	4	4	30	42	13								57		1	1				6	17	4			16		28	3							54	5			14	1			58	243	4	22	640
Austria (AS)		341		8		19	1						19	7	35		1	43		2	2	7	25	7	8		1	7	25				2		1		5	1	5	19	33				52	84		255	637
Australia (AU)			34,875	7	2	145				1			20	7	62		43				24	6	8	69	2	51	1	10	64	145					58	75	5		5	40	47	2		1	430	812		63	2,238
Belgium (BL)	7			13,494		12							21	12	169		4	1		9	9		8	2	17		9	9	206				1	3		6	1		9	30	18			1	148	197		79	1,022
Brazil (BR)	40	3	14		9,565	48	15			4			14	6	94	3				6		8	41	18	6		19	9	28	3				35	4	5			52	16	22				58	388		60	1,038
Canada (CA)	1	10	59	14	7	6,220	1	8					12	11	112		16	3	11		13	9	19	58	11	4	4	13	54	5	3	1	1		9	1	3		6	34	56		1	4	328	2,516	1	80	3,500
Czech Republic (CC)	31	1	1	9		10	143						14	6	38	1		8			5	6	1	3	3			5	5				8		6				8	16	23				47	77		76	442
Chile (CE)	6		14	1	4	39		101							8						1		4				7	6	10	5	7				4				21	3	1				13	82	1	8	246
China (CH)	1	2	36	14		43			513				9	10	31		2	2	14		9	1	13	53	1	27		6	19	3			2		2	120	34		6	11	10	4			58	301		22	1,091
Colombia (CO)	1		2		3	17		37					1		8						5		1		3		10		1	1	2				2				13		2				6	35	1		121
Croatia (CT)	12					1					26		3		7	5						1	4	1					2				1						1	1	2				8	4		6	59
Cyprus (CY)												37			1	1							1												1				1		1				2	1			14
Denmark (DN)	5			9		9						1	889	39	39		3				3	11	11	8	2		1	94	38					1	1	4			4	198	28				117	173		80	890
Finland (FN)	9	7	7	1		16							69	1,614	34		1				2	22	11	23	4			53	24				7		1	5			11	281	31	1	2		60	147		41	874
France (FR)	1	20	28	236	7	116		4					68	38	4,837		13	2		12	27	13	164	97	28	1	2	22	209				8	35	6	5	2		87	116	154	2			708	970		434	3,610
Greece (GR)						4						6				339		7				7	7		2								1		2					3	5				15	18		9	90
Hong Kong (HK)	28	1	22						42			1	10	4	20	3	348		2		4	4	4	30		73		4	6			2			4	80	8		2	4	7	3		4	67	170		14	614
Hungary (HU)		4		4		3	2					1	2	5	28	3		136			2	2	11	5	5		19	2	42			5			2		2		2	11	14			1	26	69		52	334
Indonesia (ID)			10			15			1				5	2	2		9		98	4		1	16	16	2	19		2	4							24	8		6	2	7	4		1	26	32		7	199
India (IN)	5	24	3			15							6	1	39		8		1	1,764		2	12	16		17		5	10				3		6	11	7		19	5	5	1			101	233		43	637
Ireland-Rep (IR)	1		5	4		8							6		18		2	2			354	1	3	5	1		1	1	10				3		3	3	2		2	5	5	1		1	265	172		15	555
Israel (IS)						10							3		8	1					1	1,160	2	1					3				1		3	1	1		3	3	3				26	171		12	256
Italy (IT)	24	17	23	6		24							24	19	236	1	10	13		10	9	3	1,633	29	16	2	7	98				2	5	5	2				38	60	65	1		9	233	428	1	164	1,585
Japan (JP)	1		1			6							4	2	31	3	12			1	1	3	9	1,633		1	1	7	16	1			1		1	2	1		2	11	8	1		9	46	259		42	488
Luxembourg (LX)		16				6									8							3	3		8				5						1				1	4	2				12	13		14	83
Malaysia (MA)	1		17										2		7		17		2			1		19				1	5	4		1				1	21		2	2	2	4		4	28	43		9	321
Mexico (MX)	2		4	5	6	116	4	1	2	8			6	2	24	4					4		6	7	1	188	1	2	18	3	4				2	2	1		35	10	8	1		1	33	320	1	18	650
Norway (NO)	3	4	5			8							102	55	27		1				2	2	5	3	4		2	1,688	30	1			1	1	9	2			2	193	21			6	103	130		26	739
Netherlands (NT)	16	26	44	95	5	44		2	1				36	27	122	3	9	1	9	1	60		29	39	9	4	2	181	1,512	2			2	2	9	9	3		16	66	47	1	2	3	441	436		228	1,826
New Zealand (NZ)	2	3	302	1		41							4	3	8		5	1	1	2	7		19	19		13		2	14	570			1		6	13	2		5	5	7	3			71	140		6	680
Peru (PE)	1				3	9						1											2				10		2		39				1				5		2				7	30		2	123
Philippines (PH)		10											6				6						3	11		10	2	3	1			115			1	1	12		1	2	2	3			13	32		2	119
Poland (PL)	9	1	11			12	4						26	16	45	3		5			6	12	19	2	13		16	16	39				227	4	2	2	1		13	23	10				57	76		63	497
Portugal (PO)	1	3	5	5		5							8	1	44	1		2			2	2	2	2	2		1	4	2					246	1	1	2		72	12	12				51	40		20	320
Russian Fed (RU)	4		2	7		24	2						9	23	10		3	3			2	2	11	3	9		14		18	1			6		526				4	25	15		3		59	83		30	382
South Africa (SA)		36	2			35						8	7	4	23		2	3		10	3	1	7	11	4	5	2		11	1			6		2	790	3		15	15	15			3	170	113		36	520
Singapore (SG)		28		1		7							7	4	16		35	9	22		60		25	11		98		10	8			7	1		3	614			1	9	7	9		6	42	116		15	492
South Korea (SK)		3	4			10			1				2	3	27		4	5			2	2	10	30		2		1	10				1		6	2	6,631		2	3	8			2	27	107		30	294
Spain (SP)	2	6	8	32	4	27		5					44	8	296	6		3			10	4	121	29	2	1	6	15	133			1	1	60	1	4	1		1,896	60	35				271	287		169	1,659
Sweden (SW)	9	10	14			24							176	198	67		3	8			10	4	11	23	9		182	65					1	2	1				21,558	31				206	288		99	1,463
Switzerland (SZ)	43	9	31			20				1			38	15	122	5		5	1	7	10	15	36	16	6	3	8	49				2	5	4	6			4	45	794				103	261		311	1,180
Thailand (TH)		5	2			2							2		9		10		10				1	1		1		3								2	37			3	2,194		3		22	40		9	232
Turkey (TK)	1	1	6			4						1	2	3	16	5		1		22	2		10				2		9					1	4				3	4	7		40		27	33		27	170
Taiwan (TW)		4				5												11						13				1					1				21	5		4	4	1	72	130	10	82		10	181
United Kingdom (U.K.)	29	177	392	91		305		3	1		2	4	158	66	485	17	60	2	2	2	410	20	92	173	21	21	2	89	313	14	1	1	2	1	8	10	86	42	43	206	126	7	2	515,196	3,122	443	6,753
United States (U.S.)	10	36	392	121	35	2,752	1	8	34	6		1	128	130	719	28	95	8	10	110	316	169	146	827	28	24	73	86	453	28		5	5	21	75	104	54		91	351	358	9	5	68	3,073	66,948	5	817	11,886
Venezuela (VE)	1		4			22							2	3	11						5		5				5		5										7		5		1		8	49	16	9	122
Germany (WG)		42	105	6		80	5	2	5		1		124	134	454		20	20		3	38	16	128	111	40	8	5	42	443	1		10	6	3	5	18	11	11	37	194	375	1	5	3	724	1,611		15,771	5,106
Total	234	66	557	1,360	919	133	4,236	19	60	112	16	12	23	1,199	124	134	866	3,634	150	633	40	454	73	1,044	324	1,027	1,874	242	416	160	758	2,588	226	7	51	41	142	90	333	729	171	675	2,127	1,686	54	29	145	153,969	56,978

of the matrix are thus the number of domestic mergers for a particular country while the off-diagonal entries are the number of deals involving firms from a particular country pair. The totals reported in the bottom row and the right column exclude domestic mergers and hence represent the number of cross-border mergers to and from a particular country. The country with the largest number of acquisitions is the United States: U.S. firms were acquirers in 15,034 cross-border mergers and were targets in 11,886 cross-border mergers. These numbers are substantial but do not represent the majority of the 56,978 cross-border mergers.

A casual glance at Table I indicates that geography clearly matters. For every country, domestic mergers outnumber deals with any other country. Of the cross-border mergers, there is a large tendency to purchase companies in nearby countries. For example, of the 226 cross-border acquisitions by New Zealand companies, about two thirds (145) were of Australian companies. Similarly, the main target of Hong Kong–based companies was China (214 of the 633 cross-border acquisitions of Hong Kong companies), and, aside from the United States, the vast majority of German cross-border acquisitions were from other European companies.

B. Cross-Sectional Determinants of Cross-Border Mergers

To analyze the cross-sectional patterns among acquirers and targets more formally, we use a multivariate regression framework. Our goal is to measure the factors affecting the propensity of firms from one country to acquire firms from another country. Our dependent variable measures the proportion of cross-border mergers for a particular country pair over the entire sample period. For each ordered country pair, the fraction is determined by a numerator equal to the number of cross-border acquisitions of firms in a target country by firms in an acquirer country, normalized by the sum of the number of domestic acquisitions in the target country and the numerator, so that the fraction is bounded above by one. Including domestic deals in the denominator allows us to implicitly control for factors that can influence the volume of both domestic deals and cross-border deals.[12]

We estimate equations explaining the above variable as a function of country characteristics. Since each observation is a "country pair" and we have 37 countries, the total number of potential observations is 1,332 (37 × 36).[13] However, we impose the requirement that a country pair have at least one deal during the sample period, which reduces the total number of observations to 1,036.[14] We next break down the full sample into four subsamples based on

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[12] This approach follows Rossi and Volpin (2004) and Ferreira, Massa, and Matos (2009). Note that the pairs are ordered, so that, for example, there would be a U.S.–Canada observation as well as a Canada–U.S. dummy variable.

[13] The number of countries decreases to 37 when we eliminate countries with incomplete data on GDP or bilateral trade.

[14] We also estimate our equations without this requirement, and with stricter requirements that each country-pair must have at least 5 or 10 cross-border deals during the sample period. The results from these alternative specifications are similar to those presented here.

whether the target and acquirer are private or publicly traded. We include the average 12-month stock return difference of the country indices measured in local currency over the sample period for each country pair (*Average Market R12*), as well as the average real exchange rate return difference between the two countries' currencies over the sample period (*Average Currency R12*) because changes in relative valuation likely lead to acquisitions. We also include average difference in market-to-book ratio at the country level over our sample period (*Average MTB*). Further, because regulatory and legal differences between countries potentially affect cross-border acquisitions (Rossi and Volpin (2004)), we include as independent variables the difference in the index on the quality of their disclosure of accounting information (*Disclosure Quality*) as well as the difference in a newly assembled anti-self dealing index (*Legal*) taken from DLLS (2008). To capture the regional effect discussed above, we also include great circle distance between the capital cities of two countries (*Geographic Proximity*).

Since a common culture potentially makes mergers more likely, we additionally include a dummy variable set equal to one if the target and acquirer share a primary religion (*Same Religion*), and a second dummy variable set equal to one if they share a primary language (*Same Language*). Moreover, because of the possibility that international tax differences could motivate cross-border mergers, we also include the average difference in corporate income tax rates between acquirer and target countries in 1990 (*Income Tax*).

To control for the volume of business between the two countries, we use a measure of bilateral trade flows, namely, the maximum of bilateral imports and exports, between the two countries (*Max* (*Import, Export*)). The value of bilateral imports is calculated as the value of imports by the target firm's country from the acquirer firm's country as a fraction of total imports by the target firm's country, and the value of bilateral exports is defined similarly. To control for changes in macroeconomic conditions over our sample period, we also include the difference between the countries' log of GDP in 1990 U.S. dollars normalized by population, as well as the average annual real growth rate of GDP from 1990 to 2007. Finally, each regression includes acquirer-country fixed effects.[15]

Table II contains estimates of this equation. Columns 1 to 6 include all deals, and Columns 7 to 10 restrict the sample to four subsamples based on whether the target and the acquirer are private or public firms. A number of patterns characterizing the identity of acquirers and targets emerge. First, there is a currency effect; firms from countries whose currencies appreciated over the sample period are more likely to be purchasers of firms whose currency depreciated. This effect holds in all subsamples except when a private firm is

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[15] To control for the possible effect of country-specific histories and relationships on merger decisions, we also estimate specifications using a variable constructed by Guiso, Sapienza, and Zingales (2009) that measures the average level of trust that citizens from each country have toward citizens of the country pair (see also Ahearn, Daminelli, and Fracassi (2012)). The results including this variable are similar to those reported below and are included in the Internet Appendix (which can be found at http://www.afajof.org/supplements.asp).

Table II

Cross-Sectional Analysis of the Determinants of Cross-Border Mergers and Acquisitions

This table presents estimates of cross-sectional regressions of cross-border mergers and acquisitions country pairs. The dependent variable is the total number of cross-border deals between 1990 and 2007 (X_{ij}) in which the target is from country i and the acquirer is from country j (where $i \neq j$), scaled by sum of the number of domestic deals in target country i (X_{ii}) and the number of cross-border deals between country i and country j (X_{ij}). Columns 1 through 6 examine the entire sample of cross-border deals. Columns 7 through 10 examine subsamples of deals, in which various combinations of public status of the parties are selected and then aggregated to the country level. Refer to the Appendix for the variable definitions. Acquirer country fixed effects are included in all regressions. Heteroskedasticity-corrected t-statistics are in parentheses. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

| | All Target-All Acquirer | | | | | | Private Target-Private Acquirer | Private Target-Public Acquirer | Public Target-Private Acquirer | Public Target-Public Acquirer |
	1	2	3	4	5	6	7	8	9	10
Average (Currency R12)$_{j-i}$	0.168***					0.156***	0.091***	0.264***	0.055	0.255**
	(6.14)					(5.05)	(3.72)	(4.70)	(1.34)	(2.49)
Average (Market R12)$_{j-i}$	−0.150**					−0.123*	−0.099*	0.090	0.024	−0.202
	(−2.30)					(−1.65)	(−1.71)	(0.62)	(0.22)	(−1.54)
Average (Market MTB)$_{j-i}$		0.026***								
		(4.95)								
(Disclosure Quality)$_{j-i}$			0.015***			0.013***	0.004*	0.028***	0.000	0.030***
			(6.09)			(5.06)	(1.81)	(7.14)	(0.09)	(3.60)
(Legal)$_{j-i}$			−0.015			−0.198**	−0.091	−0.198	0.067	−0.476**
			(−0.18)			(−2.22)	(−1.13)	(−1.41)	(0.52)	(−2.33)
Same Language				0.015		0.012	0.009	0.027	0.014	0.032
				(1.35)		(1.07)	(1.05)	(1.30)	(1.04)	(1.09)
Same Religion				−0.008*		0.000	−0.003	0.003	0.014*	0.007
				(−1.83)		(0.12)	(−0.98)	(0.49)	(1.88)	(0.88)
Geographic Proximity				0.005***		0.004***	0.002***	0.007***	0.001	0.005***
				(6.12)		(4.83)	(3.36)	(5.16)	(1.42)	(3.11)
(Income Tax)$_{j-i}$					0.001**					
					(2.26)					
Max (Import, Export)	0.364***	0.353***	0.305***	0.276***	0.327***	0.257***	0.216***	0.254**	0.136**	0.288***
	(4.38)	(4.35)	(4.28)	(3.28)	(3.50)	(3.25)	(3.29)	(2.53)	(2.06)	(2.89)
(log GDP per capita)$_{j-i}$	0.004	0.004	0.004**	0.006**	0.036***	−0.003	0.001	−0.005	−0.002	−0.007
	(1.59)	(1.59)	(2.13)	(2.45)	(3.38)	(−1.20)	(0.36)	(−1.22)	(−0.51)	(−1.36)
(GDP Growth)$_{j-i}$	−0.003*	−0.003*	−0.001	−0.003*	0.002	0.000	−0.001	0.002	−0.002	0.001
	(−1.85)	(−1.85)	(−0.59)	(−1.82)	(0.68)	(0.04)	(−0.96)	(0.77)	(−0.63)	(0.26)
Constant	0.024***	0.024***	0.021***	0.049***	0.028***	0.038***	0.022***	0.072***	0.016**	0.042***
	(6.96)	(6.96)	(6.98)	(7.86)	(5.65)	(6.50)	(4.38)	(8.33)	(2.53)	(3.95)
Observations	1036	1023	893	1036	319	893	893	893	893	881
R^2	0.46	0.46	0.56	0.46	0.62	0.60	0.46	0.57	0.18	0.33

acquiring a public firm, in which case the coefficient is positive but not significant. The coefficient on the average stock market return difference is negative and significant but this effect seems to be driven only by private target-private acquirer pairs. However, the average country-level market-to-book ratio has a significantly positive coefficient. Second, consistent with Rossi and Volpin (2004), a higher quality accounting disclosure system increases the likelihood that firms from the given country will be purchasers of firms from another country. This effect appears to be driven by deals with public acquirers, which are most affected by disclosure requirements (see Columns 7 to 10).[16] Third, the regional effect discussed above is evident; holding other things constant, a shorter distance between two countries decreases the likelihood of the acquisitions between firms in these countries.[17] Finally, larger differences in corporate income tax rates attract foreign investment. There is no evidence that sharing a common language or religion has any impact on merger propensities once other factors are taken into account. (See Ahern, Daminelli, and Fracassi (2010) for more analysis of this issue.)

C. Differences in Valuation Using Country-Level Panel Data: Univariate Evidence

To understand the role of valuation differences in motivating cross-border mergers, we present data on measures of acquirer and target firms' valuations. As measures of valuation, we focus on differences in real exchange rate returns, differences in real stock returns in local currency, and differences in market-to-book ratios prior to the acquisition. Because only a small minority of the deals in our sample contains both acquirers and targets that are publicly traded, we present these measures both at the country and at the firm levels.

We first calculate these return differences for the entire sample of cross-border mergers.[18] For both the recent change in valuation (local stock market returns and exchange rate return) and the level of valuation (market-to-book ratio), acquirers are more highly valued than targets. The exchange rate of acquiring companies appreciates relative to that of target companies, by 1.12% in the year prior to the acquisition, by 2.13% in the 2-year period prior to the acquisition and by 3.43% in the 3-year period prior to the acquisition. In addition, the average local stock market returns are higher for acquiring firm countries than target firm countries, by 0.3% in the year prior to the merger,

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[16] A potential concern with the quality of accounting disclosure effect is that it might be an "emerging markets" effect in that disclosure quality could proxy for the level of economic development. To address this possibility, we examine whether the accounting disclosure effect exists within subsamples of developed and emerging country targets (see the Internet Appendix). The results suggest that disclosure quality matters in each subsample, though with a larger magnitude when the target is from an emerging market.

[17] This result parallels those from a growing literature on the effect of geography in domestic acquisitions. For example, Kedia, Panchapagesan, and Uysal (2008) find that, in domestic acquisitions, acquirers experience higher returns when they are geographically closer to targets, potentially due to better information sharing between firms that are closer to one another.
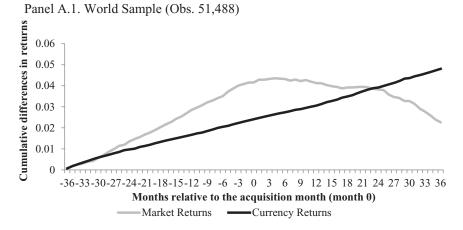
[18] We present detailed statistics on the valuation differences between targets and acquirers in the Internet Appendix.
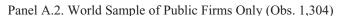
by 0.92% in the 2-year period prior to the merger, and by 2.12% in the 3-year period prior to the merger. Finally, the market-to-book ratio averages almost 10% higher for acquiring countries than for target countries. All of these results are consistent with the view that firms acquire other firms when the acquiring firm is valued highly relative to the target firm.

For the subsample of mergers for which the acquirers and targets are each publicly traded and hence have firm-level stock returns, acquirers substantially outperform targets prior to the acquisitions. The differences are much larger than the country-level differences, about 10% in the year prior to the acquisition, 19% in the 2-year period prior to the acquisition, and 23% in the 3-year period prior to the acquisition. This relation is again consistent with the valuation arguments and is similar to what others find for domestic acquisitions (see Rhodes-Kropf, Robinson, and Viswanathan (2005), Dong et al. (2006), and Harford (2005)).

This pattern can be clearly seen in Panel A of Figure 2. Prior to the month of the acquisition, differences in both the local currency stock returns and exchange rate returns are positive, meaning that the stock market of the acquirer's country outperformed that of the target country, and the acquirer's currency appreciated relative to the target's during the 3 years prior to the acquisition. Subsequent to the acquisition, however, the stock return difference disappears, implying that the target country's stock market outperforms the acquirer's during the 3 years subsequent to the acquisition. Nonetheless, the acquirer's currency continues to appreciate, leaving the common-currency returns in the two countries' stock markets approximately the same following the acquisitions. The post-acquisition appreciation of the acquirer's currency relative to the target's probably reflects the composition of acquirers and targets; acquirers are more likely than targets to be from developed economies, and over the sample period developed economies' currencies tended to appreciate relative to those of developing countries. This pattern emphasizes the importance of controlling for country-pair effects econometrically when estimating the determinants of cross-border merger propensities (as we do below).

We also break down the sample by whether the acquirer and target are from developing or developed countries, using the World Bank definition of "high income" economies. The pre-acquisition local return differences are positive for each category, although they are substantially larger when a developed acquirer buys a developing target (12.79% difference in pre-acquisition returns) than when a developing acquirer buys a developed target (9.54% difference). However, the currency movements prior to the deal go in opposite directions for these two categories. When a developing acquirer buys a developed target the acquirer's currency actually depreciates prior to the acquisition (−23.32% pre-acquisition exchange rate difference). On the other hand, when a developed acquirer buys a developing target, it generally follows a period of strong relative appreciation (34.22% difference). This pattern, which can be seen in Panel B of Figure 2, likely reflects a general appreciation of currencies in developed countries relative to developing countries over our sample period and emphasizes the importance of controlling for these effects econometrically.

Panel A.1. World Sample (Obs. 51,488)

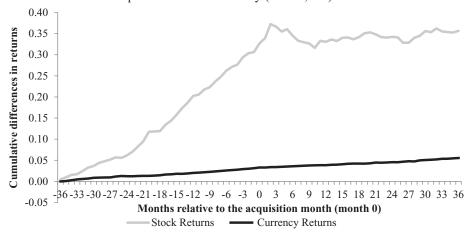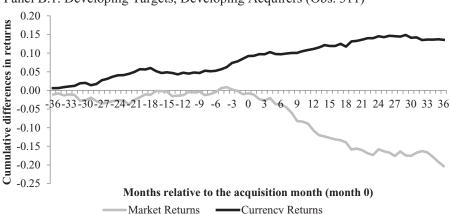Panel A.2. World Sample of Public Firms Only (Obs. 1,304)

Figure 2. Cumulative geometric differences in the real stock return in local currency and real exchange rate return between the target and the acquirer. The horizontal axis denotes the months relative to the acquisition month (month 0). Panel A.1 depicts the world sample; Panel A.2 depicts the world sample with public firms only. Panel B uses world subsamples; Panel B.1 uses acquirers and targets from developing countries, Panel B.2 uses the sample of developing targets and developed acquirers, Panel B.3 uses the sample of developed targets and developing acquirers, and Panel B.4 uses the sample of acquirers and targets from developed countries.

D. Differences in Valuation Using Country-Level Panel Data: Multivariate Evidence

To evaluate the hypothesis that relative valuation can affect merger propensities formally, we rely on a multivariate framework that controls for other potentially relevant factors. It is not obvious, however, what the most natural approach is to address this question. One possibility is to use deal-level

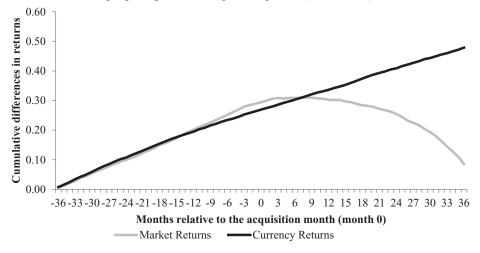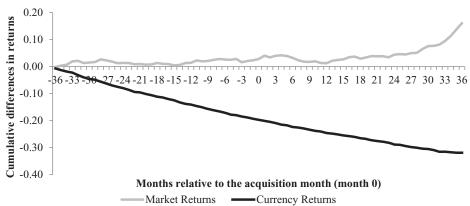Panel B.1. Developing Targets, Developing Acquirers (Obs. 311)

Months relative to the acquisition month (month 0)

——Market Returns   ——Currency Returns

Panel B.2. Developing Targets, Developed Acquirers (Obs. 3,853)

Months relative to the acquisition month (month 0)

——Market Returns   ——Currency Returns

Figure 2. Continued

data on the acquirer's and target's market valuations. This approach has the advantage of using the most accurate measure of firm values in the comparison. However, it has the disadvantage of only being usable for the subsample of public acquirers and public targets. As discussed above, the vast majority of cross-border acquisitions have either private acquirers or targets (or both), so using deal-level data necessitates discarding the vast majority of the sample. An alternative approach relies on country-level data. This approach has the disadvantage of ignoring firm-level information (where available) but has the advantage of being able to use the entire sample of deals. In addition, a number of hypotheses of interest, in particular those concerning currency movements and country-level stock market movements, are testable using country-level data.

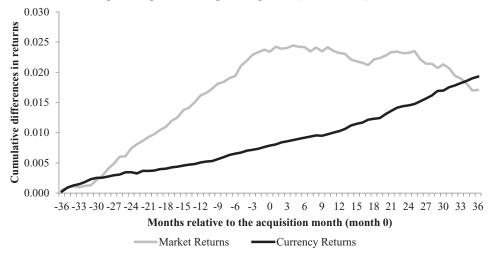Panel B.3. Developed Targets, Developing Acquirers (Obs. 1,056)

Panel B.4. Developed Targets, Developed Acquirers (Obs. 46,288)

Figure 2. Continued

Since each approach has both advantages and disadvantages, we use both. We first estimate equations using the entire sample of deals using country-level data on market indices, valuation levels, and exchange rates. We then estimate equations with deal-level data on the smaller sample of deals involving public acquirers and targets.

We estimate a specification in which the dependent variable is the number of deals between an ordered country pair, normalized by the sum of the total number of domestic deals in the target country and the number of cross-border deals between these countries in a given year. Our sample consists of country pairs with one observation per year for each pair, for a total of 14,200 observations. To control for the cross-sectional factors discussed above as well

as long-term trends in currency movements that affect merger propensities (Table II), we include country-pair fixed effects. This specification allows us to exploit time-series variation in relative valuations while controlling for cross-country differences.

We report these estimates in Table III. The currency and stock return differences are measured over the 12 months prior to the year in question, so that (*Currency R12*)$_{j-i}$ is the difference in the past 12-month real exchange rate return between the acquirer country (indexed by j) and the target country (indexed by i), (*Market R12*)$_{j-i}$ is the difference in the past 12-month real stock market return in the local currency between acquirer and target countries, and (*Market MTB*)$_{j-i}$ is the difference in the country-level value-weighted market-to-book ratios between acquirer and target countries.[19] All equations also include the volume of bilateral trade between the two countries, defined as the maximum of imports and exports, the difference in the ICRG measures of institution quality and investment profiles, the difference in log GDP, the difference in GDP growth rate between the two countries, as well as year and country-pair dummies. In all equations, standard errors are calculated correcting for clustering of observations at the country-pair level.

Columns 1 and 2 present estimates including all deals while Columns 3 to 10 report estimates for subsamples based on whether deals involve a private or public acquirer and target.[20] The coefficients on currency return differences are positive and statistically significantly different from zero in each equation, except those estimated on the public target–private acquirer subsample. Similarly, the stock return differences have a positive and statistically significant coefficient in all equations except for those estimated on public targets. Finally, the coefficients on the market-to-book differences are also positive and statistically significantly different from zero in all equations except the one estimated on the public target−public acquirer subsample. These positive coefficients on the valuation differences imply that, when valuations are higher in one country than another, the expected number of acquisitions by the first country's firms of the second country's firms increases. The larger effect for private targets than for public targets is consistent with the Froot and Stein (1991) arguments, since asymmetric information about the target's true value is likely to be higher when the target is private.

D.1. For Which Country Pairs Is the Valuation Effect Larger?

Given the relation between valuation differences and merger likelihoods, an important issue is the extent to which this pattern varies across country pairs.

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[19] We estimate these equations on U.S. and non-U.S. subsamples. The results are similar to those reported in Table III and are included in the Internet Appendix.

[20] In each equation, we restrict the sample to those country pairs with at least one merger for the sample used to estimate that equation at some point during the sample period. We estimate these equations using samples including only those country pairs with at least 10 mergers over the entire sample. The results are similar to those reported in Table III and are included in the Internet Appendix.

Table III

Panel Analysis of the Determinants of Cross-Border Mergers and Acquisitions

This table presents estimates of panel regressions of cross-border mergers and acquisitions country pairs. The dependent variable is the number of cross-border deals in year t (X_{ijt}) in which the target is from country i and the acquirer is from country j (where $i \neq j$) scaled by sum of the number of domestic deals in target country i (X_{iit}) and the number of the cross-border deals involving target country i and acquirer j (X_{ijt}). Columns 1 and 2 examine the entire sample of cross-border deals. Columns 3 through 10 examine subsamples of deals in which various combinations of public status of the parties are selected and then aggregated to the country level. Refer to the Appendix for variable definitions. Country pair and year fixed effects are included in all regressions. Standard errors are corrected for clustering of observations at the country pair level and associated t-statistics are in parentheses. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	All		Private Target–Private Acquirer		Private Target–Public Acquirer		Public Target–Private Acquirer		Public Target–Public Acquirer	
	1	2	3	4	5	6	7	8	9	10
(Market R12)$_{j-i}$	0.011***		0.009**		0.018***		−0.005		0.004	
	(3.42)		(2.37)		(4.39)		(−0.94)		(0.72)	
(Currency R12)$_{j-i}$	0.032***		0.029***		0.033***		0.004		0.027*	
	(3.43)		(2.72)		(3.33)		(0.33)		(1.81)	
(Market MTB)$_{j-i}$		0.004***		0.004***		0.004***		0.004*		0.004
		(4.12)		(3.37)		(2.93)		(1.76)		(1.49)
Max (Import, Export)	0.184**	0.160**	0.042	0.014	0.308***	0.294***	0.036	0.003	0.068	0.078
	(2.56)	(2.48)	(0.68)	(0.20)	(2.96)	(2.95)	(0.24)	(0.02)	(0.72)	(0.83)
(log GDP per capita)$_{j-i}$	0.043***	0.021*	0.021**	0.011	0.056***	0.041***	0.004	−0.004	0.023	0.018
	(3.55)	(1.95)	(2.16)	(1.09)	(3.62)	(2.66)	(0.24)	(−0.29)	(0.91)	(0.64)
(GDP Growth)$_{j-i}$	0.003	0.058*	0.003	0.030	0.045	0.114**	0.020	−0.001	0.040	0.035
	(0.08)	(1.88)	(0.10)	(0.99)	(0.82)	(2.25)	(0.37)	(−0.01)	(0.73)	(0.64)
(Quality of Institution)$_{j-i}$	−0.001	−0.001	−0.001	−0.001	−0.002*	−0.002**	−0.001	−0.001	0.002	0.002
	(−1.00)	(−1.20)	(−1.38)	(−1.14)	(−1.67)	(−1.97)	(−0.95)	(−0.84)	(1.37)	(1.17)
(Investment Profile)$_{j-i}$	−0.000	−0.000	−0.000	−0.001	−0.000	−0.000	0.002	0.001	−0.002	−0.002
	(−0.22)	(−0.63)	(−0.39)	(−0.72)	(−0.20)	(−0.44)	(1.62)	(0.89)	(−1.42)	(−1.51)
Constant	0.076***	0.034***	0.051***	0.027***	0.081***	0.053***	0.006	0.017	0.036***	0.030**
	(7.66)	(6.35)	(5.58)	(4.82)	(7.27)	(7.02)	(0.42)	(1.64)	(3.10)	(2.27)
Observations	14,857	14,715	14,340	14,193	14,332	14,177	7,234	7,166	8,042	7,939
R^2	0.496	0.512	0.339	0.344	0.552	0.549	0.296	0.301	0.348	0.353

If these mergers represent a pure financial arbitrage, the incremental valuation effect should be approximately the same regardless of countries involved. Alternatively, changes in valuation could incrementally change the desirability of a merger for a potential pair of firms that have other reasons to merge. In this case, we expect changes in valuation to have the largest impact for country pairs in which we observe substantial numbers of mergers.

To consider these explanations for the relation between valuation and merger activity, we reestimate the equations from Table III for subsamples of country pairs that are more or less likely to be associated with mergers. In particular, we consider whether the relation between valuation differences and merger likelihoods is stronger in country pairs where acquiring countries are wealthier than the targets and the countries are relatively close to each other. We also consider whether capital account openness affects the importance of valuation in merger decisions, since shareholders cannot invest in the target country directly when capital account constraints exist.

We present these estimates in Table IV. The estimates reported in Columns 1 to 2 indicate that both the stock and currency return differences have a larger impact on country pairs in which the acquiring country is wealthier than the target country. In addition, the estimates in Columns 3 to 4 of Table IV indicate that the currency effect is larger for country pairs for which the distance between them is closer than the sample median. Finally, the results reported in Columns 5 to 6 of Table IV imply that the effect of the valuation differences in country-level stock returns is strongest when the target country's capital account openness and hence financial liberalization is low. These results suggest that there is a strong pattern in the country pairs that are affected by valuation, and that, in each case, changes in valuation have the largest impact on country pairs for which mergers are more likely for other reasons. Consequently, the results are consistent with the view that changes in valuation affect mergers by making otherwise economically sensible mergers more attractive, and hence they should not be thought of as a pure financial arbitrage.

D.2. How Large Is the Valuation Effect on Merger Propensities?

The estimated coefficients reported in Column 1 of Table III imply that a one-standard-deviation increase in the real exchange rate change for a given country pair (17%) is associated with a 12% increase in the expected number of cross-border acquisitions of firms in countries with a relatively depreciated currency.[21] Similarly, a one-standard-deviation increase in the country-level stock return difference for a given country pair (27%) is expected to lead to a 6.4% increase in the number of acquisitions by the better-performing country's

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[21] The average ratio of cross-border merger to domestic mergers for a given country pair in a given year is 0.0461. Given the coefficient of the country-level 12-month real exchange rate return difference between the target country and the acquirer country from Column 1 of Table III (0.032), the percentage change in the ratio for an average country pair for a one-standard-deviation increase in exchange rate returns equals (0.032*17%)/0.0461 = 12%.

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Table IV

Panel Analysis of the Effect of Valuation Differences on Cross-Border Mergers and Acquisitions: Interactions with Economic Development, Distance, and Capital Account Openness

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This table presents estimates of panel regressions of cross-border mergers and acquisitions. The dependent variable is the number of cross-border deals in year t (X_{ijt}) in which the target is from country i and the acquirer is from country j (where $i \neq j$) scaled by sum of the number of domestic deals in target country i (X_{iit}) and the number of the cross-border deals involving target country i and acquirer j (X_{ijt}). Columns 1 and 2 present the interaction of valuation differences with the relative wealth of acquiring versus target country. The indicator variable equals one if the GDP of the acquirer country is larger than the GDP of the target country. Columns 3 and 4 present the interaction of valuation results with the geographic distance between target and acquiring country. The indicator variable takes on a value of one if the distance between the capitals of the target and acquirer countries is below the median (4,272 miles). Columns 5 and 6 present the interaction of valuation differences with the target country's capital account openness (Quinn (1997)). The indicator variable is one if the capital account openness measure (Quinn (1997)) is below the median (0.68). Refer to the Appendix for variable definitions. Country pair and year fixed effects are included in all regressions. Standard errors are corrected for clustering of observations at the country-pair level and associated t-statistics are in parentheses. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	GDP (acquirer) > GDP (target)		Below-Median Distance		Below-Median Capital Account Openness	
	1	2	3	4	5	6
(Currency R12)$_{j-i}$	0.002		0.018*		0.017***	
	(0.41)		(1.85)		(3.08)	
(Market R12)$_{j-i}$	0.003		0.013***		0.003	
	(1.32)		(3.03)		(1.18)	
(Market MTB)$_{j-i}$		−0.000		0.004***		0.002***
		(−0.01)		(3.05)		(2.75)
(Currency R12)$_{j-i}$ × Indicator	0.052***		0.037*		0.026	
	(3.24)		(1.76)		(1.48)	
(Market R12)$_{j-i}$ × Indicator	0.014**		−0.005		0.018***	
	(2.51)		(−0.81)		(2.60)	
(Market MTB)$_{j-i}$ × Indicator		0.008***		0.001		0.004**
		(4.25)		(0.31)		(1.99)
Max (Import, Export)	0.178**	0.154**	0.184**	0.160**	0.179**	0.159**
	(2.48)	(2.39)	(2.57)	(2.48)	(2.51)	(2.45)
(log GDP per capita)$_{j-i}$	0.042***	0.021*	0.042***	0.021**	0.042***	0.021*
	(3.50)	(1.95)	(3.50)	(1.96)	(3.45)	(1.95)
(GDP Growth)$_{j-i}$	0.003	0.056*	−0.001	0.059*	0.000	0.059*
	(0.09)	(1.83)	(−0.03)	(1.87)	(0.01)	(1.90)
(Quality of Institution)$_{j-i}$	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	(−1.02)	(−1.18)	(−1.00)	(−1.20)	(−0.97)	(−1.16)
(Investment Profile)$_{j-i}$	−0.000	−0.000	−0.000	−0.000	−0.000	−0.001
	(−0.24)	(−0.60)	(−0.12)	(−0.61)	(−0.27)	(−0.66)
Constant	0.076***	0.034***	0.076***	0.034***	0.076***	0.035***
	(7.69)	(6.38)	(7.67)	(6.35)	(7.69)	(6.43)
Observations	14,857	14,715	14,857	14,715	14,857	14,715
R^2	0.497	0.512	0.496	0.512	0.497	0.512

firms of the worse performing country's firms.[22] Finally, the estimates imply that a one-standard-deviation increase in the market-to-book difference for a

[22] The average ratio of cross-border mergers to domestic mergers for a given country pair in a given year is 0.0461. Given the coefficient of the country-level 12-month real stock return difference in Column 1 of Table III (0.011), the percentage change in the ratio for a one-standard-deviation increase in stock return differences equals (0.011*27%)/0.0461 = 6.4%.

given country pair (0.72) is associated with a 6.4% increase in the expected volume of cross-border mergers.

However, the quantitative importance of the impact of valuation on merger propensities implied from the estimates presented in Table III varies substantially depending on the characteristics of the country pair. For a pair of countries in which the acquiring country is wealthier than the target country and the countries are located closer to the median distance to one another, a one-standard-deviation increase in the exchange rate (17%) leads to a 36% increase in the expected ratio of cross-border mergers to domestic mergers between the two countries. In contrast, for a country pair in which the acquirer country is poorer than the target country and the countries are located relatively far away, the effect is much smaller. A one-standard-deviation increase in the exchange rate (17%) leads to only a 5.9% increase in the expected ratio of cross-border mergers to domestic mergers between the two countries. These calculations indicate that, while valuation differences can be important drivers of mergers in situations where there are other reasons for firms to merge, they are not as important in situations in which a valuation difference is the only reason for the merger.

Another way to evaluate the importance of valuation on merger propensities is to reestimate the equations in Table III for the subsample of country pairs for which there are large currency movements in the sample. If currency movements do indeed drive cross-border mergers, we should observe these types of mergers predominately among country pairs in which there are substantial currency movements. To examine this idea, we reestimate Table III on subsamples of country pairs based on the average exchange rate movement between these countries. The Internet Appendix presents these results, first using the subsample for which the exchange rate return differential is in the top three quartiles of the sample, followed by the top two quartiles, the top quartile, the top 90th percentile, and finally the top 95th percentile.[23] The coefficient on exchange rate returns increases substantially from 0.03 for those country pairs whose exchange rate differential is in the top three quartiles to 0.593 for those country pairs in the top 95th percentile. For the country pairs whose exchange rate differential is in the top 90th percentile, the estimates imply that a one-standard-deviation increase in the exchange rate (16%) leads to a 64% increase in the expected ratio of cross-border mergers to domestic mergers between the two countries. These results strongly suggest that the magnitude of the currency effect varies substantially across country pairs and is economically important for country pairs in which mergers tend to occur even in the absence of currency motives, and also for those pairs of countries that tend to experience the largest currency movements.

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[23] An Internet Appendix for this article is available online in the "Supplements and Datasets" section at http://www.afajof.org/supplements.asp.

E. Differences in Valuation Using Country-Level Panel Data: Alternative Specifications

To perform the analyses presented above, we had to make a number of choices about the sample and specification. Table V contains estimates of equations similar to those reported in Tables III and IV to examine the robustness of the results to alternative specifications.

The sample used to estimate the equations in Tables III includes only those deals that lead to majority (larger than 50%) ownership by the acquiring firm. An important issue is the extent to which the results hold in cases in which an acquirer purchases a large minority stake (5% to 49%), and whether the results for majority (50% to 99%) acquisitions are different from the results for 100% acquisitions. In Columns 1, 2, and 3 of Table V, we provide estimates of the equation reported in Table III for deals that lead to minority-block ownership (5% to 49%), for majority acquisitions (50% to 99%), and for 100% acquisitions. The coefficient on the currency return difference between the acquirer and target countries is positive in all three columns and is statistically significant at the 1% level, while the coefficient on the country-level stock return difference is statistically significant in Columns 2 and 3. These results suggest that the valuation effect appears to be robust regardless of the fraction of stock purchased by the acquirer.

In Column 4 of Table V, we reestimate our equation using the value instead of the number of mergers in a particular country pair to construct our dependent variable. Using this specification, the coefficient on currency returns as well as that on stock market returns are small and insignificantly different from zero. This finding suggests that the valuation effects are more important for smaller firms that do not have a large impact on value-weighted dependent variables. In addition, there are a substantial number of observations for which the value of the deal is missing (59% of the entire sample; 70% of private targets have missing deal values on SDC). These missing values are likely to be associated with smaller, private firms. To explore why the value-weighted results are different from the equally weighted results, we reestimate our tests for the subsample of mergers without deal value information (Column 5) and for the subsample of mergers with deal value information (Column 6). The coefficient on the country-level stock return difference is highly significant for the mergers with missing deal values in SDC but it loses significance when we focus on the mergers with information on deal values. The coefficient on the currency return difference is statistically significant in both subsamples but larger in magnitude for the mergers with missing deal values. These results suggest that the valuation effect is most important among deals with missing values, which are more likely to be smaller. This pattern potentially explains why the valuation effect is present in the equally weighted specification but not the value-weighted one.

The remaining columns of Table V document the extent to which our currency and stock market valuation effects hold under a number of alternative

Table V

Panel Analysis of the Intensity of Cross-Border Mergers and Acquisitions: Robustness Checks

This table presents estimates of panel regressions of cross-border mergers and acquisitions. The dependent variable is the number of cross-border deals in year t (X_{ijt}) in which the target is from country i and the acquirer is from country j (where $i \neq j$) scaled by sum of the number of domestic deals in target country i (X_{iit}) and the number of cross-border deals involving target country i and acquirer j (X_{ijt}). Columns 1 through 3 examine subsamples of cross-border deals based on the ownership stake the acquiring firm obtains. Column 4 examines the dollar value of all cross-border deals. Columns 5 and 6 examine subsamples of deals without information on deal value and those with deal value information, respectively. Column 7 examines the sample of cross-border deals including withdrawn (failed) ones. Column 8 examines the subsample of countries for which the exchange rate is not pegged, where an exchange rate is pegged if the absolute value of the bilateral nominal exchange rate returns is less than 0.001 for each of 12 consecutive months. Column 9 deploys a gravity model (Rose (2000)) for bilateral cross-border mergers. Columns 10 and 11 include exchange rate volatility and interest rate differences between target and acquiring countries, respectively. Refer to the Appendix for variable definitions. Country pair and year fixed effects are included in all regressions. Standard errors are corrected for clustering of observations at the country-pair level and associated t-statistics are in parentheses. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	5-49%	50-99%	100%	$ Value	# of Deals w/o $ Value	# of Deals with $ Value	Failed Deals Included	Exclude Countries with Pegged EX	Rose (2000)'s Gravity Model	Control for Exchange Rate Volatility	Control for Interest Rate
	1	2	3	4	5	6	7	8	9	10	11
(Currency R12)$_{j-i}$	0.026***	0.034***	0.036***	0.008	0.046***	0.019**	0.044***	0.031***	0.030*	0.029***	0.040***
	(2.96)	(3.09)	(3.58)	(0.79)	(4.07)	(2.47)	(4.69)	(3.34)	(2.34)	(3.15)	(3.83)
(Market R12)$_{j-i}$	0.003	0.014***	0.009**	-0.000	0.020***	0.002	0.010***	0.013***	0.011***	0.011***	0.012***
	(0.56)	(3.23)	(2.41)	(-0.04)	(5.31)	(0.63)	(3.56)	(3.71)	(2.99)	(3.31)	(3.41)
Maximum (Import, Export)	0.243***	-0.048	0.244***	0.227***	0.113	0.283***	0.184***	0.218**	0.620***	0.191***	0.228***
	(2.06)	(-0.36)	(3.51)	(2.29)	(1.56)	(3.66)	(2.83)	(2.38)	(9.77)	(2.66)	(2.72)
(Quality of Institution)$_{j-i}$	0.048***	0.031**	0.048***	0.024*	0.037***	0.045***	0.036***	0.048***	0.002	0.040***	0.042***
	(2.87)	(1.99)	(3.76)	(1.69)	(3.03)	(3.46)	(3.36)	(3.72)	(1.46)	(3.38)	(2.82)
(Investment Profile)$_{j-i}$	0.101**	-0.006	-0.013	0.077**	-0.014	0.059**	-0.030	-0.009	-0.001	0.004	-0.026
	(2.46)	(-0.12)	(-0.33)	(1.93)	(-0.32)	(1.88)	(-0.97)	(-0.26)	(-0.94)	(0.13)	(-0.61)
(log GDP per capita)$_{j-i}$	-0.001	0.001	-0.002**	-0.001	-0.000	-0.001	-0.001	-0.001	0.003***	-0.001	-0.001
	(-0.49)	(0.90)	(-2.02)	(-1.01)	(-0.37)	(-0.74)	(-0.96)	(-1.28)	(10.84)	(-1.07)	(-1.13)
(GDP growth)$_{j-i}$	-0.002	-0.001	-0.000	0.001	-0.000	0.001	-0.000	-0.000	-0.000	-0.001	0.000
	(-1.55)	(-0.83)	(-0.45)	(0.76)	(-0.02)	(1.17)	(-0.16)	(-0.27)	(-0.14)	(-0.78)	(0.43)
Log (distance)									-0.006***		
									(-4.73)		
Currency Volatility										0.273***	
										(4.51)	
(Interest Rate)$_{j-i}$											-0.000
											(-1.37)
Constant	0.067***	0.063***	0.074***	0.049***	0.075***	0.058***	0.062***	0.073***	0.006	0.068***	0.075***
	(5.73)	(5.50)	(6.84)	(4.09)	(7.67)	(5.43)	(8.65)	(7.24)	(0.14)	(6.66)	(7.32)
Observations	13,964	13,846	14,613	14,301	14,567	14,301	15,009	13,806	7,949	14,857	11,774
R^2	0.354	0.342	0.481	0.363	0.438	0.489	0.555	0.495	0.108	0.497	0.509

specifications. Column 7 includes deals that were proposed but ultimately not completed in the calculation of the dependent variable. Column 8 excludes country pairs for which the currencies of the target and acquirer are pegged, so that, for example, mergers between EU countries after the adoption of the euro in January 1999 are excluded. Column 9 estimates a "gravity" model similar to Rose (2000). In this specification, the distance between countries is entered as an independent variable, which prevents this specification from including country-pair fixed effects. Finally, the last two columns of Table V include exchange rate volatility (Column 10) and the difference in deposit rates between the acquirer and the target countries (Column 11). In each of these specifications, the coefficients on currency movements and stock market movements are positive and statistically significantly different from zero, suggesting that the relation between valuation and merger propensities is robust to alternative specifications.

F. Interpreting the Relation between Valuation and Merger Propensities

In Section II, we discuss some possible explanations for the relation between valuation and merger propensities. Increases in relative valuation, either through stock price increases or currency appreciation, could reflect real increases in wealth, enhancing firms' abilities to finance acquisitions (e.g., Froot and Stein (1991)). Alternatively, the changes in relative valuation could reflect errors in valuation, in which case firms should rationally take advantage of this misvaluation to purchase relatively cheap assets, that is, firms in another country that are not as overvalued (Shleifer and Vishny (2003)). The overvaluation argument applies mainly to public acquirers who can either issue equity or make stock acquisitions to take advantage of the high valuation, but, as Baker, Foley, and Wurgler (2009) argue, it could potentially apply to private acquirers as well if the overvalued equity market lowers the cost of capital in a country for private firms.

A prediction of the incorrect relative valuation argument is that, subsequent to acquisitions by relatively overvalued firms, there should be a price reversal and acquirers should underperform relative to targets. In particular, the overvaluation argument implies that, if an acquirer purchases a target to arbitrage differences in the price levels across countries, these differences should narrow subsequent to the acquisition. To evaluate this possibility, we reestimate our equation from Table III, including future return differences. The results are presented in Column 1 of Table VI for all mergers and in Columns 3, 5, 7, and 9 for the subsamples based on whether the acquirer and the target are public or private firms. The results are somewhat ambiguous, but indicate that the difference in currency returns tends to persist following the acquisition. This pattern is inconsistent with the notion that overvaluation explains the impact of valuation on merger decisions. It is possible, however, that the future returns tests are not particularly powerful since they only make use of the component

Table VI

Explaining the Effect of Valuation Differences on Cross-Border Mergers and Acquisitions

This table presents estimates of panel regressions of cross-border mergers and acquisitions. The dependent variable is the number of cross-border deals in year t (X_{ijt}) in which the target is from country i and the acquirer is from country j (where $i \neq j$) scaled by the sum of the number of domestic deals in target country i (X_{iit}) and that of the cross-border deals involving target country i and acquirer country j (X_{ijt}). We decompose the market-to-book ratio of each country using future stock market returns and future exchange rate returns (Baker, Foley, and Wurgler (2009)). Based on our estimates, Fitted MTB = $2.017 - 0.033$ FR12 $- 0.137$ FR24 $- 0.299$ FR36 $- 0.255$ EXFR12 $- 0.247$ EXFR24 $+ 0.487$ EXFR36 ($N = 642$, $R^2 = 0.094$). Columns 1 and 2 examine the entire sample of cross-border deals. Columns 3 through 10 examine subsamples of deals in which various combinations of public status of the parties are selected and then aggregated to the country level. Refer to the Appendix for variable definitions. Country-pair and year fixed effects are included in all regressions. Standard errors are corrected for clustering of observations at the country-pair level and associated t-statistics are in parentheses. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	All		Private Target–Private Acquirer		Private Target–Public Acquirer		Public Target–Private Acquirer		Public Target–Public Acquirer	
	1	2	3	4	5	6	7	8	9	10
(Currency FR12)$_{j-i}$	0.017***		0.015**		0.011		0.014		0.012	
	(2.74)		(2.17)		(1.14)		(1.16)		(0.78)	
(Market FR12)$_{j-i}$	−0.001		0.001		−0.006		−0.012**		0.003	
	(−0.42)		(0.39)		(−1.04)		(−2.04)		(0.51)	
(Fitted MTB)$_{j-i}$		0.002		0.006**		−0.006		0.006		−0.001
		(0.64)		(2.07)		(−1.03)		(0.81)		(−0.11)
(Residual MTB)$_{j-i}$		0.006***		0.005***		0.007***		0.004*		0.007**
		(5.34)		(4.01)		(4.47)		(1.77)		(2.37)
Maximum (Import, Export)	0.186***	0.124*	0.084	0.079	0.281***	0.191**	−0.014	−0.063	0.009	0.063
	(2.94)	(1.94)	(1.39)	(1.32)	(3.17)	(2.09)	(−0.09)	(−0.33)	(0.07)	(0.48)
(log GDP per capita)$_{j-i}$	0.041***	0.015	0.028***	0.008	0.048***	0.028**	−0.000	−0.005	0.008	0.001
	(3.82)	(1.45)	(2.88)	(0.72)	(3.68)	(2.06)	(−0.02)	(−0.27)	(0.32)	(0.02)
(GDP growth)$_{j-i}$	0.049*	0.079***	0.053*	0.061**	0.087*	0.147***	−0.001	0.033	0.084*	0.031
	(1.68)	(2.71)	(1.82)	(2.11)	(1.82)	(2.87)	(−0.02)	(0.70)	(1.75)	(0.62)
(Quality of Institution)$_{j-i}$	−0.000	−0.000	−0.000	−0.001	−0.001	−0.002	−0.001	0.000	0.003*	0.003*
	(−0.46)	(−0.59)	(−0.53)	(−0.63)	(−1.16)	(−1.43)	(−0.51)	(0.23)	(1.89)	(1.78)
(Investment Profile)$_{j-i}$	−0.000	−0.001*	−0.000	−0.001*	0.001	−0.002*	0.002	0.001	−0.002*	−0.003*
	(−0.39)	(−1.79)	(−0.63)	(−1.89)	(0.60)	(−1.69)	(1.50)	(0.59)	(−1.84)	(−1.87)
Constant	0.069***	0.033***	0.042***	0.021***	0.085***	0.060***	0.011	0.021*	0.039***	0.028**
	(8.19)	(6.33)	(5.42)	(4.46)	(8.83)	(8.30)	(0.74)	(1.70)	(3.51)	(2.08)
Observations	14,300	12,590	13,729	12,110	13,707	12,143	6,817	6,112	7,820	6,999
R^2	0.487	0.519	0.329	0.336	0.543	0.548	0.315	0.311	0.348	0.381

of overvaluation that can be explained by future returns over a prespecified interval.

To test this hypothesis formally, we follow an approach introduced by Baker, Foley, and Wurgler (2009). These authors argue that the market-to-book ratio can be broken into two components: the component due to real expected wealth and the component due to the market's over- or underreaction to news. To estimate the magnitude of each component, Baker, Foley, and Wurgler (2009) estimate equations in which the market-to-book ratio is a function of future stock returns. To the extent that the market-to-book ratio reflects overvaluation at the time of acquisitions, periods of high acquisition activity should be followed by periods of poor returns. The "fitted" component of market-to-book should represent that component arising from overvaluation while the "residual" component should come from real wealth effects.

In the first-stage equation, in which country-level market-to-book ratios are regressed on future returns, the coefficients on future returns are negative. This finding is consistent with the literature that finds a negative relation between country-level market-to-book ratios and future stock returns in a given country. However, when we break down differences in market-to-book between countries into their "fitted" and "residual" components (see Columns 2, 4, 6, 8, and 10 of Table VI), for most specifications only the residual is positively related to the ratio of cross-border mergers, as predicted by the wealth effect hypothesis. Only in the sample of acquisitions of private firms by private acquirers, for which stock market misvaluation is least likely to affect acquisitions, is the difference of the fitted values statistically significant. This finding suggests that the impact of valuation on acquisition properties occurs because of the wealth effect described by Froot and Stein (1991) rather than the mispricing effect discussed by Shleifer and Vishny (2003).

G. Differences in Valuation Using Deal-Level Panel Data

We have documented that valuation appears to play an important role in determining which firms are likely to merge. Acquirers tend to be valued relatively highly compared to targets, using prior returns or market-to-book ratios as measures of valuation. The difference in valuation between acquirers and targets appears to occur due to both stock market and currency effects. Yet the results presented so far use country-level data. Consequently, they do not control for firm-level factors that potentially affect the decision to merge, including the firm's own valuation.

To control for firm-level factors, we consider the subsample of firms for which we have public data on both acquirers and targets. Unfortunately, this subsample is both relatively small and unrepresentative of the overall sample of mergers and acquisitions, because firms in this subsample are much more likely to be from developed rather than developing countries. Of the 56,978 cross-border mergers in our sample, only 1,178 have both public acquirers and targets, and also have data available on firm-level variables that we use to control for other factors that potentially affect mergers. Of these 1,178 mergers,

877 have acquirers from developed countries and 780 have targets from developed countries. While these mergers are interesting in their own right, they are nonetheless not typical of most cross-border mergers

To estimate the factors that affect the likelihood of a merger, one would ideally like to consider every possible pair of firms that could conceivably merge and estimate the likelihood that any two of them actually do merge. Unfortunately, this approach is not feasible as the number of possible combinations would be extremely large relative to the number of actual mergers. Instead, we adopt two alternative approaches, each of which allows us to draw inferences about the factors leading one firm to buy another.

G.1. Cross-Border versus Domestic Mergers

We first consider the sample of all mergers of publicly traded firms (including domestic mergers), and estimate the characteristics of the firms involved with the merger that lead a particular merger to be either cross-border or domestic. We estimate logit models that predict whether an observed merger is domestic or cross-border as a function of deal characteristics. Intuitively, this approach presumes that domestic mergers can provide a benchmark for understanding the nature of cross-border mergers.

We present the marginal effects of these logit models in Table VII. The first two columns include the difference in acquirer and target firm-level returns converted to U.S. dollars (($Firm\ USR12$)$_{j-i}$) as an explanatory variable. Both coefficients are positive and the coefficient is statistically different from zero in the second column, which controls for whether the two firms are in a related industry as well as the size of the target and acquirer. The positive coefficient indicates that cross-border acquisitions tend to have larger return differences between acquirers and targets.[24]

In Columns 3 and 4 we break up the return differences into three components, namely, the difference in returns of the two countries' currencies (($Currency\ R12$)$_{j-i}$), the difference in local stock market indices (($Market\ R12$)$_{j-i}$), and the difference in firm-level excess returns relative to the market (($Firm\ USR12 - Currency\ R12 - Market\ R12$)$_{j-i}$).[25] The coefficients on all three variables are positive but often statistically insignificantly different from zero. Since market indices in different countries contain different compositions of firms, we next decompose the return differences into the difference in industry returns (($Industry\ R12$)$_{j-i}$), as well as the difference in returns between the two countries' currencies (($Currency\ R12$)$_{j-i}$) and the difference in firm-level excess returns relative to the industry (($Firm\ USR12 - Currency\ R12 - Industry\ R12$)$_{j-i}$). We find that the coefficient on the industry return is positive and statistically significant, suggesting that, in

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[24] All regressions include country-specific dummy variables and standard errors are corrected for clustering of observations at the country level.

[25] For the domestic deals, the differences in the local market returns and the currency returns equal zero by construction.

Table VII
Deal-Level Analysis: Cross-Border versus Domestic Mergers and Acquisitions

This table presents marginal effects for a logit model. The dependent variable equals one for cross-border deals and zero for domestic deals. The sample includes deals in which both the target and the acquirer are public. Columns 1 and 2 use the difference in the previous year's firm-level stock returns in U.S. dollars (*Firm USR12*) between the acquirer (*j*) and the target (*i*). Columns 3 and 4 decompose the difference in firm-level stock returns in U.S. dollars into three components: market returns in local currency (*Market R12*)$_{j-i}$, currency returns (*Currency R12*)$_{j-i}$, and firm residual stock returns in local currency (*Firm USR12-Market R12-Currency R12*)$_{j-i}$. Columns 5 and 6 decompose the difference in firm-level stock returns in U.S. dollars into three components: industry returns in local currency (*Industry R12*)$_{j-i}$, currency returns (*Currency R12*)$_{j-i}$, and firm residual stock returns in local currency (*Firm USR12-Industry R12-Currency R12*)$_{j-i}$. Refer to the Appendix for variable definitions. Country and year fixed effects are included in all regressions. Standard errors are corrected for clustering of observations at the country level and associated *t*-statistics are in parentheses. The symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

	Firm Returns		Decompose Firm Returns to Market and Currency Valuation		Decompose Firm Returns to Industry and Currency Valuation	
	1	2	3	4	5	6
(Firm USR12)$_{j-i}$	0.012	0.030***				
	(1.05)	(2.80)				
(Market R12)$_{j-i}$			0.321**	0.188		
			(2.21)	(1.22)		
(Firm USR12 − Market R12 − Currency R12)$_{j-i}$			0.010	0.028***		
			(0.88)	(2.60)		
(Currency R12)$_{j-i}$			0.395**	0.449	0.396***	0.349
			(2.28)	(1.46)	(2.63)	(1.27)
(Industry R12)$_{j-i}$					0.116***	0.106***
					(3.38)	(3.52)
(Firm USR12 − Industry R12 − Currency R12)$_{j-i}$					0.003	0.016
					(0.26)	(1.19)
Log Firm Size (Target)		−0.011		−0.009		−0.010
		(−1.25)		(−1.12)		(−1.01)
Log Firm Size (Acquirer)		0.056***		0.055***		0.055***
		(4.69)		(4.58)		(4.31)
Related Industry		−0.009		−0.011		−0.010
		(−0.35)		(−0.45)		(−0.36)
Observations	2,332	1,530	2,331	1,529	2,267	1,479
R^2	0.339	0.379	0.343	0.381	0.350	0.395

cross-border acquisitions, acquirers are from industries that outperform those of targets.

G.2. Identity of the Target and the Acquirer

Another approach to evaluating the reasons for cross-border mergers is to consider the differences in the characteristics of targets and acquirers. If the underlying reason for the merger is to take advantage of valuation differences,

then one ought to be able to predict which firms will be acquirers or targets using measures of valuation. Consequently, we consider the sample consisting of all firms involved in a public-to-public cross-border merger and estimate equations predicting whether a particular firm is a target or acquirer. Because the dependent variable is dichotomous, we estimate the equations by a logit model and present the marginal effects in the Internet Appendix. We estimate these equations for both domestic and cross-border mergers. As in Table VII, we first break up the firm return differences into three components, namely, the difference in returns between the two countries' currencies, the difference in local stock market indices, and the difference in firm-level excess returns relative to the market. We then decompose firm-level stock returns into the difference in industry-level index return in local currency, the difference in currency returns, and the residual. All regressions include country dummies and standard errors are corrected for clustering of observations at the country level.

The results indicate that, for both domestic and cross-border mergers, acquirers outperform targets prior to the acquisition. This finding is consistent with the prior literature on domestic mergers suggesting that acquirers typically have higher valuations than targets. We next break down each return for the cross-border sample into three components, reflecting the local stock market index (in local currency), the currency return (relative to U.S. dollars), and the firm-specific residual in local currency. The results indicate that only the firm-specific component of returns is related to whether a firm is an acquirer or a target, not the local stock market return or the currency return. When we use the industry index in local currency to decompose firm-level returns, we find that, in the cross-border sample, acquirers are more likely from industries that outperform those of targets. We also find that there is no significant difference in currency returns between the target countries and the acquirer countries.

These results are consistent with what we find at the country level using only public firms and are also similar to the deal-level regressions in Table VII using the domestic/cross-border specification. The difference between the public firm subsample and the overall sample consisting mostly of private firms is consistent with the relative wealth story suggested by Froot and Stein (1991). The underlying cause of frictions in the Froot and Stein model is asymmetric information, which is likely to be higher in private firms than in public firms. Consequently, if this channel leads to wealth effects in mergers, then it should be stronger in mergers involving private firms than in mergers of public firms, consistent with the findings reported in the Internet Appendix.

IV. Conclusion

About one third of worldwide mergers combine firms from two different countries. As the world's economies become increasingly integrated, cross-border mergers are likely to become even more important in the future. Yet in the voluminous academic literature on mergers, the vast majority of research studies domestic deals. Moreover, what little work has been done on

cross-border mergers focuses on public and/or U.S.-based firms. However, most cross-border mergers *do not* involve U.S. firms and *do* involve privately held firms. In our sample of 56,978 cross-border mergers that occurred between 1990 and 2007, 97% involved a private firm as either acquirer or target, while 53% did not involve a U.S. firm. Understanding the patterns and motivations for cross-border mergers is consequently an important and understudied research topic.

Our results indicate that geography matters; the odds of acquiring a firm in a nearby country are substantially higher than the odds of acquiring a firm in a country far away. In addition, higher economic development and better accounting quality are both associated with the likelihood of being an acquirer rather than a target.

A major factor determining the pattern of cross-border mergers is currency movements. Over the entire sample period, countries whose currencies have appreciated are more likely to have acquiring firms while countries whose currencies have depreciated are more likely to have target firms. Controlling for these overall time trends econometrically, short-term movements between two countries' currencies increase the likelihood that firms in the country with the appreciating currency purchase firms in the country with the depreciating currency.

In addition, the relative stock market performance between two countries affects the propensity of firms in these countries to merge. Our estimates indicate that the greater the difference in stock market performance between the two countries, the more likely that firms in the superior-performing country purchase firms in the worse-performing country.

The effects of currency movements and stock market performance on merger propensities are likely to be indicative of a more general valuation effect, whereby more highly valued firms tend to purchase lower-valued firms. This effect has been documented for domestic acquisitions of U.S. firms in a number of studies, and has been generally attributed to misvaluation arguments (Shleifer and Vishny (2003), Rhodes-Kropf and Viswanathan (2004)). Yet, in an international context, there is an additional reason why higher-valued firms would purchase lower-valued firms: firms from wealthier countries will have a tendency to purchase firms from poorer countries because of a wealth effect due to a lower cost of capital (Froot and Stein (1991)). We evaluate both the mispricing and wealth explanations econometrically and find support for the wealth explanation rather than the mispricing explanation.

With the increasing integration of the world's economies, it is likely that more mergers will involve firms from different countries. We provide a preliminary analysis of the patterns and reasons for cross-border mergers. These mergers undoubtedly occur for the same synergistic reasons as domestic mergers. However, country-level factors, such as currency appreciation and macroeconomic performance, appear to be making these mergers significantly more attractive for the acquiring firms. The extent to which each type of factor affects the likelihood of firms purchasing one another is an important topic for future research.

Appendix: Description of Variables

This table describes all variables used in the paper. Country-level data items are measured at the annual frequency. Deal-level items are measured in the year-end prior to the deal announcement date.

Panel A: Country-Level Variables

Variable	Description
Annual cross-border M&A country pairs	The total number of cross-border deals in year t ($Xijt$) in which the target is from country i and the acquirer is from country j (where $i \neq j$) scaled by the sum of the number of domestic deals in target country i ($Xiit$) and that of cross-border deals between country i and country j ($Xijt$). (Source: SDC Mergers and Corporate Transactions database)
Cross-border M&A country pairs	The total number of cross-border deals between 1990 and 2007 (Xij) in which the target is from country i and the acquirer is from country j (where $i \neq j$) scaled by the sum of the number of domestic deals in target country i (Xii) and that of cross-border deals between country i and country j (Xij). (Source: SDC Mergers and Corporate Transactions database)
$(\text{Currency R12})_{j-i}$	The (average) difference between the annual real bilateral U.S. dollar exchange rate return of the acquirer country (j) and target country (i). We use national exchange rates from WM/Reuters. WM/Reuters quotes are based on 4:00 P.M. London time (Greenwich Mean Time).We obtain national exchange rates for the U.K. Pound Sterling and manually convert these currency quotes to get the quotes for the U.S. dollar. These indices are then deflated using the 2000 constant dollar consumer price index (CPI) in each country to calculate real exchange rate returns (in U.S. dollars). (Source: Datastream)
$(\text{Market R12})_{j-i}$	The (average) difference between the annual local real stock market return of the acquirer country (j) and target country (i). We obtain total value-weighted return indices in local currency for each country (Datastream code: RI) and deflate these indices using the 2000 consumer price index (CPI) in each country to calculate real stock returns. (Source: Datastream)
$(\text{Market MTB})_{j-i}$	The difference between acquirer (j) and target (i) countries of domicile in value-weighted market-to-book equity. (Source: Datastream)
$(\text{Disclosure Quality})_{j-i}$	The difference between acquirer (j) and target (i) countries of domicile in the index created by the Center for International Financial Analysis and Research to rate the quality of 1990 annual reports on their disclosure of accounting information. (Source: LaPorta et al. (1997, 1998))
$(\text{Legal})_{j-i}$	The difference between acquirer (j) and target (i) countries of domicile in the Anti-Self Dealing Index, a survey-based measure of legal protection of minority shareholders against expropriation by corporate insiders. (Source: DLLS(2008))
Same Language	Dummy variable equals 1 if target and acquirers' primary language (English, French, Spanish, or Others) are the same. (Source: World Factbook)
Same Religion	Dummy variable equals 1 if target and acquirers' primary religion (Protestant, Catholic, Muslim, Buddhist, or Others) are the same. (Source: Stulz and Williamson (2003))
Geographic Proximity	The negative of the great circle distance between the capitals of countries i and j. We obtain latitude and longitude of capital cities of each country. We then apply the standard formula: $3963.0 * arccos [sin(lat1) * sin(lat2) + cos(lat1) * cos(lat2) * cos (lon2 - lon1)]$, where lon and lat are the longitudes and latitudes of the acquirer country ("1" suffix) and the target country ("2" suffix) locations, respectively. (Source: http://www.mapsofworld.com/utilities/world-latitude-longitude.htm)

(Continued)

Panel A: *Continued*

Variable	Description
(Income Tax)$_{j-i}$	The average difference between acquirer (j) and target (i) countries of domicile in corporate income tax rates. (Source: OECD)
(log GDP per capita)$_{j-i}$	The (average) difference between acquirer (j) and target (i) countries of domicile in the logarithm of annual GDP (in U.S. dollars) divided by the population. (Source: World Bank Development Indicators)
(GDP Growth)$_{j-i}$	The (average) difference between acquirer (j) and target (i) countries of domicile in the annual real growth rate of the GDP. (Source: World Bank Development Indicators)
Max (Import, Export)	The maximum of bilateral import and export between a country pair. Bilateral import (export) is calculated as the value of imports (exports) by the target country from (to) the acquirer country as a percentage of total imports (exports) by the target country, based on the Harmonized System definition. (Source: UN commodity trade database)
(Quality of Institution)$_{j-i}$	The sum of the International Country Risk Guide (ICRG) Political Risk (ICRGP) subcomponents: Corruption, Law and Order, and Bureaucratic Quality. Details on these subcomponents can be found in Bekaert, Harvey, and Lundblad (2005), Table 1.
(Investment Profile)$_{j-i}$	ICRG Political Risk (ICRGP) subcomponent. It is a measure of the government's attitude toward inward investment, and is determined by Political Risk Service's assessment of three subcomponents: (i) risk of expropriation or contract viability; (ii) payment delays; and (iii) repatriation of profits. Each subcomponent is scored on a scale from zero (very high risk) to four (very low risk).
Currency Volatility	The standard deviation of the first-difference of the monthly natural logarithm of the bilateral nominal exchange rate in the 5 years preceding year t. (Source: Datastream)
Pegged Exchange Rate	A country pair is classified as having a pegged exchange rate if the absolute value of the bilateral nominal exchange rate returns is less than 0.001 for 12 months continuously. (Source: Datastream)
(Interest rate)$_{j-i}$	The difference between acquirer (j) and target (i) countries of domicile in the deposit interest rate. (Source: World Bank Development Indicators)

Panel B. Deal-Level Variables

Value of transaction	Total value of consideration paid by the acquirer, excluding fees and expenses, adjusted to 2008 constant dollars using the U.S. city average consumer price index (CPI-U) published by the Bureau of Labor Statistics. (Source: SDC Mergers and Corporate Transactions database)
Public target (acquirer)	Target (Acquirer) is a public firm if its public status is "Public" or if its SEDOL is nonmissing. (Source: SDC Mergers and Corporate Transactions database)
Cross-border deal	A deal is a cross-border deal if the target's nation is different from that of the acquirer's ultimate parents. (Source: SDC Mergers and Corporate Transactions database)

(Continued)

Panel B: *Continued*

Variable	Description
Related industry	Target firms are in the same industries as acquirers if any line of business of the target firm (TSIC2) overlaps with that of acquirer (ASIC2). (Source: SDC Mergers and Corporate Transactions database)
Same Region	Dummy variable equals 1 if the acquirer (j) and target (i) firm countries of domicile are located in the same broadly defined continent (Africa, America, Asia, Europe). (Source: World Factbook)
5–49% stakes (50–99%, 100%)	Dummy variable equals 1 if the number of common shares acquired in the transaction plus any shares previously owned by the acquirer divided by the total number of shares outstanding is between 5% and 49% (between 50% and 99%, 100%). (Source: SDC Mergers and Corporate Transactions database)
Cash (Stock) Deals	A deal is classified as a cash (stock) deal if more than 50% of the deal value is paid in cash (stock). (Source: SDC Mergers and Corporate Transactions database)
Failed Deals	Dummy variable equals 1 if the deal is withdrawn. (Source: SDC Mergers and Corporate Transactions database)
(Firm USR12)$_{j-i}$	The difference between acquirer (j) and target (i) in annual real stock market returns in U.S. dollars. We obtain total return indices in U.S. dollars for all public firms (Datastream code: *RI*) and deflate these indices using the 2000 consumer price index (CPI) in U.S.$ to calculate real stock returns. (Source: Datastream)
(Industry R12)$_{j-i}$	The difference between acquirer (j) and target (i) primary industries in the annual local real stock market return. We calculate value-weighted annual local real stock market returns for 48 Fama-French industries of each country. (Source: Datastream and Professor Kenneth French's website at Dartmouth University, http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/index.html)
Total assets (log)	Book value of total assets in millions of constant 2000 U.S. dollars (WC07230). (Source: Worldscope)
Return on assets	(Net Income before Preferred Dividends + ((Interest Expense on Debt-Interest Capitalized) * (1 − Tax Rate)) / Average of Last Year's and Current Year's (Total Capital + Last Year's Short-Term Debt & Current Portion of Long-Term Debt) * 100 (WC08376). (Source: Worldscope)
Long-term debt/assets	Ratio of long-term debt to book value of assets (WC03251/WC02999). (Source: Worldscope)
Sales growth	Two-year local country CPI inflation-adjusted sales growth (WC01001). (Source: Worldscope)
Cash/assets	Ratio of cash and liquid assets to book value of assets (WC02001/WC02501). (Source: Worldscope)

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