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## Abstract

Previous research on the impact of currency risk on stock returns has failed to find a significant role for foreign exchange rates. This paper addresses several explanations of this finding with a unique dataset of U.S. firms that acquire targets in other countries. The dataset allows estimation of the impact of exchange rates using firm-specific bilateral exchange rates and a time period over which underlying exposure is known to significantly change. We also relate the change in exposure from before to after the acquisition to various characteristics of the acquirer, such as its presence in the target country prior to the deal and its hedging activities, and characteristics of the target, such as the exposure of the target prior to the deal. The results suggest that identifying a relevant exchange rate can be an important consideration in studying the impact of exchange rate risk on stock returns, but identifying financial hedging information is not. Further, foreign targets often provide operational hedging benefits to the U.S. acquirers, as exposure estimates are significantly affected by the acquisition.

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Previous research on the impact of currency risk on stock returns has failed to find a significant role for foreign exchange rates. This paper addresses several explanations of this finding with a unique dataset of U.S. firms that acquire targets in other countries. The dataset allows estimation of the impact of exchange rates using firm-specific bilateral exchange rates and a time period over which underlying exposure is known to significantly change. We relate the change in exposure from before to after the acquisition to various characteristics of the acquirer, such as its presence in the target country prior to the deal and its hedging activities, and characteristics of the target, such as the exposure of the target prior to the deal. The results suggest that identifying a relevant exchange rate can be an important consideration in studying the impact of exchange rate risk on stock returns, but identifying financial hedging information is not. Further, foreign targets often provide operational hedging benefits to the U.S. acquirers, as exposure estimates are significantly affected by the acquisition.

## 1. Introduction

Given the huge potential for exchange rates to affect firm values, through their effects on exporters' revenues, importers' costs and the level of competition for firms that neither export nor import, we expect them to be a significant factor affecting stock returns. However, empirical studies find that exchange rates and stock returns are not closely linked.[1] One possible explanation is that researchers usually face data limitations. In particular, researchers studying U.S. firms frequently do not know enough about the firms in the sample to identify whether they have any foreign exchange exposure or, if they do, to which exchange rates. They know little about the hedging activity of these firms, so the small exposure estimates may actually reflect a large economic role for exchange rates that is masked by the use of financial derivatives.[2]

The innovation in this study is that we are able to gather much more relevant information on the impact of exchange rates because we focus on firms in the U.S. that make acquisitions of foreign targets. These firms' exposures to the target country currencies will necessarily change upon the acquisitions. In contrast to previous studies, we know that each of these firms has exposure to a particular currency; which exchange rate constitutes the main source of that exposure; when the exposure changes; whether the exposure is hedged with derivatives; and how the acquisition affects the acquirer's cash flows from the target's country. In addition to helping understand why currency risk seems insubstantial in previous studies, our study also provides insights into firms' hedging behavior.

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[1] See Bartram and Bodnar (2007) for a review of the literature.

[2] When available, the information may be difficult to obtain. For example, Géczy, Minton and Schrand (1997) identify hedging activity for the firms in their sample by reading the footnotes in the firms' annual reports that describe derivatives usage.

The sample consists of U.S. firms that completed large acquisitions of foreign targets over the period 1996-2004. We find that the stock returns of the acquiring firms in our sample exhibit substantially more sensitivity to exchange rates than those in previous studies. We attribute this to the fact that we can identify the relevant exchange rate to which the sample firms face exposure. While our firms exhibit stronger sensitivity to exchange rates than most other samples, the sensitivity is by no means large. Substantial evidence points to acquisitions as a natural hedge, as many of the firms have business ties to the target's country before the deal. Thus, the most likely explanation for the weak statistical impact of exchange rates on stock returns is that firms with large underlying exposures undo them by adjusting the locations of their operations. We find that the exposure is not significantly related to foreign exchange rate derivatives, although a number of firms do hedge with currency derivatives. Finally, we find that derivatives usage is fairly common among our sample of firms, although some firms appear to be too small to access this market.

The remainder of this paper is as follows: Section 2 includes a literature review and develops our hypotheses; Section 3 describes the data. Section 4 presents results, and Section 5 concludes.

## 2. Literature and Methodology

### 2.1. Related Literature

Following Adler and Dumas (1984), many studies of currency exposure estimate the following equation using a time series of monthly stock returns, market returns and exchange rate movements:

$$R_{jt} = \alpha_j + \beta_j R_{Mt} + \delta_j R_{FXt} + \varepsilon_{jt} \tag{1}$$

where $R_{jt}$ is an individual firm's stock return over period $t$, $\alpha_j$ is a constant, $R_{Mt}$ is the return on the market index (measured by the CRSP valued weighted index) and $R_{FXt}$ is the return on foreign exchange. If unexpected changes in exchange rates affect stock returns (beyond what is possibly captured by the market), the coefficient on the exchange rate variable, $\delta_j$, should be significant in firm-

specific regressions.

Based on basic financial models and reports in the business press, exchange rate movements are generally believed to affect the profits of nonfinancial firms (see e.g. Bartram et al., 2005; Flood and Lessard, 1986; Adler and Dumas, 1984; Hodder, 1982; Shapiro, 1975). However, the empirical research on nonfinancial firms typically produces fewer significant exposure estimates than researchers expect, independent of the sample studied and the methodology used. For example, using a sample of U.S. multinational firms, Jorion (1990) finds foreign exchange rate exposure to be significant for only 5.2% of his sample, scarcely different than what one expects to find simply from sampling error. Amihud (1994) conditions on a sample of exporters and finds even fewer instances of significance. Similarly, Choi and Prasad (1995) show that just 14.9% of U.S. multinationals have significant exchange rate exposure to a trade-weighted value of the U.S. Dollar (albeit at the 10% level). Starks and Wei (2004) find that the magnitude of exchange rate exposures of U.S. manufacturing firms is related to firms' financial health and access to capital markets.

The evidence for firms outside the United States is not very different. Bodnar and Gentry (1993) have limited success in documenting significant exposures among Canadian and Japanese firms, even though they are highly reliant on exports, and He and Ng (1998) find 25% of Japanese multinationals have significant estimates for foreign exchange rate exposure. Doidge et al. (2006) analyze the exchange rate exposures of thousands of firms in Europe, Asia and North America and find only 8.2% show a significant exposure coefficient at the 5% level. The consensus in the literature is that the evidence for foreign exchange rate risk in stock returns is surprisingly weak (Griffin and Stulz, 2001), though there is some evidence that exposures are larger in smaller, more open and developing countries (Bartram and Bodnar, 2007; Dominguez and Tesar, 2001).

One potential limitation of many past studies is that the exchange rate variable is measured as the return on a trade-weighted exchange rate. While this is a sensible approach given that detailed information on firms' foreign operations is generally not available, using a basket of currencies may be misleading when firms are exposed to one particular currency and not the entire trade-weighted index.[3] Moreover, the basket of currencies in the index may show lower volatility than any given bilateral exchange rate, as movements in some currencies in the index are cancelled out by movements in other currencies. Only a few studies, such as Khoo (1994) and Miller and Reuer (1998), use several major bilateral exchange rates, on the assumption that these major currencies are likely to have the greatest impact. Bartram (2004) examines German firms and finds that bilateral exchange rates show an improvement over a currency basket in his sample.

Other studies focus on the possibility that exchange rate exposure is time-varying (e.g., Glaum, Brunner and Himmel, 2000; Allayannis, 1997). However, other than measuring variation in industry imports and exports or variation in firm foreign sales, researchers cannot know whether the estimations of foreign exchange rate exposure vary because the exposure varies or because of estimation error. Williamson (2001) studies the automobile industry over time, assuming that U.S. firms in the industry are exposed to foreign competition. Bartov, Bodnar and Kaul (1996) and Bartram and Karolyi (2006) examine exchange rate risk before and after major structural breaks in exchange rate regimes (the breakdown of Bretton Woods and the introduction of the Euro), still finding fairly small effects.

A further difficulty in estimating the magnitude and significance of foreign exchange rate exposure arises from the fact that firms may be hedging currency risk (Francis, Hasan and Hunter

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[3] As a result, clinical studies such as Bartram (2005) and Brown (2001) have been conducted where some of these data limitations can be overcome.

(2007). Firms can hedge exposure with derivatives, foreign-currency denominated debt, or operationally (i.e. with assets located in other countries). As a result, estimated exchange rate exposures may be small both among firms without foreign business that do not need to hedge and firms with large gross exposures that do hedge. Nonetheless, the effect of derivatives on the risk profile of the firm appears to be relatively small, as found by Guay and Kothari (2003).[4]

Bartram, Brown and Minton (2006) argue that foreign exchange rate exposures observed in stock returns may be small if firms hedge the risk, where they highlight the fact that hedging includes many activities besides using financial derivatives. Firms can match sales to operations, locate factories strategically to offset exchange rate movements, and use foreign debt to offset exposure. Empirically, they find that hedging with pass-through and operational hedges, as well as with financial derivatives, reduces estimated exposures sharply.

## 2.2. Research Design

This study improves on previous research by investigating the exchange rate exposure of a unique set of firms. First, we are able to identify the currency to which the firms we study are exposed, as each firm in the sample has a currency exposure related to the target country around the time of the acquisition. Consequently, we are able to focus on the exchange rate of the target country, rather than on a basket of currencies that may be irrelevant.

Second, we are able to examine the qualitative changes in the cash flows associated with foreign countries. By construction of the sample, these acquisitions are large relative to the market value of the acquirer. Thus, if there is an exchange rate exposure to be found, we should be able to detect it after the acquisition. After all, basic intuition suggests that revenues and costs in the target

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[4] Given the difficulty of hedging exposures completely, it seems possible that there may be, nevertheless, differences in stock return exposures between firms that hedge and those that do not, as documented e.g. in He and Ng (1998) and Allayannis and Ofek (2001).

country will increase as a result of the deal. However, despite the size of the average deal, these acquisitions may not be increasing the acquiring firm's exposure to the target country on average. The impact of the deal depends crucially on the exposure to the target country prior to the acquisition: For firms that have no presence in the target's country prior to the deal, we expect that foreign exchange rate exposures will increase after the deal and will be insignificant in the pre-merger days. For firms that already have sales to the target country, the acquisition may serve to decrease the exposure. In this case, the estimated exposure prior to the merger should be larger in absolute value than after the deal is completed (i.e., firms that are net exporters prior to the deal should have less positive coefficients once they are naturally hedged while firms that were net importers should have less negative coefficients as a result of the operational hedge).

In addition, the extent of the change in currency exposure as a result of the deal depends on the business of the target. If the target's revenues are largely denominated in U.S. dollars the change in the exposure should be weaker, as the target itself has little exposure to its country's currency. The same can be said for targets that produce in one country and sell in another, as the new exposure may be split between the target country's exchange rate and that of another country to which the target was selling its product.

We consider these circumstances by examining the operations of the acquirers and their targets prior to the acquisition. For many of the firms in our sample, an important consideration is that the deal might result in a smaller change in foreign exchange rate exposure from pre- to post-acquisition if the acquiring firm already has a large presence in the target country prior to the deal. If the acquirer's sales to the country are large before the deal, the acquisition may actually serve to naturally hedge the prior exposure, making exposure less significant after the acquisition. Consequently, we control for whether the acquiring firm sells their products or has production facilities in the target country prior to the deal. We also estimate equation (1) for the target prior to

the acquisition to determine if it had significant exposure to the U.S. Dollar and to investigate the effect of this exposure on the acquirer's exposure after the acquisition.

Suppose our sample turns out to have large acquisitions of targets that are located in countries where the acquirer has not done business before, so that these deals have dramatic effects on the sensitivity of the firms' cash flows to exchange rates. We still might find that the exposures estimated in stock return regressions, such as equation (1), are not significantly different from zero if it is the case that the acquiring firms engage in substantial financial hedging after the acquisition. Therefore, we also analyze how derivatives usage in the currency of the target's country changes from before to after the acquisition. Moreover, we determine if the acquirer uses other types of derivatives before and after the deal, thus controlling for access to derivatives markets in general when investigating whether some firms are too small to reasonably hedge the currency risk with derivatives. Using hand collected data on hedging from SEC filings, we determine which firms actively hedge with financial instruments.

Furthermore, we investigate the acquirer's debt financing before and after the deal to determine if there is an increase in debt denominated in the target's currency that serves as a hedge. For example, suppose the acquirer pays $100 million U.S. dollars to buy a Canadian firm and borrows the equivalent of $60 million U.S. dollars in Canadian-dollar-denominated debt to pay for part of the deal (the remainder is equity of the acquirer). If the acquirer hands over Canadian dollars to the target's shareholders, then the Canadian dollar debt will likely be paid off over time with profits from the Canadian target's profits. If so, the only exposure to the Canadian dollar for the U.S. acquirer is that which arises when the profits net of the debt repayments are returned home in U.S. dollars. If this is a common practice, then exposure would be diminished by foreign currency debt.

### 2.3.    Hypotheses

First, we expect that a larger fraction of firms in our sample will have significant exchange rate coefficients over the time period estimated than in previous studies of U.S. firms because we know we have a sample of firms that have business ties to foreign countries.  Moreover, we can identify the relevant exchange rate so we should find that the significance is stronger when using the appropriate bilateral exchange rate compared to using a trade-weighted basket of currencies.  As the date of the deal is a natural structural break marker for the firm's stock returns we amend equation (1) to allow time variation in the exposure:

$$R_{jt} = \alpha_j + \beta_j R_{Mt} + \delta_j R_{FXt} + \beta_{ja}\lambda R_{Mt} + \delta_{ja}\lambda R_{FXt} + \varepsilon_{jt,} \qquad (2)$$

where $\lambda$ is an indicator variable for observations after the merger.  This specification allows the exposure to change once the deal is completed, although it is possible that $\delta_j$ will be constant from one period to the next.  Moreover, this specification allows $\beta_j$ to change, which is likely given that these targets are quite large relative to the acquirers.  Firms with no business ties to the target country prior to the merger will have significant exposure only after the acquisition ($\delta_j$ will be insignificant while $\delta_{ja}$ will not be).  Because we define the exchange rate in U.S. dollars per unit of foreign currency, a positive change in the exchange rate means that exporters will find it easier to sell their goods to the target country and that importers will find foreign goods more expensive.  Thus, negative values for exposure indicate that the firm – after accounting for foreign sourcing and sales, competitive effects, hedging activities, etc. – is a "net importer", while "net exporters" have positive exposures.

The sign of the exchange rate exposure estimated from stock returns should be informative about the net effect of the cash flows from that country on the acquirer.  If we find the coefficient to be significant in the two years prior to the acquisition, the estimated exposure should reflect the

fact that the firm is already involved with the target country prior to the acquisition. SEC filings allow us to identify which firms are selling to the target country prior to the acquisition, and those firms should have positive values for $\delta_j$ in equation (2). These documents are much less explicit in reporting whether the firms are importing from the target's country.

**H$_1$: Positive foreign exchange rate exposures prior to the acquisition are more often found among firms that have sales in the target country prior to the deal.**

For acquirers that have ties to the target country prior to the acquisition, the deal may serve as a natural hedge. If the firm is a net exporter to the country (i.e. has a positive $\delta_j$), the acquisition is likely to reduce the firm's exposure to the exchange rate, because it now has not only foreign currency revenue, but also costs in the same currency. If a firm is a net importer from the target country (has a negative $\delta_j$), the acquisition will likely also decrease the firm's exposure to the exchange rate, bringing the coefficient closer to zero, because higher costs of production during a dollar depreciation are offset by higher profits of the target (now a subsidiary).

**H$_2$: Firms with positive $\delta_j$ prior to the deal (net exporters) will have negative values for $\delta_{ja}$, while firms with negative $\delta_j$ prior to the deal (net importer) will have positive values for $\delta_{ja}$.**

Stock returns are only affected by exchange rates if the exposure is not hedged. If acquiring firms use foreign currency derivatives and foreign-currency-denominated debt to hedge exchange rate risk to the target country, their stock returns may not be significantly affected by exchange rate risk. This may be a smaller consideration for firms that are not able to access the derivatives market, even if they desire to use financial instruments to hedge the exchange rate risk.

**H$_3$: Exchange rate exposures will be less significant for firms that hedge with derivatives and debt denominated in the currency of the target country.**

**H₄: Derivatives usage is related to the size of the firm and the risk being hedged. Firms that use interest rate derivatives and commodity derivatives but not foreign currency derivatives are not too small to hedge the exposure from the deal.**

## 3. Data

The sample consists of all U.S. firms that acquired foreign firms during the period 1996-2004 as reported by Securities Data Corporation (SDC). The acquisition must lead to control of the target, which we define as purchasing more than 50% of the target (the average fraction acquired is 98%; the median 100%). The target must have publicly traded stock, thus making it more likely that we can obtain financial information about it from other databases such as Datastream and Worldscope. We require that the acquisition be an important event for the acquiring firm: The market value of the target must be at least 5% of the market value of the acquirer, where the target's market value is assumed to be the "deal value" reported by SDC. SDC reports 120 acquisitions that meet these requirements. Accounting data for the acquirer are from Compustat and stock-related variables are from CRSP. We obtain target market data from Datastream or, if unavailable, from Bloomberg. Weekly returns are used to reduce the noise induced by using daily returns while increasing the number of observations relative to monthly returns to strengthen the power of the tests. We use 2 years of data before and after the merger/acquisition and thus have a sufficient number of observations (104 in each sub-period) in order to obtain reliable estimates of exposure. The final sample consists of 105 completed deals.

We collect data on the foreign operations of the acquirer and the target from SEC filings made before and after the acquisition. In particular, we determine whether the acquiring firm has a presence in the target country before the deal by examining filings prior to the deal. We can also usually determine whether the target was involved in selling outside its country by examining the acquiring firm's filings on Edgar after the deal. In a few cases, we obtain information about the

target from its filings in the home country or with the SEC when the target has sold securities in the United States (such as an ADR). Based on these disclosures, we classify acquirers according to whether they (1) had production facilities in the country of the target prior to the acquisition, and (2) were already selling to the target firm's country before the deal. Similarly, we classify targets according to whether they (1) sell in the United States; (2) sell outside the target country but not in the United States; and (3) produce their goods outside their home country.

Firms vary in the extent to which they report foreign operations: Some state the dollar amount of sales in a particular region (such as Europe), while others provide a breakdown for at least some countries (e.g. Germany, France and other parts of Europe). Consequently, it is not possible to determine precisely how the acquisition changes the sales and expense figures of the company. It is, however, possible to rank firms in terms of how much the figures are likely to have changed. Firms that already operate in a country before the acquisition and firms that acquire targets that are selling in the United States are less likely to see a significant change in exposure after the acquisition, while firms that have no presence in the country before the deal and buy targets that have no presence outside the home country are more likely to have significant currency exposure after the deal.

As discussed above, currency exposures are likely smaller if the acquiring firm hedges. To this end, we collect data on derivatives usage from the firms' 10-K reports filed prior to the takeover and after the deals are completed. We collect data on the notional value of derivatives instruments, when available, to see if firms increase their hedging of the target country's currency as a result of the acquisition. We also collect data on firms' hedging activities with interest rate and other non-currency derivatives to determine if high start-up costs of foreign currency derivatives prevent their use.

Finally, we collect data on debt denominated in the target country's currency. Firms vary in the extent to which they report this information. Some firms report that they received a loan from a Canadian bank, but do not mention whether it is in U.S. or Canadian dollars, while others report they have a loan from a Canadian bank that is denominated in U.S. dollars. We only categorize debt as denominated in the target country's currency if the firm specifically reports that the currency of its debt is denominated in that currency or if we are able to determine that a bond is denominated in that currency from its description on Bloomberg.

## 4. Results

Table 1 presents summary statistics for the sample. Panel A indicates that most of our deals occur after 1998, when new accounting standards (SFAS 133) required increased disclosure of derivatives usage. The most common target country in the sample is Canada, followed by the United Kingdom. Because these two countries represent such a large portion of the sample, we rerun our tests (in unreported results) on the subsample of firms whose targets are not in those two countries. We find the results are largely unchanged between the two samples. While a large variety of industries are represented in the sample, we see slightly more activity among software and computer firms and among energy-related businesses. By construction, the sample has only deals that are large. The average target size, as measured by deal value, is nearly a third of the average size of the acquirer. A large fraction of the deals involve equity financing, as is common among large deals.

We begin by estimating equation (1) for each of the 105 firms in our sample using weekly returns over a four year period (the two years prior to the merger and the two years following the merger). For the market return, we use the value-weighted CRSP stock index.[5] We expect that for

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[5] In unreported results, we also estimate equation (1) using a global market index. The results are qualitatively the same.

firms with no business ties to the target country prior to the merger exposures will be significant in the period following the acquisition, which we investigate by estimating equation (2). Alternatively, we can estimate equation (1) twice, once in the time period preceding the acquisition and once after, but that estimation procedure would be less efficient. For completeness, we also include the stock market index of the target country as well as its interaction with the post-merger period indicator variable, allowing the country return's effect to vary before and after the merger.

Table 2 reports the number of firms with significant exposure to the currency of the target country (either positive or negative). As is common in this literature, few sample firms have significant estimates of $\delta_j$ at the 5% level. Nonetheless, the fraction of significant coefficients is slightly higher than one would expect from randomness. In particular, 14.3% of the firms have significant positive coefficients on the target country's exchange rate, while 3.8% have significant negative exposures using the standard specification (equation (1)). We report the average exposure in the sample, but note that because we are aggregating across firms with positive and negative exposures, it is likely to be insignificant. When allowing the exchange rate exposure to differ before and after the acquisition, the fraction of significant positive coefficients is almost as high as in equation (1), but split between significance in the early and in the later time periods. Note that these results suggest a significant average exposure before the acquisition takes place, so that for the typical firm in our sample the acquisition is not the first source of exposure to the target country.

Measurement error in the time series estimates of exposure ($\delta_j$) may explain the rather low fraction of significant estimated exposures, suggesting that only a cross-sectional test of the significance of $\delta_j$ has sufficient power to detect a role for exchange rates. In our setting, even if all the firms were net importers or all the firms were net exporters (i.e., even if all the estimates of $\delta_j$ had the same sign), these coefficients will not be drawn from the same distribution, as the exposure

estimated for one country's exchange rate is unlikely to be the same magnitude as that for another country. Therefore, the various countries' exchange rates are normalized prior to estimating the exposures. Specifically, we calculate the mean and standard deviation of the target country exchange rate over the four years surrounding the acquisition. Our normalization involves subtracting the mean off the exchange rate and dividing by the standard deviation. As it turns out, the majority of the firms in our sample are net exporters (61 firms have positive coefficients in model 3 versus 44 with negative coefficients), so the cross-sectional t-test and p-values reported in Table 2 show that exchange rate exposures for the sample as a whole are significant with a positive sign. These cross-section tests suggests that measurement error is a major hurdle in finding significance in a time series setting, just as it is in tests of the CAPM.

Table 3 shows the results of the same specifications estimated using a trade-weighted basket of exchange rates instead of the bilateral exchange rate of the target country. Overall, the fraction of firms with significant exposures is smaller than in Table 2.[6] This result suggests that the lack of significance in past exposure studies owes in part to the use of an exchange rate index. A trade-weighted basket is likely to place too much emphasis on some exchange rates that are not important for a particular company, while putting too little emphasis on exchange rates of countries that are important trade partners for a particular firm. In addition, a basket of exchange rates may be problematic because it has less volatility than any one exchange rate, making measurement error an even larger problem in the time-series estimation.

One concern with using bilateral exchange rates is that it will not be the most appropriate way to assess the exposure of multinationals with multiple lines of business in different countries.

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[6] Again, in unreported results, the inclusion of a world market index as a control variable has no qualitative effect on the exposure coefficients.

In that case, using a bilateral exchange rate will not estimate its total exchange rate exposure, but only the specific exposure to the exchange rate of interest. Note that this will potentially lead to a smaller exposure estimate and thus bias the results against finding significance for bilateral exposures.[7]

The specification in equation (2) allows for changes in exchange rate exposure from the period before the deal to the period. In the most simplistic of situations, the change can be summarized as going from no exposure before the deal (because the firm is just operating in the U.S.) to significant exposure after the deal, reflecting the change in cash flows that accompany the acquisition. However, many other situations could arise and other factors come into play. For example, the impact of the deal on the acquirer depends on the characteristics of the target acquired, such as the target's own exposure to exchange rate risk. Therefore, we estimate equation (1) for the target firms before they are acquired. We report these results as well as characteristics that would affect the post-merger sensitivity of the acquirer in Table 4. Scarcely any of the targets have significant exchange rate exposures (Panel A). In addition, characteristics of the acquirer are relevant. For instance, Panel B indicates that some of the acquiring firms hedge exchange rate risk with derivatives: About a third of the firms use one or more currency derivatives tied to the target country currency after the acquisition. And, nearly two thirds of the acquirers in our sample already have operations in the target country, making it more likely that the acquisition serves to reduce exposure to the target country rather than increase it.

The majority of our firms have substantial business ties with the target country prior to the acquisition. Accordingly, Table 5 further analyzes the relationship between currency exposures and

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[7] For robustness, we have also estimated the bilateral exchange rate exposure controlling for the multilateral exchange rate and find similar results.

pre-merger activities of the acquiring firms in the target countries. While we do not know precisely the extent to which the sample firms are importing from the targets' country prior to the deal, we do have data (collected from SEC filings) that shows the majority of the acquiring firms are selling their products and producing in the target country prior to the acquisition: 66% of the firms have sales in the target country, and 68% have production facilities in the target country. Most of these firms (63%) have both sales and production facilities in the target country prior to the acquisition. Firms selling in the target country also tend to acquire larger target firms, and face slightly higher exchange rate volatility.

Table 5 reports results that show support for **H₁:** Of the 69 firms that sell in the target country prior to the deal, 44 (64%) have positive coefficients in the period prior to the deal. In contrast, of the 31 firms that had no presence in the target country before the deal only 42% have positive coefficients before the deal, even less than the 50% we would expect if the coefficients were equal to zero and the noise were symmetrically distributed around zero. The *t*-statistic for the cross-section test of the exposure coefficients is significant for the firms that were selling in the target country prior to the deal, whereas the firms with no presence before the deal do not have a significant *t*-statistic.

Given that such a large fraction of the sample has exposure to the target country prior to the acquisition, we expect that many firms will have a structural break in their time series exposure at the time of the acquisition. Therefore, we split the sample into firms that had positive exposures prior to the deal (exporters) and firms that had pre-merger negative exposures (importers). Exporters on average should have less positive coefficients after the deal if the group as a whole is using the deal as a natural hedge. Likewise, importers should have less negative coefficients after the deal when it helps them to hedge existing operations. Table 6 shows the results of these cross-sectional tests, distinguishing between positive and negative exposure estimates in the two years prior to the merger.

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The pre-merger coefficients on the exchange rate exposure are highly significant in the cross-section, as expected because we sorted the sample based on the sign of the coefficients. The more reliable statistics in Table 6, and the ones in which we are most interested, are the cross-section tests of the post-merger coefficients. Results presented in Table 6, Panel A show that for net exporters, the deals on average reduce the exposure of the firm. Similarly, for the net importers (Panel B), the deal makes the coefficient more positive. For this group, the impact of the deal is more pronounced than for the firms in Panel A. Thus, on average, the deals are reducing the net exposures of the firms, which is consistent with them representing operational hedges.

As predicted by **H$_2$**, Table 6 shows that firms with positive currency exposures in the pre-merger period tend to have less positive coefficients after the acquisition (the marginal coefficients in the post-merger period are negative). Likewise, firms with negative exposures before the acquisition are more likely to have positive marginal coefficients on the post-merger period currency variable. Table 7 shows regression analysis exploring the determinants of the change in exposure of the acquirer induced by the acquisitions (marginal coefficients), separated by positive and negative exposures in the pre-merger period. Among the firms with positive exposures in the pre-merger period (net exporters), we expect that the intercept will be negative on average if the deal is effectively a natural hedge. While the relative size of the deal is not significant, its coefficient is positive in all specifications as expected. Other variables of interest do not significantly affect the average post-merger exposure of the exporters. The fact that derivatives are among these variables is consistent with previous studies that suggest derivatives have small effect on the average corporate risk profiles. Firms with negative exposure coefficients in the pre-merger period (net importers) have significant positive intercept coefficients after the deal. Few variables have a discernible impact on the marginal coefficient for these firms, suggesting that financial hedging is not an explanation for the lack of significance found in the previous literature. We also estimated these regressions

(unreported) using weighted least squares where the weights reflect precision in the estimation of the target's exposure, but no variables changed sign or significance by this method.

While we do not find that financial hedging impacts the changes in estimated exposures, many of the firms in the sample do use derivatives. About two-thirds hedge various financial risks around the time of the merger, though far fewer use exchange rate derivatives denominated in the currency of the target after the acquisition. Table 8 presents the results of logit regressions that estimate the propensity of acquiring firms to use currency derivatives. Consistent with economic intuition and some prior evidence, larger acquirers more often use target country currency derivatives as well as currency derivatives of any kind. Firms that hedge with foreign currency denominated debt tend to also use financial derivatives to hedge, especially derivatives based on the target country currency.

## 5. Conclusion

Previous studies find that estimates of the impact of exchange rates on individual stock returns are frequently not significant. The literature has identified several explanations for these results: (1) exchange rate risk may not be important to most U.S. firms, either because the exchange rates are not volatile or because U.S. firms' profits are mainly driven by domestic factors; (2) exchange rate risk is important, but exposure estimates show little significance because currency risk is highly correlated with market risk; (3) currency risk is important, but it is poorly measured by a trade-weighted basket of currencies; and (4) exchange rate risk is important, but firms undertake hedging activities to offset this risk, using a combination of operational hedges (pass-through, foreign production/sourcing) and financial hedges (derivatives, foreign currency-denominated debt).

This study addresses these potential explanations with a unique dataset of U.S. firms that acquire targets in other countries. The dataset allows estimation of the impact of exchange rates

using firm-specific bilateral exchange rates and a time period where underlying exposure is known to exist. We can also determine if the change in exposure from before to after the acquisition is related to changes in the acquiring firm's operations. Moreover, we investigate the hedging activities of the acquirer before and after the deal to determine if exposure estimation is hampered by the use of derivatives or debt denominated in foreign currencies.

We find that estimates of exchange rate exposure are less insignificant in our sample than in previous studies. While the time-series regressions reveal only a small fraction of significant exchange rate coefficients, cross-sectional tests typically reveal that exchange rate risk has a significant impact on stock returns. We infer that measurement error in time series regressions of individual firm stock returns makes it unlikely that exchange rate coefficients will be significantly different from zero. We also find that identifying an appropriate bilateral exchange rate for a particular firm is important in currency exposure tests.

Another hurdle facing researchers that we find important is knowledge of how exposure changes over time. Among the firms in our sample with positive (negative) exposure prior to the acquisition, the average change in exposure as a result of the deal is negative (positive), indicating that foreign acquisitions represent operational hedges that shrink exposures towards zero. In contrast, we find that the use of foreign currency derivatives plays no discernible role in managing the overall risk profile of the acquirers, despite the fact that a number of firms in the sample appear to have access to derivatives markets.

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## Table 1: Summary Statistics for Acquisitions of Foreign Targets by U.S. Firms

The table shows summary statistics on the acquisitions of foreign target firms by U.S. firms. In particular, Panel A shows the number of transactions (N) by year. In total, there are 105 transactions during the sample period 1996-2004. Panel B shows the industries of the acquiring firms and target firms for the 71 most important industries. Panel C provides a break-down of the countries of the target firms, and Panel D shows selected characteristics of the deals.

Panel A.  Time

| Year | N |
|------|-----|
| 1996 | 3 |
| 1997 | 13 |
| 1998 | 27 |
| 1999 | 21 |
| 2000 | 12 |
| 2001 | 8 |
| 2002 | 6 |
| 2003 | 12 |
| 2004 | 3 |
| Total | 105 |

Panel B.  Industry

| Industry | Acquirer | Target |
|----------|----------|--------|
| Business services | 16 | 16 |
| Oil and gas extraction | 13 | 14 |
| Other electrical equipment, not computers | 10 | 11 |
| Precision instruments | 9 | 8 |
| Computers | 8 | 8 |
| Chemicals and allied products | 6 | 7 |
| Paper | 5 | 3 |
| Food and kindred products | 4 | 4 |
| Total of most common industries | 71 | 71 |

Panel C.  Geography

| Target Country | N |
|----------------|-----|
| Australia | 6 |
| Bermuda | 3 |
| Canada | 39 |
| Denmark | 2 |
| France | 1 |
| Germany | 4 |
| Israel | 2 |
| Italy | 2 |
| Mexico | 1 |
| Netherlands | 2 |
| New Zealand | 1 |
| Norway | 4 |
| Singapore | 1 |
| Sweden | 2 |
| Switzerland | 2 |
| Taiwan | 1 |
| Thailand | 1 |
| United Kingdom | 31 |

Panel D.  Deal Characteristics

| | Mean | Median |
|--|------|--------|
| Deal value (US$) | 926.4 | 300.0 |
| Acquiring firm market value (US$) | 3142.3 | 1154.3 |
| Percent of deal compensation paid in stock | 36.6 | 0.0 |
| Percent of deal compensation paid in cash | 55.9 | 70.6 |
| Percent of deals that used debt financing | 4.8 | 0.0 |
| Percent of deals that used equity financing | 44.8 | 0.0 |

## Table 2: Bilateral Exchange Rate Exposure of U.S. Acquirers

The table shows summary statistics from firm-level regressions for U.S. acquiring firms. In specification (1), the weekly stock return of each acquiring firm is regressed on the percentage change in the bilateral exchange rate between the U.S. dollar and the currency of the target firm, and the return on the value-weighted U.S. stock market index during the pre-merger period. Specification (2) also includes the percentage change in the exchange rate in the post-merger period. Specification (3) also includes the U.S. stock market index return in the post-merger period. Specification (4) further includes the return of the stock market index of the target country in the pre-merger period and post-merger period. The pre-merger period covers 2 years before the merger, while the post-merger period covers 2 years after the merger. All returns are in U.S. dollars. Exchange rates are in U.S. dollars relative to foreign currency. The table shows the percentage of significant positive and negative coefficients at the 5% significance level, the average coefficient, as well as $t$-statistics and $p$-values of cross sectional tests that the mean coefficient is equal to zero.

| | | Pre-Merger | | | Post-Merger | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | Exchange Rate | US Market Index | Target Country Market Index | Exchange Rate | US Market Index | Target Country Market Index |
| (1) | Percent significant positive | 14.3% | 92.4% | | | | |
| | Percent significant negative | 3.8% | 0.0% | | | | |
| | Average coefficient | 0.003 | 1.020 | | | | |
| | Cross-section $t$-statistic | 3.69 | 17.42 | | | | |
| | Cross-section $p$-value | 0.001 | 0.001 | | | | |
| (2) | Percent significant positive | 7.6% | 91.4% | | 3.8% | | |
| | Percent significant negative | 2.9% | 0.0% | | 2.9% | | |
| | Average coefficient | 0.002 | 1.020 | | 0.000 | | |
| | Cross-section $t$-statistic | 2.78 | 17.58 | | 0.32 | | |
| | Cross-section $p$-value | 0.007 | 0.001 | | 0.751 | | |
| (3) | Percent significant positive | 6.7% | 76.2% | | 2.9% | 7.6% | |
| | Percent significant negative | 2.9% | 0.0% | | 2.9% | 8.6% | |
| | Average coefficient | 0.002 | 1.050 | | 0.000 | -0.006 | |
| | Cross-section $t$-statistic | 2.93 | 17.49 | | 0.36 | -0.10 | |
| | Cross-section $p$-value | 0.004 | 0.001 | | 0.722 | 0.924 | |
| (4) | Percent significant positive | 4.8% | 61.0% | 8.6% | 3.8% | 3.8% | 6.7% |
| | Percent significant negative | 2.9% | 0.0% | 0.0% | 4.8% | 6.7% | 3.8% |
| | Average coefficient | 0.002 | 1.030 | 0.001 | 0.001 | -0.121 | 0.005 |
| | Cross-section $t$-statistic | 2.17 | 13.83 | 0.82 | 0.40 | -1.56 | 2.43 |
| | Cross-section $p$-value | 0.033 | 0.001 | 0.414 | 0.694 | 0.121 | 0.017 |

# Table 3: Multilateral Exchange Rate Exposure of U.S. Acquirers

The table shows summary statistics from firm-level regressions for U.S. acquiring firms. In specification (1), the weekly stock return of each acquiring firm is regressed on the percentage change in the multilateral U.S. exchange rate (trade-weighted basket), and the return on the value-weighted U.S. stock market index during the pre-merger period. Specification (2) also includes the percentage change in the exchange rate in the post-merger period. Specification (3) also includes the U.S. stock market index return in the post-merger period. Specification (4) further includes the return of the stock market index of the target country in the pre-merger period and post-merger period. The pre-merger period covers 2 years before the merger, while the post-merger period covers 2 years after the merger. All returns are in U.S. dollars. Exchange rates are in U.S. dollars relative to foreign currency. The table shows the percentage of significant positive and negative coefficients at the 5% significance level, the average coefficient, as well as $t$-statistics and $p$-values of cross sectional tests that the mean coefficient is equal to zero.

| | | Pre-Merger | | | Post-Merger | | |
|---|---|---|---|---|---|---|---|
| | | Exchange Rate | US Market Index | Target Country Market Index | Exchange Rate | US Market Index | Target Country Market Index |
| (1) | Percent significant positive | 10.5% | 92.4% | | | | |
| | Percent significant negative | 2.9% | 0.0% | | | | |
| | Average coefficient | 0.205 | 1.047 | | | | |
| | Cross-section $t$-statistic | 2.61 | 18.13 | | | | |
| | Cross-section $p$-value | 0.010 | 0.001 | | | | |
| (2) | Percent significant positive | 4.8% | 92.4% | | 1.9% | | |
| | Percent significant negative | 1.9% | 0.0% | | 1.0% | | |
| | Average coefficient | 0.146 | 1.051 | | 0.091 | | |
| | Cross-section $t$-statistic | 1.78 | 18.09 | | 0.72 | | |
| | Cross-section $p$-value | 0.078 | 0.001 | | 0.476 | | |
| (3) | Percent significant positive | 7.6% | 78.1% | | 2.9% | 8.6% | |
| | Percent significant negative | 0.0% | 0.0% | | 0.0% | 9.5% | |
| | Average coefficient | 0.153 | 1.075 | | 0.078 | 0.019 | |
| | Cross-section $t$-statistic | 1.86 | 17.73 | | 0.62 | 0.30 | |
| | Cross-section $p$-value | 0.066 | 0.001 | | 0.539 | 0.763 | |
| (4) | Percent significant positive | 6.7% | 60.0% | 9.5% | 1.9% | 3.8% | 5.7% |
| | Percent significant negative | 1.9% | 0.0% | 0.0% | 2.9% | 4.8% | 2.9% |
| | Average coefficient | 0.111 | 1.045 | 0.001 | 0.105 | -0.108 | 0.006 |
| | Cross-section $t$-statistic | 1.35 | 14.42 | 1.00 | 0.86 | -1.44 | 2.63 |
| | Cross-section $p$-value | 0.180 | 0.001 | 0.321 | 0.394 | 0.152 | 0.010 |

## Table 4: Target Firm Exchange Rate Exposure and Hedging Characteristics

The table shows various firm characteristics that affect the exchange rate exposure of U.S. acquirers. Panel A shows summary statistics from firm-level regressions for target firms. In particular, the weekly stock return of each target firm is regressed on the percentage change in the bilateral exchange rate between the U.S. dollar and the currency of the target firm, and the return on the value-weighted stock market index of the target firm's country during the pre-merger period. All returns are in local currency. Exchange rates are in U.S. dollars relative to foreign currency. The table shows the average coefficient, as well as *t*-statistics and *p*-values of cross sectional tests that the mean coefficient is equal to zero. It also shows the percentage of significant positive and negative coefficients (at the 5% significance level), as well as the average positive and negative coefficient. Panel B shows the percentage of target or acquiring firms with various natural and financial hedging characteristics in the pre-merger and post-merger period, respectively. The pre-merger period covers 2 years before the merger, while the post-merger period covers 2 years after the merger.

### Panel A: Target Firm Exchange Rate and Market Exposures

|  | Exchange Rate | Target Country Market Index |
|---|---|---|
| Average coefficient | 0.120 | 0.510 |
| Cross-sectional *t*-statistic | 1.36 | 9.83 |
| Percent significant positive | 10% | 47% |
| Percent significant negative | 1% | 0% |
| Average positive coefficient (n=57) | 0.620 | |
| Average negative coefficient (n=48) | -0.480 | |

### Panel B: Natural and Financial Hedging Characteristics

|  | Pre-Merger | Post-Merger |
|---|---|---|
| Target produces outside of target country | 84% | |
| Target sells outside of target country | 91% | |
| Acquirer produces in or sells in target country | 65% | |
| Acquirer uses currency derivatives of any kind | 39% | 55% |
| Acquirer uses forwards in target currentcy | 10% | 24% |
| Acquirer uses swaps in target currency | 2% | 6% |
| Acquirer uses options in target currency | 3% | 14% |
| Acquirer has interest rate swaps | 36% | 38% |
| Acquirer has debt denominated in target currency | 19% | 42% |

**Table 5: Exchange Rate Exposure and Pre-Merger Activity of Acquirers in the Target Country**

The table shows statistics on the bilateral exchange rate exposure of U.S. acquirers in the pre-merger period by activity in the target country prior to the merger. In particular, results are presented for the Full sample, acquirers that sell in the target country prior to the deal, as well as acquirers that have no presence in the target country prior to the deal. The table shows the number of firms and fraction of the total sample. Moreover, it shows the percentage of firms with positive as well as significant positive foreign exchange rate exposures (at the 5% significance level). Subsequently, it shows the percentage of firms with negative as well as significant negative foreign exchange rate exposures (at the 5% significance level). Finally, it shows the average foreign exchange rate exposure coefficient as well as $t$-statistics and $p$-values of cross sectional tests that the mean coefficient is equal to zero. Foreign exchange rate exposure is estimated as the coefficient on the bilateral exchange rate between the U.S. dollar and the currency of the target firm in a regression of acquirer stock returns on the percentage change in the exchange rate and the return on the U.S. value weighted stock market index during two years prior to the acquisition. All returns are in U.S. dollars. Exchange Rates are in U.S. dollars relative to foreign currency.

| | Full Sample | Acquirer Sells in Target Country Prior to Deal | Acquirer Has no Presence in Target Country Prior to Deal |
|---|---|---|---|
| Number of firms | 105 | 69 | 31 |
| Percent of sample | 100.0% | 65.7% | 29.5% |
| | | | |
| Exchange Rate Exposure in Pre-Merger Period | | | |
| Positive | 58.1% | 63.8% | 41.9% |
| Significant positive | 6.7% | 7.2% | 6.5% |
| | | | |
| Negative | 41.9% | 36.2% | 58.1% |
| Significant negative | 2.9% | 1.4% | 0.0% |
| | | | |
| Average | 0.002 | 0.003 | 0.003 |
| Cross-sectional $t$-statistic | 2.93 | 3.35 | 1.29 |
| Cross-sectional $p$-value | 0.004 | 0.001 | 0.208 |

## Table 6: Bilateral Exchange Rate Exposures of Net Exporters and Net Importers

The table shows summary statistics from firm-level regressions for U.S. acquiring firms, separately for net exporters (Panel A) and net importers (Panel B). Net exporters (importers) are U.S. firms with a positive (negative) exchange rate exposure prior to the acquisition, where the exposure is measured as the coefficient on the bilateral exchange rate between the U.S. dollar and the currency of the target firm in a regression of acquirer stock returns on the percentage change in the exchange rate and the return on the U.S. value weighted stock market index during two years prior to the acquisition. In specification (1), the weekly stock return of each acquiring firm is regressed on the percentage change in the bilateral exchange rate between the U.S. dollar and the currency of the target firm, the return on the value-weighted U.S. stock market index during the pre-merger period, as well as the percentage change in the exchange rate in the post-merger period. Specification (2) also includes the U.S. market index return in the post-merger period. Specification (3) further includes the return of the stock market index of the target country in the pre-merger period and post-merger period. The pre-merger period covers 2 years before the merger, while the post-merger period covers 2 years after the merger. All returns are in U.S. dollars. Exchange Rates are in U.S. dollars relative to foreign currency. The table shows the average coefficient, as well as $t$-statistics and $p$-values of cross sectional tests that the mean coefficient is equal to zero.

| | | Pre-Merger | | | Post-Merger | | |
|---|---|---|---|---|---|---|---|
| | | Exchange Rate | US Market Index | Target Country Market Index | Exchange Rate | US Market Index | Target Country Market Index |
| **Panel A: Net Exporters (N=61)** | | | | | | | |
| (1) | Average coefficient | 0.008 | 1.049 | | -0.004 | | |
| | Cross-section $t$-statistic | 8.39 | 13.29 | | -2.51 | | |
| | Cross-section $p$-value | 0.001 | 0.001 | | 0.015 | | |
| (2) | Average coefficient | 0.007 | 1.130 | | -0.004 | -0.075 | |
| | Cross-section $t$-statistic | 8.40 | 13.84 | | -2.17 | -0.91 | |
| | Cross-section $p$-value | 0.001 | 0.001 | | 0.034 | 0.366 | |
| (3) | Average coefficient | 0.007 | 1.053 | 0.003 | -0.004 | -0.176 | 0.004 |
| | Cross-section $t$-statistic | 8.08 | 10.16 | 1.44 | -2.31 | -1.82 | 1.48 |
| | Cross-section $p$-value | 0.001 | 0.001 | 0.155 | 0.024 | 0.074 | 0.144 |
| **Panel B: Net Importers (N=44)** | | | | | | | |
| (1) | Average coefficient | -0.005 | 0.984 | | 0.007 | | |
| | Cross-section $t$-statistic | -5.31 | 11.44 | | 4.05 | | |
| | Cross-section $p$-value | 0.001 | 0.001 | | 0.001 | | |
| (2) | Average coefficient | -0.004 | 0.949 | | 0.007 | 0.090 | |
| | Cross-section $t$-statistic | -6.05 | 10.87 | | 3.93 | 0.94 | |
| | Cross-section $p$-value | 0.001 | 0.001 | | 0.001 | 0.353 | |
| (3) | Average coefficient | -0.005 | 0.993 | -0.001 | 0.007 | -0.045 | 0.007 |
| | Cross-section $t$-statistic | -6.16 | 9.45 | -0.74 | 4.32 | -0.35 | 2.01 |
| | Cross-section $p$-value | 0.001 | 0.001 | 0.463 | 0.001 | 0.728 | 0.051 |

## Table 7: Determinants of Post-Merger Exchange Rate Exposure

The table shows regression results of the determinants of the post-merger exchange rate exposure, separately for net exporters and net importers. The dependent variable of the regression is the exchange rate exposure from a regression of the weekly stock return of each acquiring firm on the percentage change in the bilateral exchange rate between the U.S. dollar and the currency of the target firm, and the return on the value-weighted U.S. stock market index during the pre- and post-merger period. The pre-merger period covers 2 years before the merger, while the post-merger period covers 2 years after the merger. All returns are in U.S. dollars. Exchange rates are in U.S. dollars relative to foreign currency. "Relative deal size" is the amount the acquirer paid for the target divided by its market value. "Acquirer sells in target country prior to deal" is an indicator variable set to one for firms that had sales in the target country prior to the deal, and zero otherwise. "Acquirer uses any currency derivative" is an indicator variable set to one for firms that use currency derivatives after the deal, and zero otherwise. "Acquirer uses derivatives on target currency" is an indicator variable set to one for acquirers that use derivatives denominated in the target country currency after the merger, and zero otherwise. "Acquirer uses foreign currency debt" is an indicator variable for firms that have debt denominated in the currency of the target's country, and zero otherwise. Target exposure is the coefficient on the exchange rate from a regression of target firm stock returns on the percentage change in the exchange rate and the target country's stock market index return prior to the acquisition. T-statistics are in parentheses (significant coefficients at the 10% or lower level are in bold). The table also shows the adjusted $R^2$, and the number of observations (N).

| | Net Exporters | | | | | | Net Importers | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (1) | (2) | (3) | (4) | (5) | (6) |
| Relative deal size | 4.848 | 4.827 | 4.914 | 4.720 | 5.347 | | -0.311 | -0.294 | -0.565 | -0.478 | -0.064 | |
| | (1.17) | (1.16) | (1.17) | (1.13) | (1.13) | | (-0.08) | (-0.07) | (-0.69) | (-0.12) | (-0.02) | |
| Acquirer sells in target country prior to deal | | 0.004 | | | | | | 0.001 | | | | |
| | | (0.88) | | | | | | (0.16) | | | | |
| Acquirer uses any currency derivative | | | 0.001 | | | | | | -0.002 | | | |
| | | | (0.16) | | | | | | (-0.69) | | | |
| Acquirer uses derivatives on target currency | | | | 0.001 | | | | | | -0.001 | | |
| | | | | (0.35) | | | | | | (-0.37) | | |
| Acquirer uses foreign currency debt | | | | | -0.001 | | | | | | -0.003 | |
| | | | | | (-0.22) | | | | | | (-0.82) | |
| Target exposure to US ($/FC) is *positive* | | | | | | 0.212 | | | | | | -0.170 |
| | | | | | | (0.89) | | | | | | (-1.37) |
| Target exposure to US ($/FC) is *negative* | | | | | | -0.151 | | | | | | 0.447 |
| | | | | | | (-0.41) | | | | | | (1.19) |
| Intercept | -0.006 | -0.009 | -0.006 | -0.007 | -0.006 | -0.005 | 0.007 | 0.006 | 0.008 | 0.007 | 0.008 | 0.009 |
| | **(-2.32)** | **(-2.18)** | **(-1.87)** | **(-2.24)** | **(-2.15)** | **(-2.08)** | **(2.71)** | **(2.01)** | **(2.48)** | **(2.55)** | **(2.77)** | **(3.69)** |
| Adjusted $R^2$ | 0.01 | 0.002 | -0.01 | -0.01 | -0.01 | 0.00 | -0.024 | -0.050 | -0.040 | -0.045 | -0.032 | 0.012 |
| N | 61 | 61 | 61 | 61 | 61 | 61 | 44 | 44 | 44 | 44 | 44 | 44 |

## Table 8: Determinants of Foreign Currency Derivatives Usage by U.S. Acquirers

The table shows results from a logit analysis of the determinants of usage of foreign currency derivatives by the acquiring U.S. firms, alternatively for the use of any foreign currency derivatives or derivatives (swaps, forwards or options ) in the currency of the target country in the year of the acquisition. "Relative deal size" is the amount the acquirer paid for the target divided by its market value. "Market value of the acquirer" is the size of the U.S. acquirer using the price and shares outstanding from CRSP in the 6 months prior to the acquisition. "Acquirer sells in target country prior to deal" is an indicator variable set to one for firms that had sales in the target country prior to the deal, and zero otherwise. "Acquirer uses interest rate derivatives" is an indicator variable set to one if the acquirer uses interest rate derivatives, and zero otherwise. "Acquirer uses foreign currency debt" is an indicator variable for firms that have debt denominated in the currency of the target's country, and zero otherwise. Chi-squared statistics are reported in bold. The table also shows the Pseudo $R^2$, and the number of observations (N).

| | Any Foreign Currency Derivatives | | | | Derivatives in Target Country Currency | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (1) | (2) | (3) | (4) |
| Relative deal size | 350.8 | 391.3 | 257.8 | 100.3 | 931.5 | 950.5 | 921.6 | 606.9 |
| | **0.41** | **0.50** | **0.20** | **0.03** | **2.64** | **2.73*** | **2.56** | **0.94** |
| Market value of acquirer | 0.72 | 0.76 | 0.68 | 0.72 | 0.71 | 0.73 | 0.7 | 0.74 |
| | **17.445*** | **17.99*** | **14.07*** | **17.75*** | **15.65*** | **15.72*** | **13.98*** | **15.92*** |
| Acquirer sells in target country prior to deal | | -0.51 | | | | -0.26 | | |
| | | **1.12** | | | | **0.27** | | |
| Acquirer uses interest rate derivatives | | | 1.13 | | | | 0.11 | |
| | | | **5.18**** | | | | **0.05** | |
| Acquirer uses foreign currency debt | | | | 0.73 | | | | 1.03 |
| | | | | **2.28** | | | | **4.19**** |
| Intercept | -9.95 | -10.17 | -9.61 | -10.11 | -11.09 | -11.20 | -10.96 | -11.83 |
| | **15.97*** | **16.23*** | **13.74*** | **16.65*** | **17.15*** | **17.33*** | **16.07*** | **17.80*** |
| N | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 |
| Dependent variable is one | 58 | 58 | 58 | 58 | 35 | 35 | 35 | 35 |
| Pseudo $R^2$ | 0.21 | 0.22 | 0.25 | 0.23 | 0.18 | 0.18 | 0.18 | 0.21 |