

Foreign Currency Exposure and Hedging: Evidence from Foreign Acquisitions

Söhnke M. Bartram

Lancaster University

Natasha Burns

University of Texas at San Antonio

Jean Helwege

Penn State University

FX Exposure and Stock Returns

- Firm value is affected by FX risk due to
 - foreign sales, foreign sourcing, foreign (import) competition
- Expect that FX risk is priced in stock returns; Adler and Dumas 1984; Jorion (1990)

$$R_{jt} = \alpha + \beta_j R_{Mt} + \delta_j R_{FXt} + \varepsilon_{jt} \quad (1)$$

- Existing research has documented little economic and statistical significance of exchange rate exposures
- δ is estimated for each firm; the percentage of times that δ is significant is often no more than would occur randomly

Research Question

This paper analyzes a dataset of U.S. firms that acquire foreign targets in order to better understand why the previous literature has had such low success in identifying effects of forex on stock returns.

The use of acquiring firms helps to identify the source of the forex risk and how the firm offsets that risk, if indeed it does.

Why Doesn't FX Affect Stock Returns?

1. It just does not matter
2. It does matter, but measurement error in the estimation of equation (1) makes it impossible to find significant effects:
 - a. Exchange rates may not move enough to accurately measure their impact
 - b. It only matters to some firms, but we don't know which ones
 - c. We cannot easily measure the part of FX risk that is orthogonal to market risk
3. It matters, but only if we have the right exchange rate (e.g., trade-weighted basket)
4. It matters, but the firms try to hedge away the risk

Previous Literature

High expected exposure:

Jorion (1990), He and Ng (1998), Williamson (2001), Bartov, Bodnar and Kaul (1996), Bartram and Karolyi (2006), Amihud (1994), Choi and Prasad (1995)

Bilateral exchange rates:

Doukas, Hall and Lang (1999), Bartram (2004), Khoo (1994), Bartram and Karoyli (2006)

Hedging with derivatives:

Allayannis, Ihrig and Weston (2001), Geczy, Minton and Schrand (1997), Allayannis and Weston (2001)

Advantages of our sample

- We know which bilateral exchange rate is important for our firms because we know the target
- We know that there is a major change in exposure from before to after the acquisition
 - Acquisition may be to offset existing exposure or it may be new
 - It is highly unlikely that these are firms for which currency risk is unimportant
- We know the firm's use of currency derivatives before and after the acquisition
 - We know if they use currency derivatives in the target country currency

Data

- All acquisitions in Securities Data Corp. merger file between 1996-2004
 - Hedging disclosure weak before 1996
- Acquirers are US public firms and targets are foreign public firms
- Acquisition of target is 51% of target's stock
- Relative size of acquisition must be large
 - Deal size is at least 5% of MV of acquirer
- Sample size is 120 before data limitations; final sample is 105
- Acquirers' stock returns are from CRSP; targets' from Datastream
- Financial variables from Compustat
- Data on derivatives usage, target country presence pre-merger, target operations and foreign-currency debt from Edgar (largely from the acquiring firms' 10-Ks)

Hypotheses

- 1) Exposure should be more apparent in this sample than in previous studies of US firms
- 2) Using a trade-weighted basket of exchange rates should make it harder to find significant exposure than using the bilateral exchange rate
- 3) Positive coefficients on the exchange rate before the deal are associated with firms that had sales to the target country before the acquisition
 - Exchange rate is defined as percentage change in foreign currency/US dollar
 - Therefore a positive percentage change is a depreciation of the dollar
 - Therefore a firm that exports to the target country will benefit from a positive percentage change in the exchange rate (positive coefficient)

Hypotheses

- 4) Firms with positive coefficients on the exchange rate before the deal will have less positive coefficients after (the marginal coefficient is negative). Opposite for negative exposure firms (their marginal coefficients should be positive)
- 5) We won't see much support for any of these hypotheses if firms are hedging
- 6) Less hedging among small firms that have no access to derivatives market

Table 1
Summary Statistics

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

Table 1
Summary Statistics

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

Table 2
Exchange rate exposure - Bilateral exchange rates

				Post Merger		
	Exchange Rate	VW	Target Country Return	Exchange Rate	VW	Target Country Return
(1) Constant Exposure						
Percent significant positive	14.3%	92.4%				
Percent significant negative	3.8%	0.0%				
Average coefficient	0.003	1.02				
(3) Exposure and market risk vary over time						
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	1.05		0.0005	-0.006	
(4) Exposure and market risk vary over time and target country returns included						
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	1.03	0.001	0.001	-0.12	0.01

Table 3
Exchange rate exposure - Trade-weighted basket of exchange rates

	Exchange Rate	VW	Target Country Return	Post Merger		
				Exchange Rate	VW	Target Country Return
(1) Constant Exposure						
Percent significant positive	10.5%	92.4%				
Percent significant negative	2.9%	0.0%				
Average coefficient	0.21	1.05				
(3) Exposure and market risk vary over time						
Percent significant positive	7.6%	78.1%		2.9%	8.6%	
Percent significant negative	0.0%	0.0%		0.0%	9.5%	
Average coefficient	0.15	1.07		0.08	0.02	
(4) Exposure and market risk vary over time and target country returns included						
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	0.11	1.04	0.001	0.11	-0.11	0.01

Table 4

Characteristics Affecting Acquirer Exchange Rate Exposure

Panel A: Target exchange rate exposure

	Exchange Rate	Target Country Return
Average coefficient	0.12	0.51
T-statistic in cross-section	1.36	9.83
Percent significant positive	10%	47%
Percent significant negative	1%	0%

Panel B: Natural and financial hedging characteristics

Percentage of firms with characteristics.

	before acquisition	after acquisition
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 currency	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
Currency exposure and pre-merger activity in the target country

	Full Sample	Sells in Target	No Presence
Number of firms	105	69	31
Percent of sample	100.0%	65.7%	29.5%
Positive $\bar{\delta}$ in pre-merger period	58.1%	63.8%	41.9%
Significant positive coefficient	6.7%	7.2%	6.5%
Negative $\bar{\delta}$ in pre-merger period	41.9%	36.2%	58.1%
Significant negative coefficient	2.9%	1.4%	0.0%
Average coefficient in pre-merger period	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
Exchange rate exposure - Bilateral exchange rates

Panel A. Positive exposure firms (n=61)				Post Merger		
	Exchange Rate	VW	Target Country Return	Exchange Rate	VW	Target Country Return
(3) Exposure and market risk vary over time						
Average coefficient	0.01	1.13		-0.004	-0.08	
T-statistic in cross-section	8.40	13.84		-2.17	-0.91	
p-value in cross-section	0.001	0.001		0.034	0.366	
(4) Exposure and market risk vary over time and target country returns included						
Average coefficient	0.01	1.05	0.003	-0.004	-0.18	0.004
T-statistic in cross-section	8.08	10.16	1.44	-1.82	-1.82	1.48
p-value in cross-section	0.001	0.001	0.155	0.024	0.074	0.144

Panel B. Negative exposure firms (n=44)

				Post merger		
	Rate	VW	Target Country Return	Rate	VW	Target Country Return
(3) Exposure and market risk vary over time						
Average coefficient	-0.004	0.95		0.01	0.09	
T-statistic in cross-section	-6.05	10.87		3.93	0.94	
p-value in cross-section	0.001	0.001		0.001	0.353	
(4) Exposure and market risk vary over time and target country returns included						
Average coefficient	-0.01	0.99	-0.001	0.01	-0.05	0.01
T-statistic in cross-section	-6.16	9.45	-0.74	4.32	-0.35	2.01
p-value in cross-section	0.001	0.001	0.463	0.001	0.728	0.051

Table 7

Factors affecting post-merger exchange rate exposure

Panel A. Positive coefficients before merger	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-0.01 (-2.32)	-0.01 (-2.18)	-0.01 (-1.87)	-0.01 (-2.24)	-0.01 (-2.15)	-0.01 (-2.08)
Relative Size	4.85 (1.17)	4.83 (1.16)	4.91 (1.17)	4.72 (1.13)	5.35 (1.13)	
Acquirer sells in target prior to deal		0.004 (0.88)				
Acquirer uses any currency derivative			0.001 (0.16)			
Acquirer uses derivatives on target currency				0.001 (0.35)		
Foreign currency debt exists					-0.001 (-0.22)	
Target exposure to US (\$/FC) is <i>positive</i>						0.21 (0.89)
Target exposure to US (\$/FC) is <i>negative</i>						-0.15 (-0.41)
Adjusted R ²	0.01	0.002	-0.01	-0.01	-0.01	0.00

Panel B. Negative coefficients before merger	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.01 (2.71)	0.01 (2.01)	0.01 (2.48)	0.01 (2.55)	0.01 (2.77)	0.01 (3.69)
Relative size	-0.31 (-0.08)	-0.29 (-0.07)	-0.57 (-0.69)	-0.48 (-0.12)	-0.06 (-0.02)	
Acquirer sells in target prior to deal		0.001 (0.16)				
Acquirer uses any currency derivative			-0.002 (-0.69)			
Acquirer uses derivatives on target currency				-0.001 (-0.37)		
Foreign currency debt exists					-0.003 (-0.82)	
Target exposure to US (\$/FC) is <i>positive</i>						-0.17 (-1.37)
Target exposure to US (\$/FC) is <i>negative</i>						0.45 (1.19)
Adjusted R ²	-0.02	-0.05	-0.04	-0.05	-0.03	0.01

Table 8

Logit of Probability of Hedging with Derivatives

	Uses any foreign currency derivatives				Uses forwards options or swaps in target currency			
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
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
	17.45	17.99	14.07	17.75	15.65	15.72	13.98	15.92
Acquirer sells in target before deal		-0.51				-0.26		
		1.12				0.27		
Interest rate derivatives used			1.13				0.11	
			5.18				0.05	
Debt in currency of target exists				0.73				1.03
				2.28				4.19
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

Conclusion

- Even among a group of firms with known exposure to a bilateral exchange rate, only a low fraction of individual stock return regressions have significant exposure.
 - This likely reflects measurement error. Cross-sectional t-statistics help determine significance.
- Bilateral exchange rate coefficients are more significant than coefficients using a trade-weighted basket of exchange rates.

Conclusion

- Only a small fraction of the firms in the sample hedge the exchange rate exposure using derivatives denominated in the target country's currency. We are unable to see any effects of derivatives hedging on exposure estimates.
- Derivatives usage, to the extent it exists in the target country currency, is related to the size of the firm and the relative deal size.
- Acquisitions serve as a natural hedge for most of the sample. Maybe firms that have large enough exposures to show up in the data undo it via operational choices.