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Why Do Firms Raise Foreign Currency Denominated Debt? Evidence from Finland

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Abstract

This study examines the determinants of the decision to raise currency debt. The results suggest that hedging figures importantly in the currency-of-denomination decision: firms in which exports constitute a significant fraction of net sales are more likely to raise currency debt. However, firms also tend to borrow in periods when the nominal interest rate for the loan currency, relative to other currencies, is lower than usual. This is consistent with the currency debt issue decision being affected by speculative motives. Large firms, with a wider access to the international capital markets, are more likely to borrow in foreign currencies than small firms.

Keywords: *currency of denomination*; *hedging*; *speculation*.

JEL classification: *F*23, *G*32.

1. Introduction

The currency of denomination is one of the most important characteristics in any corporate debt issue (see, e.g., Levi, 1990; Giddy, 1994). There are three reasons why a firm might want to raise foreign currency debt.

First, it provides hedging of foreign exchange exposures. The shareholders of a firm can benefit from hedging at the corporate level because it decreases taxes and the costs of financial distress (Smith and Stulz, 1985), and helps ensure that the firm has

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sufficient internal funds available to take advantage of attractive investment opportunities (Froot *et al.*, 1993). Occasionally hedging may be of interest for corporate managers even if it does not benefit shareholders. Hedging increases managers' expected utility from compensation (Stulz, 1984) and reduces the impact that foreign exchange gains and losses have on reported earnings (Smith and Stulz, 1985; DeMarzo and Duffie, 1996).

Second, borrowing in foreign currencies may cost less than borrowing in the domestic currency. Issuing in the Euromarkets may be more economical than domestic borrowing as it helps to circumvent withholding taxes and capital controls imposed by many governments. Shapiro (1984) and Rhee *et al.* (1985) analyse the role of taxes and flotation costs in the determination of loan currency and show that if the expected borrowing costs in two currencies are equal before tax, the process of minimising after-tax borrowing costs generally involves borrowing the weaker currency. Moreover, Shapiro shows that in some countries, such as Finland, tax laws encourage companies to borrow the foreign currency, regardless of whether it is weaker or stronger.

Third, speculative reasons may make foreign currency debt an attractive alternative. A financial manager may choose to deviate from a hedging oriented strategy if she believes that, adjusting for risk, the differential in interest rates between two currencies does not accurately reflect the expected exchange rate change. Such occurrences are not necessarily rare: Hakkarainen *et al.* (1997) report that 72% of the CFOs of 68 large Finnish corporations believe that they can predict exchange rates at least to some extent in the short run and 53% in the long run. While the managers' beliefs appear to be consistent with the well-known findings in the psychology of judgment that people tend to be overconfident (see, e.g., DeBondt and Thaler, 1995), they may also be motivated by the fact that the International Fisher Effect does not necessarily hold. In fact, Virén (1988) documents that in 1980–87 the uncovered interest rate parity relationship was very weak or nonexistent in Finland—much weaker than for countries with more developed capital markets such as Switzerland and Sweden. Also many other researchers, such as Fama (1984), report evidence that is inconsistent with the International Fisher Effect.

Recent studies by Allayannis and Ofek (forthcoming) and Kedia and Mozumdar (1999) examine the use of foreign currency debt in large US corporations, while Doukas *et al.* (2000) study the determinants of foreign exchange risk exposure of Japanese companies. The evidence in these papers is consistent with the notion that hedging demand is an important motivation for issuing currency debt, although the motivation may differ across currencies.[1] To our knowledge, there has not been any rigorous studies on the use of currency debt in Europe, despite of the importance of the research question and the fact that the motivations for particularly US firms to issue currency debt may differ from those of firms in other countries due to differences in the openness of the economy. The lack of empirical studies on the currency-of-denomination decision is probably largely due to the fact that banks are the most

[1] Geczy *et al.* (1997) examine the determinants of currency derivative usage. Also their evidence is consistent with the notion that currency derivatives are primarily used for hedging purposes. Moreover, they find that firms that use currency swaps or combinations of swaps have relatively higher levels of currency debt than firms with no currency derivatives. This suggests that currency derivatives and foreign debt complement each other in reducing a firm's currency risk exposures.

important source of debt financing in many countries (Mayer, 1990), and yet no sources of company information on new bank loan agreements are readily available (James, 1987).

This paper examines the role of foreign currency debt by taking advantage of a unique and comprehensive sample of private and public debt raised by Finnish corporations. The sample includes virtually all of the non-subsidized long-term borrowing of 44 listed Finnish corporations between 1985 and 1991, representing 19% of the total long-term corporate borrowing and 30% of foreign currency denominated long-term corporate borrowing in Finland during the time period. Finnish data are particularly well suited for examining the role of foreign currency debt since Finland is a more open economy than most large industrial countries: in 1994 exports constituted 36% of GNP, whereas the corresponding figure was 11% in the USA and 23% in Germany. Therefore, many Finnish companies—including sample companies which on average generated 35% of their net sales from exports during the sample period—are likely to benefit from raising foreign currency debt for hedging purposes.

The remainder of the paper is organised as follows. The next section provides a short description of Finnish financial institutions and the role of currency denominated loans in Finnish corporate finance. Section three details the data. The sample consists of 337 new loans with an aggregate nominal amount of FIM30 billion (FIM7 $\approx$ US$1) of which FIM25 billion is foreign currency debt. Section four documents the empirical findings. The results suggest that hedging induced demand is an important determinant of the currency-of-denomination decision although we also find evidence consistent with speculative behaviour affecting the choice of loan currency. Section five concludes with a summary of the findings.

2. Finnish financial institutions and the role of foreign currency denominated loans in Finnish corporate finance

Banks play a major role in Finnish corporate finance. As in Japan and Germany, in particular, a large part of the funds for investments are provided in the form of bank loans. Mayer (1990) reports sources of average gross financing of non-financial enterprises in 1970–85 and finds that in Finland 45% of external funding came from banks as opposed to 9% from shares and 3% from bonds.

In addition to banks, insurance companies are an important source of institutional finance for the Finnish corporate sector. For example, in 1991 they provided about 20% of the total borrowing to Finnish industrial companies. Insurance companies differ markedly from banks in that they lend only in the domestic currency. Moreover, because of regulation a significant fraction of their loans to the corporate sector is essentially subsidised.

Another important competitor for banks are state-operated funds that grant Finnish markka denominated loans with low, often subsidised interest rates. State-subsidised loans are mostly targeted at firms that operate in rural areas or in areas that have been hit hardest by the structural changes in the economy. In the late 1980s the competition between the banks and other suppliers of capital was so fierce that the average interest rate marginal for fixed rate markka denominated loans for large firms was on average negative (Niskanen, 1996). This helps to explain why an increasing fraction of bank loans were denominated in foreign currencies after the liberalisation of financial markets made that possible.

Foreign currency denominated long-term borrowing and the use of off-balance sheet hedging instruments were regulated in Finland in the early 1980s. Any company wishing to borrow long-term in a foreign currency had to obtain permission from the Bank of Finland. Permission was usually granted provided that the company seeking it was an industrial company. The only off-balance sheet hedging instrument available was a forward contract with a bank, allowing firms to hedge their transaction exposures. In 1985 the Bank of Finland allowed companies to hedge their transaction and translation exposures without permission and allowed the use of options contracts. The next year industrial and shipping companies were allowed to raise currency loans with maturities of at least five years without permission. In 1987 this ruling was extended to include all companies with the exception of financial institutions and insurance companies. In 1989 the Bank of Finland allowed currency swaps and reduced the maturity restrictions for currency loans to one year.

3. Data

The cornerstone of this study is a database of long-term loans (initial maturity of the loan at least one year) which was obtained from a private survey. The survey was targeted at all non-financial Finnish companies that had a listing for at least three consecutive years on the Helsinki Stock Exchange (first market), in the OTC list (second market), or the Stockbrokers' list (third market) between the years 1985 and 1991. Of these 67 companies ten refused to participate in the study and three provided insufficient data. In addition, we exclude ten firms which did not take any long-term, non-subsidized loans during the sample period. This leaves us with a sample of 44 companies and 337 loans.

The companies were asked to provide the following information on all their long-term non-subsidized debt financing:

- Lender
- Loan size in Finnish markkas on the day the loan was raised
- Initial loan currency (Only two of the 185 foreign currency loans were swapped into another currency at the time of raising the debt. Both swaps involved foreign currencies.)
- Whether the interest rate was initially fixed or floating (ignoring interest rate swaps), and the reference rate for floating rate loans
- Initial loan maturity (ignoring later prepayments)
- Whether collateral was pledged
- Whether the loan was guaranteed

In addition, we use the following firm specific and economy wide variables:

- Exports-to-net sales
- Log (total book assets)
- Debt-to-book assets = total debt/total book assets
- Multinational dummy. A multinational is defined as a firm with at least one foreign subsidiary
- Return-on-book assets = (EBIT − taxes)/total book assets
- Concentration = $\sum_{i=1}^{n} S_i^2/(\sum_{i=1}^{n} S_i)^2$, where S_i is the net sales of a firm's business segment i and n is the number of business segments in that firm

- Book-to-market value of assets = total book assets/(total book assets − book value of equity + market value of equity)
- Dividend yield = dividend per share/year-end stock price
- FIM interest rate—FIM basket interest rate. During the sample period the Finnish markka was first pegged to a basket consisting of 12 currencies and, since June 1991, to the ECU. Both the markka and the basket rates are 3-month rates if the loan is a variable rate loan and 10-year rates if the loan is a fixed rate loan. The interest rates are calculated at the time the loan is raised.
- Dummies for the years 1985–90.

Firm specific financial data were collected from *Listed Companies in Finland*, *Pörssitieto*, and from annual reports. Interest rate data were provided by courtesy of the Bank of Finland.

4. Results

4.1. *Descriptive statistics*

Table 1 shows descriptive statistics of the sample companies. They vary considerably in size and their usage frequency of the long-term loan markets: for example, some small companies raised only one loan during the time period whereas some large companies raised up to 33 loans. Foreign operations play an important role in many of the sample companies as shown by the fact that on average firms generate 35% of their net sales from exports.

Table 2 breaks down by year the number and volume of foreign currency loans, and the difference between the Finnish markka and the basket interest rate. During the sample period both the short and long-term Finnish markka interest rates were on average about 3% higher than the index. This created an incentive for firms to borrow in foreign currencies provided that their financial managers believed that the Finnish markka would not be devaluated. Both the number and total volume of foreign currency loans increased towards the end of the period with the liberation of the financial markets (this pattern is also partly due to the fact that some old loan documents were missing), only to come down in 1991 marking

Table 1

Descriptive statistics of 44 sample companies between the years 1985 and 1991.

Variable	Mean	Median	Minimum	Maximum	N
Total book assets (million FIM)	3621	1292	101	21,716	44
Debt-to-book assets	0.55	0.59	0.15	0.92	44
Exports-to-net sales	0.35	0.24	0	0.94	41
Number of loans	7.66	5	1	33	44

Notes: For a given company, the variable total book assets is calculated as the weighted average of total book assets in the sample years. The weights are determined by the number of loans raised by the company in each year. The variables debt-to-book assets and exports-to-net sales are calculated in the same way. The variable exports-to-net sales is not available for three companies. All nominal values are expressed in terms of the purchasing power of 1991 Finnish markkas (7 FIM ≈ 1 US$).

Table 2

The number and volume of foreign currency loans, and the average monthly difference between the Finnish markka and the basket interest rate, by year.

	Foreign currency loans					Average FIM–FIM basket rate differential, % points	
				Proportion of total (%)			
Year	No. of loans	Loan volume (million FIM)		No. of loans	Loan volume	10-year rate	3-month rate
1985	5	522		35.7	78.4	2.79	2.99
1986	14	1,490		37.8	66.2	3.57	3.42
1987	18	2,135		51.4	64.7	2.66	2.21
1988	40	5,464		62.5	91.7	2.13	2.14
1989	40	4,610		59.7	88.5	3.49	2.88
1990	40	7,053		63.5	87.5	3.24	3.16
1991	28	4,101		49.1	74.2	2.51	2.99
Totals	185	25,375	Average	51.4	78.7	2.90	2.77

Note: All nominal values are expressed in terms of the purchasing power of 1991 Finnish markkas (7 FIM $\approx$ 1 US$).

the outbreak of an economic recession and a 12.3% devaluation of the Finnish markka.

Table 3 compares Finnish markka denominated loans to currency loans. The mean size of currency loans is more than three times larger than that of markka loans, suggesting that smaller companies, raising smaller loans, rely on markka debt while larger corporations, raising larger loans, opt for foreign currencies. For example, 61% of the loans in the smallest firm size quartile are markka denominated, whereas only

Table 3

Comparison of Finnish markka and foreign currency denominated loans.

	FIM denominated loans	Foreign currency denominated loans
Mean loan size (million FIM)	38.8	137.2
Median loan size (million FIM)	12.7	59.0
Mean loan maturity (years)	6.5	6.2
Median loan maturity (years)	6.0	5.0
Proportion of fixed rate loans (%)	77.0	41.6
Proportion of collateralised loans (%)	38.8	30.3
Proportion of guaranteed loans (%)	41.4	4.3
N	152	185

Note: All nominal values are expressed in terms of the purchasing power of 1991 Finnish markkas (7 FIM $\approx$ 1 US$).

20% of the loans in the largest firm size quartile are markka loans. This finding is probably due to the fact that foreign lenders are mostly interested in doing business with the largest companies: their debt issue volumes are the largest, and the information disadvantage of foreign lenders relative to domestic lenders is at its smallest. Since a financial institution is likely to lend its local currency, borrowing from foreign financial institutions probably provides foreign currency denominated financing.

Fixed rate loans account for 77% of markka loans but only 42% of currency loans. The dominant role of fixed rate markka loans can be explained by the fact that floating markka denominated Helibor interest rates were introduced in 1987, and only gradually gained popularity.[2] The proportion of collateralised and, in particular, guaranteed markka loans is larger than that of currency loans. This is mostly because markka loans are the key source of financing for small companies, which are most likely to be asked to pledge collateral or provide additional security to the lender by purchasing a bank or insurance company guarantee.

Table 4 shows the relationship between the currency of denomination and the source of the loan. The majority of the loans from domestic banks are foreign currency denominated even though markka loans constitute the largest single group. Other important lending currencies for domestic banks are the US dollar and the German mark.

Consistent with Mayer (1990), public bonds are a relatively unimportant source of financing: only one of the 152 Finnish markka denominated loans or debt issues is a public bond and ten are privately placed. Similarly, only eight of the 185 foreign currency denominated loans or debt issues are foreign bonds, and all except one are privately placed. There are no Eurobonds in the sample.

The currency distribution of the sample loans is in line with the overall distribution of foreign currency denominated billing of the Finnish corporate sector. In 1991 the most important currency by far was the US dollar, representing 45% of total foreign currency denominated billing. The German mark came next with 8% and the French franc was the third with 5%. Since the US dollar and the German mark are also the most frequently used foreign loan currencies—29% and 16% of the number of loans and 46% and 15% of the volume of loans—the results are consistent with the notion that the sample firms use foreign currency denominated borrowing to hedge against receivables in the same currencies.

4.2. *The determinants of the decision to raise foreign currency denominated debt*

Table 5 examines the determinants of the decision to raise foreign currency debt in a probit regression framework. The dependent variable in the regression is a dummy variable which takes the value of one if a loan is denominated in any foreign currency and the value of zero if the loan is Finnish markka denominated.

The independent variables are as follows. First, companies are expected to use foreign currency loans to hedge their currency receivables. Therefore, the coefficient of the variable measuring the share of exports of net sales is expected to have a

[2] In addition to 17 Helibor loans, floating rate loans include 18 loans which use the Bank of Finland's base rate as the reference interest rate. This is an administrative interest rate mostly used for mortgages and small firm loans.

Table 4

The number of loans from each loan source and their currency of denomination.

	Currency											
	FIM	Basket	ECU	US$	DEM	JP¥	CHF	BEF	GB£	SEK	Other	Totals
Domestic sources of financing:												
Banks	85	33	6	26	19	3	5	3	5		3	188
Insurance companies	56											56
Other institutions	10			3	2					5		20
Public bonds	1											1
Foreign sources of financing:												
American banks				5	2							7
German banks			1	2	4							7
Japanese banks				9	2	6					1	18
Swiss banks		2		1			9					12
Luxemburgian banks			2					5				7
British banks				2					1			3
Swedish banks		3		1								4
Syndicates and other banks				3	1			1			2	7
Public bonds									1			1
Japanese insurance companies				1		5						6
Totals	152	38	9	53	30	14	14	9	7	5	6	337

Table 5
The determinants of the decision to raise foreign currency denominated debt.

Independent variables	Expected sign	Dependent variable: Foreign currency denomination dummy	
Constant	?	−2.73	−3.96
		(0.0001)***	(0.0000)***
Exports-to-net sales	+	1.67	1.35
		(0.0000)***	(0.0007)***
Multinational dummy	+	−0.26	0.11
		(0.2940)	(0.697)
Log (Total book assets)	+	0.25	0.24
		(0.0004)***	(0.0040)***
Debt-to-book assets	+	−1.20	−1.22
		(0.0095)***	(0.0263)**
Industrial concentration	+	0.30	0.46
		(0.3741)	(0.2544)
Book-to-market value of assets	−		1.29
			(0.0883)*
Dividend yield	+		5.36
			(0.2778)
Return-on-book assets	?	−1.59	−2.36
		(0.3005)	(0.2890)
FIM interest rate—FIM basket interest rate	−	0.29	0.21
		(0.0024)***	(0.0555)*
Year 1985 dummy	?	0.17	0.53
		(0.6969)	(0.3647)
Year 1986 dummy	?	−0.30	−0.17
		(0.3868)	(0.6845)
Year 1987 dummy	?	0.50	1.32
		(0.1357)	(0.0069)***
Year 1988 dummy	?	0.70	1.03
		(0.0199)**	(0.0068)***
Year 1989 dummy	?	0.66	0.87
		(0.0278)**	(0.0095)***
Year 1990 dummy	?	0.57	0.37
		(0.0568)*	(0.2430)
Pseudo R-squared		0.224	0.254
N		321	269

Notes: The results are obtained from a probit regression where the dependent variable obtains the value of one if a loan is denominated in a foreign currency and zero otherwise. The number of observations differs from full sample size because the variable exports-to-net sales is not available for all companies and because some companies were not listed the whole sample period. Two-tailed *p*-values are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively. Pseudo R^2 is computed as $1 - \ln L(\Omega)/\ln L(\omega)$, where $\ln L(\Omega)$ is the value of the likelihood function evaluated at the maximum likelihood estimates and $\ln L(\omega)$ is the maximum value of the likelihood function under the hypothesis that all independent variables equal zero.

positive sign.[3] Similarly, the coefficient for the multinational dummy (indicating whether the firm has foreign subsidiaries or not) is expected to be positive.

Second, we include a measure for firm size: the log of total book assets. Large companies are likely to have a larger international reputation and a more direct access to international capital markets than small companies. Since borrowing from foreign sources is likely to be denominated in foreign currencies, the coefficient for the variable log of total assets is expected to be positive.

Third, the expected costs from financial distress are positively related to leverage and negatively related to profitability. Therefore, hedging by using currency debt (as opposed to using markka debt) is more valuable for companies which have high leverage ratios or low profitability. Thus the expected coefficient for the ratio of debt-to-total book assets is positive.[4] The expected coefficient for profitability, proxied by return-on assets, is less clear-cut. While the financial distress argument implies that the expected coefficient for ROA should be negative, reputational effects suggest a converse relation. High ROA companies are more reputable and as a result are expected to have an easier access to foreign debt.[5]

Fourth, firms that are industrially diversified are less likely to benefit from hedging. Following Berger and Ofek (1995) our measure of industrial concentration is the revenue-based Hefindahl index, computed here from two-digit level SIC code data. We expect the coefficient for the industrial concentration variable to be positive.

Fifth, firms with more growth options in their investment opportunity set are more likely to undertake a hedging program aimed at reducing the variance in firm value (Froot *et al.*, 1993; Nance *et al.*, 1993). Since firms with promising growth opportunities are likely to have small book-to-market ratios, the coefficient for the book-to-market ratio is expected to be negative.

Sixth, as pointed out by Nance *et al.* (1993), a firm's hedging policy is also influenced by its other financial policies. For example, a firm could substitute a hedging policy and decrease the risk of default by restricting its dividends. Therefore, we expect that the dividend yield is positively related to the probability that a firm hedges by raising foreign currency denominated debt.

Seventh, the expected costs of finance are likely to affect the choice between foreign and domestic currency denominated debt. The Finnish government permits unrealized

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[3] Ideally one would like to examine how foreign currency loans are used for hedging the net exposure in each currency. Unfortunately data on the sample companies' net exposures or sales distribution by currency were not available. Therefore, we rely on this relatively crude measure of currency exposure.

[4] Note that the decision to use foreign debt (and debt in general) is endogenous. For example, the issue to use foreign debt may be related to past debt, both domestic and foreign. Therefore, it is possible that firms that hedge actually have *ex post* higher leverage, as hedging has allowed them to take on additional debt. Given that our data lists debt transactions from the sample period, but not the amount of currency or markka debt outstanding at any given point of time, it would be very difficult to meaningfully relate new loans to existing debt, particularly in the early years of our sample period when the loan stock for each company is largely unknown. Therefore, we do not make any attempt to control for the effect of endogeneity on the results.

[5] In principle this reputation effect could be controlled for by including variables measuring the credit rating in the regression. Unfortunately this is not possible in our study since none of the 44 sample companies had a long-term credit rating during the sample period.

exchange losses on foreign currency loans to be tax deductible immediately, while taxes on exchange gains are deferred until realized. Shapiro (1984) shows that such tax laws encourage companies operating in Finland to prefer (on an expected value basis) to borrow the foreign currency, regardless of whether it is weaker or stronger, provided that the International Fisher Effect holds before tax. Moreover, Shapiro shows that the weaker the markka is, the smaller are the tax savings from borrowing the foreign currency. In other words, the larger the interest rate differential between the Finnish markka and its basket, the smaller the incentives for firms to raise foreign currency denominated debt. We thus expect the coefficient for the interest rate differential to be negative.

Eighth and finally, we include year dummies to control for the increasing demand for foreign currency debt after the restrictions on that particular loan type were lifted.

The variable exports-to-net sales has the expected sign and is highly significant (p-value from a two-tailed test less than 0.07%). This is consistent with the hypothesis that companies raise currency debt to hedge their foreign exchange exposures. However, as pointed out by the referee, this result also is consistent with the following interpretation. Firms with extensive exports are likely to have a better international reputation than companies that export less. This is likely to improve their ability to raise foreign debt.

The variable log of book assets is also positive as expected and highly significant. Thus the results support the notion that large firms with a generally better international reputation and a wider access to the international capital markets are more likely to raise foreign currency debt.[6]

The results for the other variables are less clear-cut. The coefficient for the differential between the FIM and FIM basket interest rates is in both specifications significantly or almost significantly positive (in the first specification the p-value is 0.002, in the second 0.06), the opposite of what was predicted by the tax hypothesis.

Our explanation to this finding is that the interest rate differential variable also captures the effect of speculation. The results are a likely indication that the financial managers of the sample firms did not believe that the International Fisher Effect held at the time of borrowing; instead, they may have believed that they could reduce the costs of finance by raising foreign currency denominated loans (which on average have a lower nominal interest rate than the Finnish markka), and hedging their position if the devaluation of the Finnish markka would become an issue. This is understandable given Virén's (1988) evidence that the uncovered interest rate parity relationship was very weak or nonexistent for the Finnish markka in 1980–87.

An investigation of the sample firms' choice of foreign currency and the timing of their borrowing gives further support for the interpretation that speculative motives

[6] Large companies typically export relatively more than small companies: the Pearson correlation coefficient between the variables exports-to-net sales and log (total book assets) is 0.44. The resulting collinearity problem can be assessed by checking whether the coefficients on the two variables and the interpretation of the results are affected if either of the two variables is dropped from the model. When we do this, the significance level for the variable left in the model increases. The interpretation of the results does not change, however, suggesting that the collinearity effect is not serious.

have an effect on financial managers' decision making.[7] Despite of Shapiro's (1984) tax argument that Finnish firms should have preferred currencies with high nominal interest rates, the sample firms tended to borrow in periods when the nominal interest rate for the loan currency, relative to other currencies, was lower than during the sample period in general. In other words, the sample firms did not appear to believe that the International Fisher Effect held for foreign currencies. The sample firms' preference for borrowing in periods when the nominal interest rate for the loan currency is lower than usual is significant at the 10% level for variable rate loans and at the 35% level for fixed rate loans (one-tailed test).

In the probit estimations, the coefficients for industrial concentration, dividend yield and return-on-book assets are of their expected sign but are far from significant. The signs for the multinational dummy differ across specifications. Moreover, the variables debt-to-book assets and book-to-market value of assets have the wrong sign but are significant at the 10% level or lower. In other words, the variables that are related to the hedging policies of the firm in general but have no direct link to hedging foreign exchange exposures have much less to do with the probability of raising foreign currency debt than the variables that are directly linked to foreign exchange exposures (exports-to-net sales) or to the firm's access to foreign sources of finance (log of total book assets). Although not reported here, this result does not change qualitatively if we use the current ratio instead of the dividend yield or the interest coverage ratio instead of the ratio of debt to book assets.

4.3. *Additional tests*

The above probit estimations do not attempt to take advantage of one potentially important observable variable: the firm that raised the loan. On average, the sample firms raised eight loans during the sample period, suggesting that there is substantial correlation among observations and identical observations (except for the interest rate differential) for all the loans in each year for a given firm. Therefore, a firm-specific

[7] We use bootstrapping to document the sample firms' preference for borrowing in periods when the nominal interest rate for the loan currency is lower than usual. The analysis consists of six stages. We first rank in each month the nominal interest rate of the 12 foreign loan currencies used by the sample firms. Second, we register the rank of each loan currency in the month the loan was raised. This gives us 68 ranks for fixed rate loans and 79 ranks for variable rate loans (the total number of ranks is smaller than the total number of foreign currency loans because the sample includes 38 foreign currency basket loans that are not considered in this analysis). Third, we determine the benchmark against which we can compare the sample firms' interest rate preferences. We do this by pairing the nominal interest rate rank of each loan with a randomly selected interest rate rank in the loan currency (the benchmark rank is selected from among 84 ranks in the loan currency, one rank for each month within the sample period). This makes sure that the sample loans and the benchmark have an identical currency distribution, and that the results are not affected by the sample firms' potential hedging-driven preference for currencies that have lower-than-average nominal interest rates. Fourth, we perform a non-parametric rank sum test which compares the interest rate ranks for the loans to those for the benchmark. Fifth, we repeat the random selection of the benchmark vector and the rank sum test 999 times. Sixth and finally, we analyse the distribution of the results from the rank sum tests. The results suggest that in 90% of the cases, variable rate loans have a lower interest rate than the benchmark. The corresponding number for fixed rate loans is 65%.

variable might capture some of the unexplained variation in the probability of raising currency debt. As a robustness test, we estimate a random effects probit model that takes into account this panel feature in the data. The random effects model assumes that, in addition to the intercept term and the regressors in the equation, the model includes a random disturbance component u_i, which characterises the ith observation and is constant through time when the firm is used as a grouping variable. This random disturbance component can be viewed as a collection of factors not in the regression that are specific to each firm (Greene, 1997, p. 623–624).

Estimations of the random effects probit model (not reported here) suggest that the firm-specific effects are generally not significant; a likelihood ratio test suggests that the more complicated random effects model performs no better than the simple probit model. The results from the tests of the hypotheses are qualitatively similar for both models.

As an additional robustness test, and analogously to Allayannis and Ofek (forthcoming), we run a probit regression where the dependent variable is a dummy for whether a company raised at least one currency loan in a given year, conditional on that it raised at least one loan of any type (currency or Finnish markka loan) in that year. The results (not formally reported in the paper) suggest that the variable exports-to-net sales is highly significantly positively related to the probability of issuing currency debt. Moreover, the results from the second stage of a Cragg two-stage regression suggest that exports-to-net sales is highly significantly positively related to the fraction of currency loans raised by a given firm in a given year. The coefficient for interest rate differential is positive but generally not significant in both the probit model and the second stage of the Cragg model. The decrease in the significance level for the interest rate differential variable is expected, since aggregation of the data from an individual loan level to a level where the firm-year intersection is the unit of observation throws away data. Moreover, aggregation eliminates all within-year variation in the interest rate differential variable, decreasing the accuracy with which speculative demand for currency loans can be linked to relative interest rate changes.

To check for robustness of the results across time periods, we estimate the probit regression for subperiods 1985–87, 1988–89, and 1990–91. Although not formally reported in the paper, the variable exports-to-net sales is positive and highly significant in all subperiods. The interest rate differential is highly significantly positive in the 1990–91 subperiod but insignificant in other periods. This is consistent with the notion that the speculative demand for currency loans was particularly evident in the eve of the devaluation which occurred in November 1991.

Kedia and Mozumdar (1999) document that firms' rationale in borrowing in Swiss francs and Japanese yen is different from the rationale for the other currencies. We investigate this issue by running separate probit regressions for the currencies with the largest number of observations (US$, DEM, JP¥, CHF). Our results suggest that the key variables—the exports-to-net sales and the interest rate differential—are positive and highly significant for the US dollar and the German mark, the currencies with the largest number of observations. Consistent with Kedia and Mozumdar (1999), the Swiss franc has the lowest coefficient for the exports-to-net sales variable—a possible indication of other than hedging driven demand for Swiss franc loans. However, one must note that the small number of Swiss franc and Japanese yen loans (14 loans of both currencies) makes it difficult to make firm conclusions about these currencies. In fact, the yen displays the largest coefficient for the exports-to-net sales variable and

yet it is insignificant at conventional levels, a manifestation of the low power of the test when there are few observations.

Stulz (1996) suggests that firms may speculate by creating an exposure through foreign exchange derivatives. Although our sample does not include data on the use of foreign exchange derivatives, it is occasionally possible to make inferences of speculative behaviour from the use of currency debt. For example, more than a quarter of all loans (12 of 44) raised by the companies with no exports were denominated in foreign currency. The paucity of a natural exposure for these companies, and the fact that currency swaps were very rare during the sample period, hints that these loans may have been raised for speculative purposes. Similarly, some of the Swiss franc and yen denominated loans have probably not been used to hedge Swiss franc or yen denominated receivables. For example, the chief financial officer of one major sample company told us in an interview that the company raised a yen loan in early 1991 to take advantage of the favourable interest rate—the company did not have any natural exposure in yen and did not hedge its yen loan. The FIM value of the loan more than doubled by the time it was repaid after five years.

So far we have shown evidence from firm level behaviour that is consistent with hedging and with speculation. To complement this evidence with the market's reaction to the use of foreign debt, and to make an attempt to better disentangle the hedging and speculative motives from each other, we apply the two-stage method developed by Jorion (1990) and others, as specified in Allayannis and Ofek (1999). At the first stage we regress the monthly returns for a stock from the sample period 1985–91 against the Helsinki Stock Exchange general index and exchange rate index for the Finnish markka. At the second stage, we regress the estimated (firm level) coefficient for the exchange rate index against average exports-to-net sales (across the sample years) and the fraction of the number of currency loans to the number of all loans for that firm.

The results suggest that none of the variables at the second stage are significant: the *t*-value for average exports-to-net sales is −0.55, whereas the fraction of currency loans has a *t*-value of 0.02. The results are similar if the fraction of currency loan volume (in terms of FIM) is used as an independent variable, or if the exchange rate beta is computed with respect to an individual currency index (we try US$/FIM, DEM/FIM, JP¥/FIM, CHF/FIM, and GB£/FIM indices). The insignificance of the results probably reflects the fact that the exchange rate betas are relatively noisy estimates of exchange rate exposures, a fact that is exacerbated by thin trading on the Helsinki Stock Exchange.[8]

5. Conclusions

This study examines the determinants of the decision to raise foreign currency debt by taking advantage of a unique and comprehensive sample of private and public debt raised by 44 Finnish corporations. The results suggest that hedging is an important

[8] As an additional check, we investigate whether the market beta is associated with a company's use of foreign debt. We do not find evidence of such an association. The Pearson (Spearman rank) correlation between the foreign debt ratio and the market beta is 0.06 (0.27); neither of these correlations is significant at conventional levels. Similarly, the market betas for companies that raised currency debt are not significantly different from the betas for companies that did not raise currency debt.

determinant of the currency-of-denomination decision: firms in which exports constitute a significant fraction of net sales are most likely to raise foreign currency debt. Large firms, with a wider access to the international capital markets, tend to borrow in foreign currencies relatively more often than small firms. We also find evidence that speculative reasons have an effect on the choice of loan currency. Despite of a conflicting tax motive, the sample firms tended to borrow in periods when the nominal interest rate for the loan currency, relative to other currencies, was lower than during the sample period in general.

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