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Currency choice in international bond issuance[1]

Aggregate issuance of international bonds is found to be significantly higher in strong currencies than in weak ones. The mix of currencies is also found to be influenced by interest rate differentials, with greater issuance in higher-yielding currencies, and by the amount of home country issuance. Taken together, the results suggest that both the investor's and the issuer's preferences determine currency choice in international bond issuance.

JEL classification: G110, G150, G320.

The international debt securities market[2] brings together borrowers and lenders with diverse risk profiles and risk appetites. This special feature investigates the determinants of the currency denomination of international debt issuance. Specifically, it examines the share of aggregate issuance of international bonds and notes that is denominated in selected currencies, and estimates the impact on these currency shares of a number of plausible factors. The international market is an attractive one for studying currency choice issues, because issuers are likely to be well known outside their national boundaries, and investors are likely to be comparatively well informed. As a result, asymmetric information regarding credit quality will be relatively low.

The key finding is that there is more issuance in a given currency when it is strong relative to historical averages and when long-term interest rates in that currency are high relative to those available in other major currencies. These findings hold even when controlling for demand for investable funds in that currency, as proxied by the growth of investment, or the level of home country issuance. The preferences of investors appear to play just as important a role as those of issuers in determining the terms and conditions of international bond issues.

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[2] "International debt securities" are debt securities that are either issued outside the borrower's home market (in any currency), issued in the domestic market in foreign currency, or issued in the domestic market but targeted at foreign investors. See BIS (2003) for detailed discussion.

The first section discusses some of the potential determinants of the currency mix of international bond issuance and reviews prior research on the subject. The second then presents broad trends in observed currency shares, and examines the explanatory power of a simple statistical model that relates these shares to exchange rate levels, interest rate differentials and other factors. A concluding section summarises the results and suggests interpretations.

Factors influencing the currency of denomination of bond issues

Two sets of factors are likely to enter into the choice of currency for a bond issue: those relating to risk management, and those relating to borrowing costs.

Currency choices are influenced by risk management by issuers ...

Regarding risk management, a borrower would ideally want to match the currency of its interest and principal payments to that of the net cash inflows it expects to receive from operations during the life of the bond, while an investor would ideally want to match asset returns to current and prospective expenses. Kedia and Mozumdar (2003) find that US firms that issue foreign currency debt also tend to have significant foreign income, as well as characteristics suggesting that exchange rate hedging improves their ability to exploit growth opportunities. Keloharju and Niskanen (2001) obtain similar results for Finnish firms. Researchers at the ECB (2005) find a strong positive relationship at the firm level between having subsidiaries in a currency area and bond issuance in that currency. As financial derivatives have become more widely available in recent years, these considerations might be thought to have become less important, since mismatches between asset and liability flows can often be reduced or eliminated through the use of an appropriate derivative structure. But derivatives-based hedging strategies are sometimes costly for long-term assets.[3]

... and investors ...

Considerably less research has been done on the extent to which and the reasons why investors in mature economies take positions in currencies outside their own. Theoretically, the standard approach tends to favour full hedging; for example, Solnik (1974) concluded that it is optimal to diversify equity risk internationally while fully hedging exchange rate risk. Other authors, however, have suggested that unhedged or partially hedged foreign currency investments would be desirable insofar as they hedge against equity market risks (Froot (1993)) or movements in real interest rates (Campbell et al (2003)).

... as well as borrowing costs related to institutional factors

With regard to borrowing costs, some of these reflect institutional factors, the cost of which is shared between issuers and investors. The market for bonds denominated in a certain currency might be subject to withholding taxes or regulatory burdens, or might be too thin to provide the level of liquidity demanded by active investors. Very large issuers may want to diversify their

[3] The global outstanding notional amount of currency swaps, which allow a stream of interest payments in one currency to be exchanged for payments in another, increased from $1.9 trillion in June 1998 to $7.0 trillion in June 2004. Studies of the determinants of foreign currency derivatives usage include Géczy et al (1997), Allayannis and Ofek (2001), Hagelin (2003) and Huffman and Makar (2004).

funding sources to assure themselves steady market access. When these considerations are relevant, borrowers will issue in the cash market where institutional costs are lowest and use the swap market to adopt their preferred currency exposure (Kim and Stulz (1988)). For borrowers from emerging economies, the thinness of markets for home currency debt is a well recognised problem. In this case, swap markets also tend to be underdeveloped, so issuers are often forced to take mismatched currency exposures as a price of market access. See Goldstein and Turner (2004) for further discussion.

If investors and issuers have identical expectations regarding the future path of exchange and interest rates, and similar levels of tolerance for the risk embodied in unhedged currency exposures, then hedging considerations and institutional borrowing costs such as these should be decisive. The quantity of bonds issued in a given currency will be determined solely by the capital needs of issuers, the portfolio allocation needs of investors and institutional characteristics of specific markets, and not by interest rate differentials or by prospective exchange rate trends.

However, even if borrowers and lenders are primarily concerned with hedging risk, there might be an interest rate differential wide enough, or an exchange rate level sufficiently out of tune with expectations, to override risk management considerations and institutional borrowing costs.[4] There are three principal reasons why market participants might allow prevailing interest rate or exchange rate conditions to influence their debt denomination decisions.

Other factors include violations of uncovered interest parity ...

First, issuers and investors may differ about whether expected exchange rate movements will fully counteract interest rate differentials across currencies. Although standard economic theory teaches that expected exchange rate movements should perfectly counteract interest rate differentials, a relationship known as uncovered interest parity (UIP), the empirical evidence for this relationship is weak. Instead, the evidence suggests that investing in high-yielding currencies should be a profitable strategy for investors and issuing in low-yielding currencies should be profitable for borrowers. Alternatively, participants could focus on evidence that exchange rates tend to follow trends and to overshoot their equilibrium levels. The observed relationship between yield differentials and currency patterns on the one hand, and bond currency denomination shares on the other, might then signify whether the preferences of either borrowers or investors are dominant in currency denomination choices.[5]

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[4] Allayannis et al (2003) find that interest differentials play a significant role in foreign currency debt issuance by East Asian corporations, alongside hedging-related factors such as the degree to which they have foreign earnings. ECB (2005) obtains a similar result for a sample of global debt issuers.

[5] See Froot and Thaler (1990) and Chinn and Meredith (2005) for further discussion of the evidence for UIP. Johnson (1988) finds that, for the case of Canada, differences in interest rates are likely to assume greater importance when the exchange rate is expected to be fixed. See Mohl (1984) for an early study of the salience of investor preferences in international bond currency choices.

... differences in risk aversion ...

Second, even if exchange rate levels do not reliably forecast their future movements, they could be associated with differences in the risk characteristics of exchange rates. A weak currency could be perceived as incorporating a large risk of a substantial further weakening, while a strong one might be seen as offering a greater possibility of a substantial further strengthening. Risk-averse investors would then prefer strong currencies even if the absolute returns they are expected to offer are no greater than for weak ones.[6] If borrowers are relatively less risk-averse than investors, then the borrowers may be able to reduce their borrowing costs by accommodating the risk protection demands of investors.

... and breakdowns of cross-market arbitrage

A third potential reason is that interest rate differentials might not be fully reflected in prices for foreign exchange derivatives such as forwards and swaps. Observers of the international bond market often stress the ability of issuers to take advantage of temporary anomalies in the prevailing configuration of bond yields, currency swap rates and forward exchange rates (see, for example, Grabbe (1996), pp 314–15). While the no-arbitrage relationship among these variables, known as covered interest parity (CIP), generally holds at short horizons, the lack of liquidity or depth in certain markets could allow anomalies to persist long enough for well placed borrowers to take advantage of them. It is worth noting that, while violations of UIP could plausibly result from differences in expectations or risk sensitivities across market participants, violations of CIP, which is a riskless arbitrage relationship, require the existence of an institutional barrier that prevents or delays the rectification of a market anomaly.[7]

Modelling strategy and results

Currency shares and exchange rate levels

The bulk of international bond issuance is concentrated in a small number of currencies, particularly the US dollar, euro, Japanese yen and pound sterling (Table 1). The currency shares are even more concentrated than economic activity in the respective issuing countries. For example, in 2004 the United States accounted for 29% of global GDP (at market exchange rates), but the US dollar was used in 35% of international bond issuance. This reflects the status of those currencies as means of payment and stores of value outside their home countries. Issuers from a given country tend to issue primarily, but not exclusively, in their home currency (Table 1, columns 2–4). Currency

[6] The pricing of risk reversals, derivative positions that comprise a put and call position on a currency with strike prices that are equally out of the money, offers evidence that markets perceive risk in this way. See Dunis and Lequeux (2001) and Pagès (1996) for discussions of the information content of risk reversals.

[7] Clinton (1988) shows that deviations of CIP at short horizons tend to be small and within the range that would be explained by transaction costs. However, Fletcher and Taylor (1996) find that deviations from CIP at long horizons in excess of transaction costs are neither rare nor non-trivial.

Currency shares in international bond and note issuance

Share in total announced issuance over the period indicated

	All issuers	US issuers	Euro area issuers	Japanese issuers
1993 Q3–1998 Q4				
US dollar	0.443	0.772	0.256	0.299
Japanese yen	0.140	0.046	0.111	0.526
Deutsche mark	0.099	0.041	0.183	0.035
Pound sterling	0.073	0.043	0.038	0.023
Swiss franc	0.036	0.021	0.046	0.081
Canadian dollar	0.011	0.006	0.010	0.004
Australian dollar	0.013	0.006	0.006	0.005
1999 Q1–2004 Q4				
US dollar	0.428	0.822	0.147	0.253
Japanese yen	0.046	0.025	0.033	0.605
Euro	0.410	0.106	0.737	0.096
Pound sterling	0.067	0.030	0.039	0.012
Swiss franc	0.014	0.007	0.019	0.011
Canadian dollar	0.007	0.001	0.002	0.004
Australian dollar	0.008	0.004	0.006	0.003

Sources: Dealogic; Euroclear; ISMA; Thomson Financial Securities Data; BIS calculations. Table 1

shares tend to be similar across the main categories of issuers, such as governments, financial institutions and non-financial corporations.

Currency shares tend to track exchange rate levels

A casual look at historical patterns in debt issuance and exchange rates suggests that the share of international debt issuance denominated in a given currency has tended to be broadly related to the strength of that currency (Graph 1).[8] The link between the exchange rate level and the currency share appears to be strongest for the US dollar, the Deutsche mark and the euro. For the other currencies displayed in Graph 1, while exchange rate and currency share trends broadly coincided for much of the period from 1993 to 2002, the appreciation of these currencies against the dollar from 2002 onwards has tended not to be accompanied by an increased share in international bond issuance.

A model of international bond currency shares

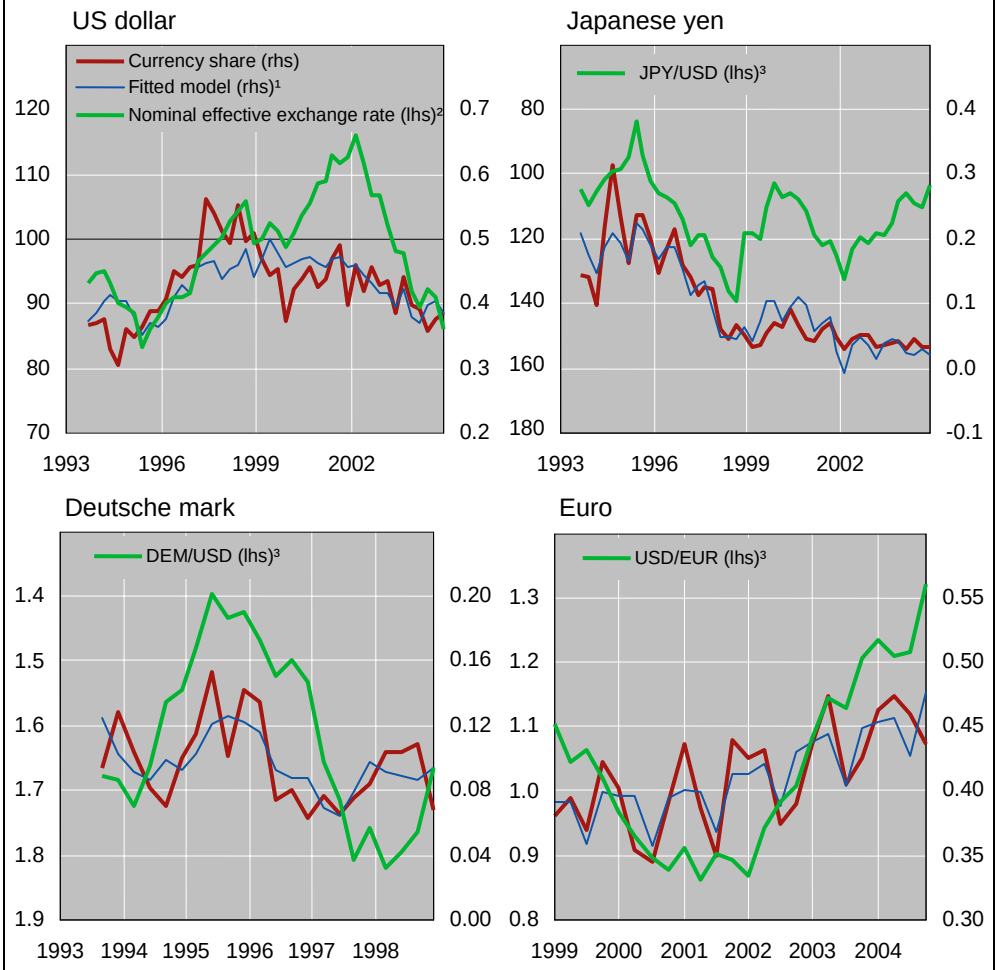
To gain a fuller understanding of the relationship between bond currency shares and market conditions, a simple statistical model is estimated for eight major currencies incorporating several of the factors discussed so far. The model regresses the quarterly share of announced international bond and note

[8] Throughout the analysis that follows, quarterly currency shares convert local currency amounts into dollars using the *average* level of the relevant exchange rate over the whole sample period. If the quarterly level of exchange rates were used, a stronger exchange rate would automatically be associated with a larger currency share even if local currency amounts were unchanged.

issuance denominated in each currency on the following variables (quarterly averages are used except where specified):

- The log of the exchange rate against the US dollar. For the United States, the nominal effective (trade-weighted) exchange rate is used.
- The difference between the 10-year US Treasury yield and a comparable 10-year government bond yield for the home country. For the United States, the difference between the US Treasury yield and the 10-year German bund yield is used.
- The difference between quarterly nominal investment growth in the home country and a GDP-weighted average of investment growth rates for the countries in the study. This term is intended to capture the use of bonds

Exchange rates and currency shares in international bond issuance

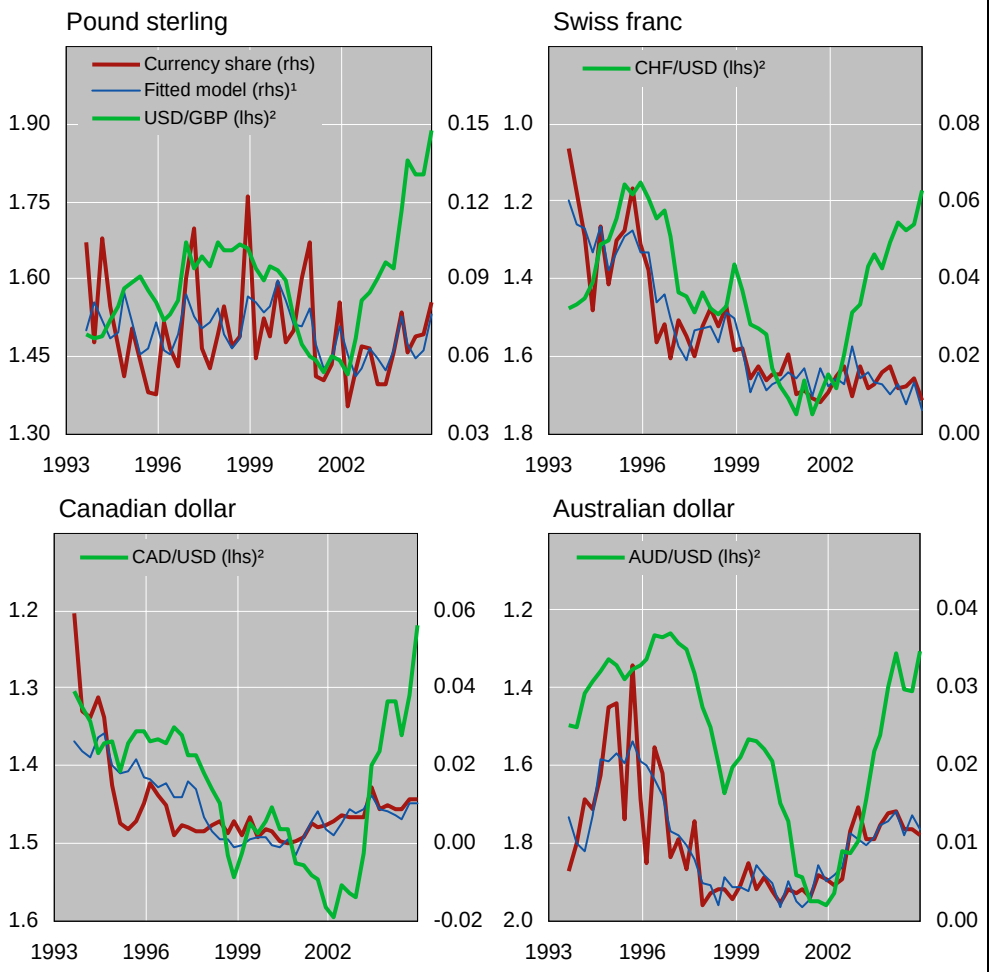


Note: We consider the Deutsche mark before 1999 and the euro thereafter.

[1] The fitted model is obtained from the OLS regression of the currency share on a time trend, the log of the bilateral exchange rate against the US dollar (trade-weighted nominal effective exchange rate for the US dollar), the difference between the 10-year government bond yield and the 10-year US Treasury yield, the adjusted nominal investment growth rate and three quarterly seasonal dummies; one quarterly dummy is used for the euro area and no dummies for Germany. [2] March 1999 = 100. [3] Bilateral exchange rate against the US dollar; an increase indicates a depreciation of the US dollar; inverted scale except for the euro.

Sources: Bloomberg; Dealogic; Euroclear; ISMA; Thomson Financial Securities Data; national authorities; BIS calculations. Graph 1

Exchange rates and currency shares in international bond issuance (cont)



[1] The fitted model is obtained from the OLS regression of the currency share on a time trend, the log of the bilateral exchange rate against the US dollar, the difference between the 10-year government bond yield and the 10-year US Treasury yield, the adjusted nominal investment growth rate and three quarterly seasonal dummies. [2] Bilateral exchange rate against the US dollar; an increase indicates a depreciation of the US dollar; inverted scale except for the pound sterling.

Sources: Bloomberg; Dealogic; Euroclear; ISMA; Thomson Financial Securities Data; national authorities; BIS calculations. Graph 1 (cont)

denominated in a given currency to hedge the future cash flows in that currency arising from real assets.

- The share of a country's nationals in total debt issuance. This variable offers an alternative means by which to capture the demand by issuers for instruments with which to hedge future cash flows in the stated currency.[9]
- A time-trend term. This should capture longer-term developments in currency shares, resulting from such trends as the changing investor base for international bonds and the greater international use of the euro.

[9] Because the country share can also reflect the demand for a country's bonds from international investors based on exchange rate and interest rate effects, we use the residual from a first-stage regression of the national share variable on the other explanatory variables. This allows us to isolate the impact of issuers' demands for home currency funding.

- Quarterly dummy variables. Some currency shares display seasonal patterns, reflecting uneven funding flows at different times of the year.

The model is estimated using data from the third quarter of 1993 (the quarter from which the BIS international debt securities data can be considered to offer full market coverage) to the fourth quarter of 2004. For the Deutsche mark, the estimation covers 1993 Q3–1998 Q4, while the estimation for the euro covers 1999 Q1–2004 Q4. For each currency, two regressions are run: one specification with nominal investment as the explanatory variable capturing issuer demand, the other with the modified home country issuance variable.

The fitted currency shares resulting from the model match the data fairly well, with adjusted *R*-squared statistics exceeding 40% for seven of the eight currencies in the second specification (Table 2; Graph 1, blue lines). For the Japanese yen, Australian dollar and Swiss franc, the adjusted *R*-squared exceeds 70%. It appears that, whatever their interpretation, the identified variables go a long way towards explaining currency denomination decisions in the international bond market. The one currency share for which the model appears to perform comparatively poorly is the pound sterling.

Issuance is higher in currencies which are relatively strong …

For five of the eight currencies, the exchange rate level has a strong and statistically significant impact in both specifications (Table 2, column 1). The results confirm the impression transmitted by the graphs that a stronger currency tends to be associated with a rise in that currency's use as a vehicle for international bond issuance. For example, the model predicts that a 10% appreciation of the yen should lead to a 2.2 percentage point increase in the yen's share of international bond issuance if other variables are unchanged. This is relative to an average yen currency share of 9.9% during 1993 Q3–2004 Q4. As will be discussed further below, this effect seems to be associated with the (log) level of the exchange rate, rather than with its recent trend.

… high-yielding …

For an overlapping set of five currencies, increased international bond issuance tends to be associated with relatively higher interest rates (Table 2, column 2). The estimation results suggest that, for these currencies, an increase in the local bond yield relative to the United States is associated with an increase in the use of the respective currency in international bond issuance, and that higher US Treasury yields relative to bunds lead to greater US dollar-denominated issuance. The pound sterling is the one currency for which lower relative interest rates are associated with greater issuance, though this is statistically significant in only one of the two specifications.

... and linked to increased home country issuance

Of the two proxy measures for issuer demand, the modified home country issuance variable appears to provide the better predictive power. The impact of nominal investment growth on bond issuance is positive for five of the eight currencies, but it is statistically significant for only three of them (Table 2, column 3).[10] By contrast, the home country issuance variable is statistically significant in seven out of eight specifications. Despite the development of currency swap markets that might be expected to dilute the impact of issuer demand on final currency of issuance, it would appear that borrowers'

[10] Similar results were found when other variables (such as the share of nominal investment expenditure) were used to measure investment-related demand for funding.

Factors influencing international bond currency shares

	Log exchange rate	Interest rate differential	Investment growth	Home country issuance	Adjusted R^2
US dollar[1]	0.27**	0.052**	–0.002		0.33
	0.31**	0.049**		0.408**	0.41
Deutsche mark	0.00	–0.047**	0.001		0.30
	0.07	–0.048**		0.629**	0.67
Euro	–0.09	0.002	0.003		0.56
	–0.01	0.012		0.464	0.61
Japanese yen	–0.22**	0.004	0.005**		0.80
	–0.26**	0.004		0.927**	0.78
Pound sterling	–0.05	0.007	–0.001		0.11
	–0.06	0.009**		0.329*	0.16
Australian dollar	–0.01*	–0.006**	0.000		0.66
	–0.01**	–0.006**		0.225**	0.70
Canadian dollar	–0.06**	–0.009**	0.001**		0.45
	–0.05**	–0.007**		0.329**	0.49
Swiss franc	–0.03**	–0.011**	0.001*		0.85
	–0.02**	–0.012**		0.225*	0.85

Note: Coefficients from a regression of the share of quarterly announced international bond issuance in the listed currency on a constant; the log of the exchange rate; the difference between the US 10-year Treasury yield and a comparable government bond yield in that currency; the difference between quarterly nominal investment growth in that country and GDP-weighted average quarterly nominal investment growth for the countries studied in the first line for each currency (in the second line, residuals of shares of announced international bond issuance in the listed currency by issuers from that country (nationality basis)); a time trend; and seasonal dummies. All regressions are estimated over 1993 Q3–2004 Q4 except in the case of the Deutsche mark (1993 Q3–1998 Q4) and the euro (1999 Q1–2004 Q4). ** and * indicate significance at the 95% and 90% confidence levels respectively. Quarterly currency shares are computed using average exchange rates over 1993 Q3–2004 Q4. Complete results are available from the author.

[1] For the United States, the interest rate differential is the difference between 10-year US Treasury and 10-year German bund yields, and the exchange rate is the nominal trade-weighted effective exchange rate. Table 2

preference for matching the currency denomination of their assets and liabilities plays an important role in their choice of currencies as funding vehicles in the international bond market.

Exchange rate levels and exchange rate trends

Exchange rate levels have more explanatory power than trends

Perhaps surprisingly, exchange rate levels tend to have a stronger and more consistent impact on currency denomination decisions than do exchange rate trends (Table 3). The difference between the current quarter's average exchange rate and its average over the previous four quarters has a significant impact on the currency share of bond issuance for only three of the eight currencies (Table 3, column 1). In all three cases, issuance is greater in a currency that has appreciated relative to its levels of the previous year. When this variable is included alongside the log level of the exchange rate, its statistical significance falls further, although the performance of the log exchange rate suffers as well (Table 3, columns 3 and 4).[11]

[11] Similar results are obtained when other variables representing recent exchange rate movements are used. For example, the quarter-on-quarter change in the exchange rate does

Alternative models of the influence of exchange rates on international bond currency shares

	Model using exchange rate trends		Model using exchange rate levels and exchange rate trends		
	Trend in log exchange rate (see note)	Adjusted R^2	Log exchange rate	Trend in log exchange rate	Adjusted R^2
US dollar[1]	0.102	0.26	0.558**	–0.390*	0.37
Deutsche mark	0.056	0.31	–0.043	0.087	0.28
Euro	–0.054	0.33	–0.135	0.107	0.32
Japanese yen	–0.309**	0.80	–0.131*	–0.184*	0.81
Pound sterling	–0.081	0.14	0.012	–0.093	0.11
Australian dollar	–0.007	0.64	–0.023*	0.016	0.66
Canadian dollar	–0.092**	0.51	0.013	–0.106**	0.50
Swiss franc	–0.053**	0.86	–0.009	–0.042	0.85

Note: Regression models are identical to those presented in Table 2, except that an exchange rate trend term is included instead of the log exchange rate in the regressions in columns 1 and 2, and in addition to the log exchange rate in the regressions in columns 3–5. In both sets of regressions, the exchange rate trend term is $\ln(e_t) - (1/4)\,(\ln(e_{t-1}) + \ln(e_{t-2}) + \ln(e_{t-3}) + \ln(e_{t-4}))$. ** and * indicate significance at the 95% and 90% confidence levels respectively. Complete results are available from the author.

[1] For the United States, the interest rate differential is the difference between 10-year US Treasury and 10-year German bund yields, and the exchange rate is the nominal trade-weighted effective exchange rate. Table 3

These results suggest that, to the extent that the exchange rate has an impact on decisions about the currency of denomination of international bond issues, this impact depends on the currency's strength relative to its long-run average rather than more recent values. This can be seen from the relatively better performance of the econometric specifications presented in Table 2, where the coefficient on the log exchange rate in effect measures the impact of the exchange rate's level relative to its average level over the entire sample period.

Currency denomination choices by nationality

The strength of the home country issuance variable suggests that nationality is an important factor underlying the currency composition of international bond issuance. To explore this issue further, it may also be useful to examine currency shares for bond issuance by issuers from a single nationality. In particular, we can ask whether the choice of alternative currencies by borrowers of a given nationality is influenced by exchange rates and interest rates to the same degree that these factors influence currency shares observed in the aggregate, while acknowledging that we are looking at only part of the picture.

Exchange rate effects are weaker for home country issuers ...

Looking only at US and German issuers, it appears that the exchange rate effects documented earlier do not appear to be driven by home country issuers (Table 4, columns 1 and 4). Before 1999, while an appreciation of the Deutsche

not have a statistically significant impact on the currency share for any of the eight currencies studied. Detailed results are available from the author.

mark caused more Deutsche mark-denominated issuance by US issuers, it caused *less* Deutsche mark issuance by issuers from Germany. After 1999, the exchange rate between the dollar and euro had no significant impact on currency denomination decisions by either group. Regarding the decision to use the US dollar as a denomination currency, US issuers were not significantly influenced by the euro/dollar exchange rate, while German issuers responded to a stronger dollar by increasing dollar-denominated issuance. This suggests that the tendency of a stronger dollar to attract dollar-denominated issuance, documented in Table 2, primarily reflects behaviour by non-US borrowers. For other currencies, the impact of currency strength on bond denomination by US and German issuers broadly matches that estimated for the full set of issuers, though statistical significance levels are lower.

... though interest rate differentials still play a role

The impact of interest rates on issuance, by contrast, does seem to result at least in part from the behaviour of home country issuers (Table 4, columns 2 and 5). An increase in the difference between US Treasury and bund yields

Factors influencing international bond currency shares: results by nationality of issuer

	US issuers			German issuers			Sample period
	Log exchange rate	Interest rate differential	Adj R^2	Log exchange rate	Interest rate differential	Adj R^2	
US dollar[1]	–0.052	0.060**	0.59	–0.220*	0.076**	0.22	1993–2004
Deutsche mark[2]	–0.241**	0.010	0.22	–2.258*	0.225**	0.33	1993–1998
Euro[3]	0.120	0.032	0.10	0.264	–0.473**	0.43	1999–2004
Japanese yen	–0.050	–0.025**	0.51	–0.064	0.043**	0.40	1993–2004
Pound sterling	–0.089	0.004	0.03	0.147*	0.004	0.19	1993–2004
Australian dollar	–0.018**	–0.000	0.11	0.044**	–0.010**	0.49	1993–2004
Canadian dollar	–0.048	–0.009**	0.43	0.025	–0.012*	0.38	1993–2004
Swiss franc	–0.060**	–0.000	0.62	0.176	0.030**	0.59	1993–2004

Note: Except as noted, coefficients under "US issuers" are from a regression of the share of quarterly announced international bond issuance in the listed currency by US issuers on a constant; the log of the exchange rate (in currency units per US dollar); the difference between the US 10-year Treasury yield and a 10-year government bond yield in that currency; the difference between quarterly nominal investment growth in that country and GDP-weighted average quarterly nominal investment growth for the countries studied; a time trend; and seasonal dummies. Coefficients under "German issuers" are from the same regression, with currency units per euro instead of the US dollar and the German bund yield instead of the US Treasury yield. Pre-1999 euro rates are constructed based on the 1999 conversion ratios. ** and * indicate significance at the 95% and 90% confidence levels respectively. Complete results are available from the author.

[1] The "US dollar" regression under "US issuers" uses the log EUR/USD rate and the difference between the US and German government bond yields. [2] The "Deutsche mark" regression under "German issuers" uses the log USD/DEM rate and the difference between the German and US government bond yields. [3] The "Euro" regression under "German issuers" uses the log USD/EUR rate and the difference between the German and US government bond yields. Table 4

leads to more dollar-based borrowing by US issuers and less Deutsche mark- or euro-based borrowing by German issuers. As with the exchange rate, results for other currencies broadly match those for the full set of issuers.

These findings confirm those of Kedia and Mozumdar (2003) and others, to the effect that issuers generally prefer to match the currency denomination of their bonds to that of assets and cash flows. The preference of issuers for their home currency does not seem to be strongly affected by whether that currency is strong or weak. Where issuers have already decided to venture outside their home currency, however, exchange rates and interest rates have a greater impact. As suggested by ECB (2005), issuers seem to follow a two-stage approach to the denomination decision: first, whether to borrow in domestic or foreign currency; and second, if foreign currency is preferred, which foreign currency to use.

Concluding remarks

The share of international bond issuance denominated in a given currency tends to be greater for strong currencies, for those boasting relatively high long-term bond yields, and for those where home country demand for funding is high. The impact of home country funding demand confirms the results of previous research on the importance of risk management motives to decisions about the currency denomination choices of international bond issuers. The exchange rate and interest rate effects seem to result primarily from changes in currency denomination choices on the part of borrowers which are not issuing in their home currency. These results suggest that, while risk management motives on the part of issuers and investors play an important role in currency denomination decisions, other factors are relevant as well.

Strong exchange rates and high yields may be taken by investors as a signal that investment returns in those currencies are likely to be higher in the near future. Investors might implicitly hold the belief that interest rate differentials do not, or do not fully, reflect future exchange rate changes, in other words that UIP is systematically violated. Borrowers might be willing to concede these increased returns (which correspond to increased borrowing costs for them) either because they do not share these beliefs, or because they are able to use derivatives to pass the associated exchange rate exposures to other counterparties who do not share these beliefs.

An explanation based on market imperfections would focus on ways in which borrowers are able to take advantage of certain markets to which investors do not have access. For example, it could be the case that CIP is systematically violated in such a way that the all-in cost of issuing in a high-yielding currency and swapping into a low-yielding one is frequently lower than that of issuing directly in the low-yielding currency to begin with, and that there are market imperfections preventing this anomaly from being arbitraged away smoothly.

To choose among these and other explanations, one would need a fuller model that takes account of alternative financial instruments, including domestic bonds and bank loans, and incorporates more rigorous behavioural

models of both investors and issuers. One would also require more conclusive empirical evidence on anomalies and imperfections in international long-term debt markets, including the typical degree and direction of deviations from UIP and CIP.

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