



EUROPEAN CENTRAL BANK

**WORKING PAPER SERIES**

**NO. 550 / NOVEMBER 2005**

**ECB-CFS RESEARCH NETWORK ON  
CAPITAL MARKETS AND FINANCIAL  
INTEGRATION IN EUROPE**

**UNDERWRITER  
COMPETITION AND  
GROSS SPREADS IN THE  
EUROBOND MARKET**

by Michael G. Kollo



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# UNDERWRITER COMPETITION AND GROSS SPREADS IN THE EUROBOND MARKET <sup>1</sup>

by Michael G. Kollo <sup>2</sup>

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## ABSTRACT

We investigate the competitive landscape of underwriting services in the Eurobond market including the choice of underwriter and underwriter gross spread. We find a significant but declining association between the home market of the Eurobond's currency of denomination and that of the lead underwriter. These bonds underwritten by underwriters 'local' to the currency also carry significantly lower underwriter gross spreads vis-à-vis other Eurobonds. The amalgamation of the European currencies into the Euro resulted in a significant shift in the competitive landscape for underwriting services. We find a significant portion of market shares shifted from the 'local' European underwriters to non-'local' U.S. underwriters with the introduction of the Euro. Moreover, the volume of new issues rose and the gross underwriter spread declined significantly. Our empirical results suggest that Eurozone underwriters responded to the increased entry of U.S. and other Eurozone underwriters with aggressive discounting of the underwriter gross spread.

*Journal of Economic Literature Classification Codes: G15 and G24.*

*Key words: Underwriter competition, Underwriter spreads, Eurobond market*

## Non-Technical Summary

Our study examines the competitive landscape for underwriting services in the international debt market, the Eurobond market. Prior studies argue that underwriters in the Eurobond market compete based on their expertise and placement strength specific to the Eurobond's currency of denomination. This suggests underwriters 'local' to the currency of denomination enjoy some degree of competitive advantage for underwriting new issues vis-à-vis other 'foreign' underwriters. Our study is the first to examine the competitive landscape for Eurobond underwriters in the light of 'local' underwriter segmentation. We examine the change in market shares and competition for 'local' Eurozone underwriters due to the introduction of the Euro.

Our study asks the question: what is the role of the 'local' underwriters in the competition for intermediary services in the Eurobond market? How did the Euro change the 'local' European underwriter market shares and the underwriter fee? Who were the 'winners' in the Eurobond market as a result of the introduction of the Euro?

Our model is a two-stage estimation procedure that examines the determinants of the choice of a 'local' underwriter before and after the introduction of the Euro. Our findings show that larger, riskier public issues are more likely to employ a 'local' lead underwriter. Moreover, we find that the likelihood of choosing 'local' underwriters declines significantly over our sample period 1993 to 2003.

The second stage of our model examines the determinants of the underwriter fee. Interestingly, we find that 'local' underwriters generally charge a significantly lower underwriter fee vis-à-vis non-'local' underwriters. Moreover, our results show that 'local' Eurozone underwriters lowered fees significantly after the introduction of the Euro in 1999. An unforeseen result was the significant increase in market share of non-'local' U.S. investment banks in the Euro denominated Eurobond market to the

detriment of ‘local’ Eurozone underwriters. We find no evidence to suggest that the U.S. investment banks gained this market share through price discrimination. Instead, we find support for a competing hypothesis that ‘local’ European underwriters cut fees after the introduction of the Euro. We argue that this was in response to the loss of ‘local’ market power in the segmented currency zones that brought the Eurozone underwriters into direct competition with each other and the more reputable U.S. investment banks. The increased competition and the loss of market power by eurozone underwriters helped drive competition in fees.

Our empirical evidence suggests that, overall, the introduction of the Euro lowered the barriers of entry and increased the quantity of new issues in the Eurobond market. The mainly European community of issuers benefited greatly from the lower barriers of entry and greater demand for their securities. While the demand for underwriting services increased overall, U.S. investment banks were successful in capturing a greater share in the Euro Eurobond market than the Eurozone banks.



## Introduction

The Eurobond market is serviced by a diverse range of international banks. Competition in the Eurobond market is intense, and underwriters cite “excessive competition” as leading to thin profit margins.<sup>1</sup> Levich (2001, p. 352) reports elevated competitive conditions in the Eurobond market arguing that the top ten underwriters in the Eurobond market captured only 63.5% of the total market share in 1999. Furthermore, the author cites a diverse mix of U.K., European, U.S. and Japanese underwriters occupying the top ten positions in the league tables from 1978 to 1999. Concluding that the market for underwriters’ services is competitive based on evidence of aggregate underwriter concentration in the Eurobond market can be misleading. Instead, Balder et al (1991) suggest that underwriters in the Eurobond market also compete based on their expertise and placement strength in the Eurobond’s currency of denomination. In support, the authors find that underwriters are more likely to manage Eurobonds denominated in their home nation’s currency vis-à-vis other currencies.<sup>2</sup> In 2003, 56% of the volume of Euro denominated Eurobonds underwritten by the top twenty underwriters employed a European underwriter.<sup>3</sup> This phenomenon suggests some degree of competitive advantage for underwriting services in favour of underwriters ‘local’ to the currency of denomination (herein referred to as a ‘local’ underwriter). Our study models the choice of a ‘local’ underwriter and the impact of this choice on the cost of issuance, the underwriter gross spread.

Our study of the association between the nationality of the underwriter chosen and the pricing of underwriter services is of interest for several reasons. First, the

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<sup>1</sup> The Wall Street Journal, “Eurobond Market No Longer Affords Investment Banks Big Profit Margins”. Oct 31, 1994.

<sup>2</sup> Similarly, McCauley and White (1997, Table 7) find a strong correlation between the underwriter’s nationality and the currency of denomination.

<sup>3</sup> Authors calculations based on the population of non-equity linked Eurobonds in 2003.



study provides evidence on important competitive barriers of entry that affect the cross-currency competition of underwriters in the Eurobond market. Recent studies by McCauley and White (1997) and McCauley (1999) document the correlation between underwriter nationality and currency, and suggest that underwriters enjoy a competitive advantage in placing Eurobonds denominated in their home currency. Whilst we also find a significant relationship between the currency of denomination and the underwriter's home nation, we note that the association declines from 1993 to 2003.

Second, the study examines the effect of the amalgamation of the Eurozone currencies in 1999 on the choice of a Eurozone 'local' underwriter and underwriter spread in the legacy/Euro denominated Eurobond market. The introduction of the Euro worked to erode the competitive advantage of European banks underwriting Eurobonds in their home currencies vis-à-vis non-European underwriters. Seminal studies by Detken and Hartmann (2000) and Santos and Tsatsaronis (2003) document the increased volume of new issues, a decline in underwriter gross spreads and the increased contestability of the Eurobond market due to the introduction of the Euro. Our results of the choice of underwriter are generally consistent with these observations, as the probability of using a 'local' European underwriter to place legacy/Euro denominated Eurobonds declines significantly after 1999. However, we find that increased competition between Eurozone underwriters, rather than the entry of U.S. underwriters, resulted in the decline in underwriter gross spreads. Our findings are in contrast to Santos and Tsatsaronis (2003) who suggest that the new entrant U.S. underwriters were associated with the decline in underwriter gross spreads.

Finally, the study is of interest as it develops the existing models of underwriter spreads by incorporating endogenous underwriter choice. Jewell and Livingston (1998) and Livingston and Miller (2000) assume exogenous contract choice and

exogenous underwriter choice terms in their models of the underwriter gross spread. While Gande, Puri and Saunders (1999) and Livingston and Zhou (2002) incorporate endogenous selection of the underwriter type and placement type in their model, they do not focus their analyses on these determinants. Our study provides a detailed analysis of the determinants of the underwriter choice and incorporates the estimated underwriter choice as a determinant of the underwriter spread.

The remainder of the paper is structured as follows. Section One briefly describes the Eurobond market, the issuance process and the studies that document the competitive landscape in the Eurobond market. In Section Two, we develop the model for the determinants of the underwriter choice and the underwriter spread. The data and summary statistics are described in Section Three while regression results are reported in Section Four. Section Five summarizes the principal findings and suggests topics for ongoing research.

## **1. The Eurobond Market**

The first Eurobond issue was in 1957 by Petrofina, a Belgian petroleum company for the small amount of \$5 million. Issuers were attracted to the Eurodollar, the U.S. Dollar denominated Eurobonds, as an alternative to foreign bonds issued in the U.S. domestic market that carry disclosure costs and excise taxes.<sup>4</sup> Panel A of Table I shows the volume of new non-equity linked Eurobond issues from 1990 to 2003. The Eurobond market saw rapid expansion in the 1990s, averaging an annual growth of 18.4% from 1990 to 2000, and slowing to an average of 3% growth in volume from 2000 to 2003. Similarly, Levich (2001, pp. 337) reports an average growth from 1979 to 1999 of 20% p.a.

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<sup>4</sup> The introduction of the interest equalization tax (IET) in 1963 greatly increased the cost of funds for foreign borrowers in U.S. domestic markets. While the IET program was later scrapped in 1974, the Eurobond market survived and continued to grow.

Eurobonds differ from foreign bonds in that a Eurobond issue may be denominated in any currency, and is often sold across a range of markets simultaneously.<sup>5</sup> The primary currency of denomination has traditionally been the U.S. Dollar followed by the European currencies and the Yen. Detken and Hartmann (2000) and Detken and Hartmann (2002) document the important role of the Euro in the international financial markets. The authors show that the Euro overtook the U.S. Dollar briefly in 1999, and settled as the second most widely used currency behind the U.S. Dollar for international financing.

Eurobonds are underwritten by a lead underwriter(s) and a syndicate of international banks assist in the marketing and sale of the new security. The issuing entity sets the contract characteristics of the Eurobond such as tenure, size and other characteristics. The lead underwriter(s) is chosen through a competitive tender to sell the issue.<sup>6</sup> In the case of a ‘bought deal’<sup>7</sup>, the lead underwriter buys the entire issue from the issuer. In syndicated offerings, the Eurobonds are sold using the ‘fixed-price’ method to avoid under-pricing by syndicate members to favoured clients.<sup>8</sup>

## **1.1. Competition in the Eurobond Market**

The Eurobond markets are generally regarded as very competitive (Levich (2001, p351)). However, aggregate league tables may provide misleading conclusions in a market with heterogeneous products. Agents that are specialised in certain segments of the Eurobond market are naturally more competitive vis-à-vis other

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<sup>5</sup> While not domiciled in any one country, secondary market over the counter (OTC) trading of Eurobonds is usually based in London, New York and Luxemburg. See Esho, Kollo and Sharpe (2004) and Kollo and Sharpe (2004) for an overview of the Eurobond market.

<sup>6</sup> The competitive tender may be omitted if the issuer is concerned about the speed of the issuance.

<sup>7</sup> This contrasts to a ‘best efforts’ underwriter contract, where the underwriter does not commit to a firm purchase of all the outstanding securities. Almost all Eurobonds use the ‘bought deal’ method.

<sup>8</sup> In ‘fixed-price’ issues, all members of the syndicate must sell the issue at the same price set by the lead underwriter, for which they receive a commission. Therefore, underwriters in the sales syndicate are not able to decrease the sale price that cuts into their fee revenue.

agents. Therefore, if product segments are largely captured by the agents that specialise in them, then aggregate measures of market share will most likely show the share of product segments rather than agents.

Balder et al (1991) argue that currency of denomination is an important source of product heterogeneity in the Eurobond market. They show a strong positive correlation between the currency of denomination and the lead underwriter's nationality from 1985 to 1989. The authors interpret their findings as evidence of competitive advantages in the production of underwriting services across the currency of denomination. They suggest that underwriters enjoy a competitive advantage in placing issues denominated in their home market currency vis-à-vis other currencies. The competitive advantage enjoyed by underwriters placing issues in their home currencies is due to (i) investor preferences for domestic currency securities and (ii) the dominant market position enjoyed by underwriters in their local markets (Denaus (1996).

Firstly, investor preferences for home currency securities are supported by the observed portfolio weights of large domestic institutional investors and documented in the 'home-bias' literature. Lannoo (1998) reports that pension funds in the U.S. invested ten percent of their portfolio in foreign assets, while German pension funds held less than six percent. Similarly, Roldos (2004) reports pension funds investments in foreign assets accounted for eleven percent of portfolio holdings in the U.S., and only five and seven percent in France and Germany respectively in 2001-02. The 'home bias' or under-diversification observed in the portfolio allocation of large domestic institutional investors suggests that currency of denomination is an important factor in determining investor base for new securities. Moreover, studies by Stehler (1977) and Adler and Dumas (1983) document 'home-bias' by domestic investors in foreign securities denominated in foreign currencies. Similarly, Kim and



Stultz (1988) argue that clientele effects in the investor base allow large U.S. corporations to borrow in the Eurobond market at a lower cost of capital relative to issuing in their domestic market.

Secondly, ‘local’ underwriters’ competitive advantage is further enforced by their dominant market share of their home market relative to foreign underwriters. De Nicolo et al (2003) reports the mean asset share controlled by domestic banks as 87 percent in the North American markets, and 68 percent on average for countries in Western Europe in 2000. The dominant position of domestic banks in their home markets suggests greater access to domestic investors relative to other nationality underwriters. In summary, segmented investor preference and the dominant position of underwriters in their home markets provide a natural competitive advantage to underwriters placing Eurobonds denominated in their home market’s currency.

## **1.2. The Introduction of the Euro**

The introduction of the Euro in 1999 reduced the level of competitive advantage enjoyed by European underwriters by (i) amalgamating the investor base for Euro denominated Eurobonds and (ii) increasing the entry of non-European underwriters into the Eurozone currency segments of the Eurobond market. Santos and Tsatsaronis (2003) and Galati and Tsatsaronis (2003) argue that the introduction of the Euro opened the entry of U.S. investment banks into the Euro segment of the Eurobond market, increasing the contestability of the Euro denominated Eurobond underwriting market. Figure 1 shows the percentage market shares of U.S., Eurozone, Ex-Eurozone European<sup>9</sup> and Japanese underwriters for the Eurozone currency denominated Eurobonds issued by non-financial firms from 1993 to 2003. The increased entry of

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<sup>9</sup> Ex-Eurozone European underwriters are those from European nations that did not adopt the Euro. For example, U.K and Swiss underwriters.

U.S. investment banks into the Eurozone currency segment is especially evident at the introduction of the Euro in 1999, consistent with the authors arguments. Galati and Tsatsaronis (2003) argues that the increased entry of U.S. investment banks increased the contestability of underwriter services in the Eurobond market. Our study seeks to refine this observation by differentiating the choice and pricing of ‘local’ and non-‘local’ underwriters pre and post the Euro in 1999.

### **1.3. Underwriter Compensation**

An important cost of capital for new issues in the Eurobond market is the underwriter gross spread.<sup>10</sup> The underwriter gross spread is the price of the underwriting service and varies with the default risk of the issue, the maturity of the issue, the issue size, the reputation of the lead underwriter and other institutional characteristics of the issue (see Jewell and Livingston (1998), Gande et al (1999), Altinkiliç and Hansen (2000), Livingston and Miller (2000), Livingston and Zhou (2002) and Rotten and Mullineaux (2002)).

Market studies of the Eurobond underwriter spreads have largely been neglected by the U.S. domestic market focused academic literature.<sup>11</sup> A small number of studies focused on the Eurobond market find the underwriter spread is generally higher than in the U.S. domestic market. Moreover, the underwriter spread has seen a significant decline in the late 1990’s, especially pronounced for Eurobonds denominated in legacy currencies (Santos and Tsatsaronis (2003), Galati and Tsatsaronis (2003), Kollo and Sharpe (2004) and Melnik and Nissim (2003)).

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<sup>10</sup> The underwriter compensation is expressed as a ‘spread’, or percentage of the issue size and is paid to the underwriter on agreement of the deal. This is distinct to the more commonly used variant of the term ‘spread’ to signify secondary market makers spread between the bid and ask price. We may consider the ‘underwriter spread’ as the difference between the price the issuer sells the bonds to the underwriter and the price at which the underwriter sells the issue to the market.

<sup>11</sup> See studies by Esho, Kollo and Sharpe (2003) and Kollo and Sharpe (2004) for a discussion of the unique determinants of underwriter spreads in the Eurobond market.

Figure 2 shows the average underwriter gross spread for Eurozone, ex-Eurozone European and the U.S. Dollar currency denominated Eurobonds issued by non-financial firms. Consistent with Galati and Tsatsaronis (2003, p 184), the figure shows a clear negative trend in underwriter spreads for all currency segments except the U.S. Dollar. The authors argue that the decline in underwriter spreads is due to lower costs of research and distribution for Euro denominated Eurobonds and a corresponding boom in bond issuance over the 1998 to 2001 period.

Santos and Tsatsaronis (2003) argue that the lower underwriter gross spreads are a result of competitive changes due to the increased entry of U.S. investment banks into the Eurobond underwriting market. Figure 3 shows the average underwriter gross spread (%) for fixed/straight Eurobonds denominated in the legacy currencies pre-1999 and the Euro post 1999. The average underwriter gross spread was lower for Eurobonds underwritten by European underwriters vis-à-vis U.S. underwriters post the introduction of the Euro in 1999, 2000, and 2001. Our study provides evidence on the difference in pricing of underwriter services post the introduction of the euro by U.S. and European underwriters. Our study builds on the authors findings by explicitly differentiating between the increased competition from non-‘local’ (U.S.) and ‘local’ (European) underwriters post the introduction of the Euro in 1999.

## **2 Model**

Our model examines the effect of the choice of the underwriter on the underwriter gross spread. The model is estimated as a two-stage system of equations, where the first-stage Logit estimates of the underwriter choice are included in the



second-stage ordinary least squares regression of the underwriter gross spread.<sup>12</sup> The first stage and second stage are as follows:

$$\text{Log}(Y_i / (1 - Y_i)) = \delta_1 + \delta_2 (Z_i) + e_i \quad (1)$$

$$W_i = \beta_1 + \beta_2 (\hat{Y}_i) + \beta_3 (X_i) + \epsilon_i \quad (2)$$

Where  $Y_i$  is the dichotomous variable of the choice of an underwriter of the same nation as the domestic market of the currency of denomination (a ‘local’ underwriter). The  $Z_i$  are the determinants of the ‘local’ underwriter choice. The  $W_i$  is the underwriter gross spread, the  $\hat{Y}_i$  is the estimated continuous<sup>13</sup> underwriter choice from equation one, while  $X_i$  are the determinants of the underwriter gross spread.

Our model relies on two important assumptions. First, we assume that the issue characteristics included in  $Z_i$ <sup>14</sup> are independent of the underwriter choice.<sup>15</sup> Smith and Walter (1997) suggest that some of the characteristics of the new Eurobond issue may be altered on advice of the lead underwriter to take advantage of favourable market conditions. In this case, numerous contract terms (for example maturity, currency and placement type) may be determined simultaneously with the choice of underwriter. The decision to assume  $Z_i$  as exogenous to the model is based on the lack of theoretical literature that provides guidance as to which of the contract terms may be determined by the underwriter and which by the issuer. This assumption simplifies the analysis and allows us to examine the underwriter choice consistently with the prior

<sup>12</sup> Our results are unchanged by using Probit instead of Logit estimators. For ease of interpretation, we chose the Logit framework.

<sup>13</sup> We use the continuous Type I predicted underwriter choice that is a normal, continuous variable between zero and one [0,1]. Using the normal predicted variable (Type II) or a truncated dichotomous predicted variable does not qualitatively alter our results.

<sup>14</sup> The contract terms are defined as the size, tenure, placement type and currency of denomination of the issue.

<sup>15</sup> The most important aspect of this assumption is the choice of currency. We assume that the firm chooses the currency of denomination for the Eurobond to match its balance sheet hedging requirements. Therefore, the currency is a contract choice made prior and exogenously to the underwriter choice.

literature (James (1992), Gande et al (1997), Jewell and Livingston (1998), Livingston and Miller (2000), Krigman et al (2001) and Burch, Nanda and Warther (2004)).

Our second assumption is that the underwriter choice is not simultaneously determined with the underwriter gross spread, given the contract terms of the Eurobond.<sup>16</sup> This is primarily because the underwriter gross spread is not observed prior to the choice of the underwriter.<sup>17</sup> This assumption is consistent with the survey findings of Krigman et al (2001) who suggest that issuers choose underwriters based on a number of criteria including reputation, placement capacity, expertise in the security market and prior experience. While the underwriter gross spread constitutes an important cost of capital for issuers, it is negotiated at a later stage of the offering, subsequent to the choice of underwriter. Uttal (1986) provides institutional evidence from the U.S. domestic market that underwriters are chosen long before the underwriter gross spread is determined. Our model of the underwriter choice and gross spread is consistent with the institutional evidence and the models of James (1992) and Burch, Nanda and Warther (2004).

## 2.1. 'Local' Underwriter Choice

We proxy the choice of underwriter as a dichotomous variable that takes the value of unity if the lead underwriter's parent's home nation is the currency's home nation, and zero otherwise, 'CURR\_UW'.<sup>18</sup> We model this 'local' underwriter choice as a function of (i) the issue size and liquidity (ii) the default risk and maturity, (iii) placement type of the new issue and (iv) controls for the currency of issue, time-trend,

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<sup>16</sup> In econometric terms, this means that  $W_i$  is not a subset of  $Z_i$ .

<sup>17</sup> While expectations of the underwriter gross spread may impact the choice, these are not sufficient to impact the choice of underwriter significantly.

<sup>18</sup> In the case of multiple lead underwriters, if any of the lead underwriter's parents are of the same nation as the currency's domestic nation, we define CURR\_UW as unity. Without a clear single investor base or home nation for European Currency Unit issues, we define CURR\_UW as zero for all ECU issues.

the home currency of the issuer's parent and issuer parent's industry.<sup>19</sup> The model is specified as follows:

$$CURR\_UW_i = \alpha + \beta(SIZE, LIQUIDITY) + \phi(DEFAULT, MATURITY) + \gamma(PLACEMENT) + \delta(CONTROLS) + \varepsilon_i \quad (3)$$

Where *SIZE* refers to the issue size, *LIQUIDITY* is the measure of liquidity in the Eurobond's currency segment, *DEFAULT* is the default risk of the issue, *MATURITY* is the maturity of issue and *PLACEMENT* are the placement characteristics of the issue.

### 2.1.1. Size and Liquidity

Large issues are likely to require greater placement expertise by the lead underwriter. Underwriters 'local' to the currency of denomination are more likely to possess the necessary placement capacity to successfully sell larger issues. We expect the size of the issue to have a direct relationship with the choice of a 'local' underwriter. We proxy the underwriter's required placement capacity with the real U.S. Dollar tranche issue amount, 'ISSUE\_SIZE'.<sup>20</sup> However, as it is not clear that this relationship is linear, we include the quadratic form of the real issue size, 'ISSUE\_SIZE^2'.

Less liquid Eurobond issues are more likely to require the expertise of an underwriter 'local' to the currency of denomination. Our measure of liquidity is the average investor demand for corporate Eurobonds in the currency of denomination,

<sup>19</sup> Issuers and underwriters are always identified on the parent level. Our decision reflects the multinational nature of the issuing firms and underwriters.

<sup>20</sup> Issue size is reported by Thomsons in U.S. Dollars and deflated by the US General CPI Index to constant 1995 dollars. The issue amount is censored at the 1% and 99% percentiles due to the presence of outlier observations. Although we are not able to directly check each of these observations, it is likely that these are as a result of Thomsons errors in variables. Moreover, the issue size is scaled by 10,000 for ease of reporting. Using the natural log of issue size in place of censoring does not qualitatively alter our results.

‘CURR\_VOL’.<sup>21</sup> It is calculated as the cumulative sum of the real issue amounts of all corporate Eurobond denominated in the issue’s currency of denomination, issued over the twelve months immediately preceding the current issue date.<sup>22</sup> We expect an inverse relationship between ‘CURR\_VOL’ and the choice of a ‘local’ underwriter to reflect the significance of the ‘local’ underwriters’ expertise in placing issues denominated in less liquid currency segments.

### 2.1.2. *Default Risk and Maturity*

Denaus (1996) argues that the expertise of ‘local’ underwriters arises from their superior default risk evaluation and pricing of issues denominated in their home currencies. Lower rated issues are generally more difficult to certify and require greater expertise in pricing and marketing to new investors. To capture the effect of default risk of the issue on the choice of underwriter, we include three indicator variables, ‘INVGR’, ‘SUBINVGR’, and ‘NR\_RATE’ to proxy investment grade, sub-investment grade, and ‘Not-Rated’ Eurobonds respectively. We exclude the ‘SUBINVGR’ variable to avoid singularity and omit the sub-investment grade category as a base for comparison. We expect that issuers are more likely to value the ‘local’ underwriters expertise for lower rated issues, and therefore a negative relationship between the ratings dummies ‘INVGR’ and ‘NR\_RATE’ and the likelihood of using a ‘local’ underwriter. We include the natural log of the years to maturity, ‘LN(MAT)’, to proxy the investment risk of new Eurobond issues as suggested by Jewell and Livingston (1998), Livingston and Miller (2000) and Gande

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<sup>21</sup> We use only Eurobonds issued by non-financial firms to calculate ‘CURR\_VOL’. We therefore assume that demand for Eurobonds is in part segmented across the issuer types (i.e. banks, corporate and supranational/government issuers). This assumption is mirrored in our overall sample selection and is supported by Santos and Tsatsaronis (2003). Finally, ‘CURR\_VOL’ is scaled by 10,000 for ease of reporting.

<sup>22</sup> For Euro denominated Eurobond issues in 1999, we calculate the cumulative sum including European Currency Unit issues in 1998.

et al (1997). We expect a positive relationship between the maturity of the Eurobond and the choice of a ‘local’ underwriter.

### 2.1.3. *Placement Type*

Eurobonds can be offered as either private placements or public offerings. Private placements are marketed directly to large institutional investors and are generally smaller in size, require lower disclosure, and are faster to place.<sup>23</sup> Public issues are sold to a wider range of investors, involve an expensive road-show and more extensive efforts by the underwriter to solicit investor interest vis-à-vis private placements. It is not clear how the higher distribution capacity of ‘local’ underwriters differs across private institutional investors and the general pool of public issue investors. We include an indicator variable to control for the institutional differences between private and public placements that takes the value of unity for private placements and zero for public issues, ‘PRIV\_PL’. The relationship between placement type and the ‘local’ underwriter choice is unknown.

A security under the Rule 144a placement category is unlisted and may be sold directly to U.S. domiciled institutional investors without SEC registration (see Levich (2001, p366)). Unlike unregistered bearer bonds, Rule 144a placements may also be traded over the counter between institutional investors within the U.S. domestic market. We include an indicator variable that takes the value of unity if the issue is a Rule 144a placement, ‘US\_R144A’. Denaus (1996) suggest that an issuer’s relationship with their domestic underwriter may also impact the choice of an underwriter. Therefore, issues targeted specifically at U.S. domestic investors are more likely to employ the services of a U.S. underwriter. The relationship between ‘US\_R144A’ and the ‘local’ underwriter choice is expected to be positive for U.S. Dollar issues, and negative for all other currency Eurobonds.

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<sup>23</sup> See Carey, Prowse, Rea and Udell (1993) for an extensive overview of the private placement market.

#### 2.1.4. Controls

We control for the home currency of the issuer, the currency of denomination, the year of the issue and the industry of the issuer's parent. Our definition of a 'local' underwriter is analogous with an underwriter from the issuer's home market where the currency of denomination is the issuer's home currency.<sup>24</sup> We control for this by including a home currency choice variable, 'HOME\_CURR' that takes the value of unity if the currency's domestic market is the issuer's parent's home nation.

We include indicator variables for U.S. Dollar, Eurozone<sup>25</sup>, Euro, Yen and all other currencies. The coefficients control for the currency-specific effects in the choice of underwriter. Moreover, we control for time trend characteristics in the dependent variable by including indicator variables for the year of the issue. Finally, we include indicator variables for the issuer's parent's first digit of SIC industry code. Our variables control for currency, time and industry specific effects in the 'local' underwriter choice.

## 2.2. Underwriter Gross Spread

The gross underwriter spread is the cost of intermediation for the placement of new bonds, and is commonly measured as the sum of the management fee, marketing costs, syndicate fees, and selling concession<sup>26</sup> divided by the issue size (Gande et al (1997), Jewell and Livingston (1998), Livingston and Miller (2000), Livingston and

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<sup>24</sup> The exception may arise for issues denominated in Euros and in the case of multiple underwriters. For example, a French company issuing Euro denominated Eurobonds that uses a German underwriter. In this case, the underwriter is local to the currency (UW\_CURR=1) but not of the same nation as the issuer. Moreover, issuers may use multiple lead managers that overlap in categories. As in the previous case, if the French company used two lead underwriters, one German and one French.

<sup>25</sup> We define Eurozone currencies as those that were replaced by the EURO in 1999. For example, we do not include Swiss Francs and Pound Sterling, but do include German Marks, French Franks, Italian Lira, Spanish Peso and the European Currency Unit.

<sup>26</sup> A selling concession is offered as payment to the selling group (including the lead underwriter) for placing the issue and is the difference between the price the underwriter pays for the issue and the price it sells the issue to investors. Even in the presence of a syndicate of underwriters, the lead underwriter generally takes on a large percentage of the issue. For a detailed review of the underwriter spread components in the U.S. domestic market see Torstila (2001).

Zhou (2002) and Burch, Nanda and Warther (2004)). We define the dependent variable as the underwriter gross spread, 'UW\_SPREAD'. The regression estimates the relationship between underwriter spread and the (i) the choice of underwriter local to the currency of denomination, (ii) the currency segment's liquidity, (iii) the underwriter competition, (iv) the underwriter reputation, (v) default risk and maturity, and (vi) placement type. Moreover, the regression controls for the issuer's home currency, time-trend, issue size, infrequent issuers, call options on the Eurobonds, the currency of denomination, and the underwriter's parent's nationality. The model is specified as follows:

$$UW\_SPREAD_i = \alpha + \beta(CURR\_UW) + c(CURR\_VOL) + d(UW\_COMP) + e(UW\_REP) + f(DEFAULT, MATURITY) + g(PLACEMENT) + h(CONTROLS) + \varepsilon_i \quad (4)$$

### 2.2.1. 'Local' Underwriter Choice

Underwriters may have superior placement capacity in their home currencies vis-à-vis other currencies and therefore face lower distribution costs. The choice of a 'local' underwriter is expected to result in lower underwriter gross spread. In contrast, if the competition from non-'local' underwriters in the Eurobond's currency segment is significantly impeded, 'local' underwriters are more likely to extract the lower distribution costs as quasi rents through higher underwriter gross spreads. The lower costs of the 'local' underwriter are reflected in the underwriter spread based on the competitive landscape for underwriter services within the currency of denomination.

The choice of a 'local' underwriter is proxied by the indicator variable 'CURR\_UW' defined in Section 2.1.1 that takes the value of unity if the underwriter parent's home nation is the currency's domestic market. As the choice of underwriter is likely to be endogenous to the contract characteristics of the Eurobond, we use the continuous predicted value, 'Pr(CURR\_UW)', derived from the regression estimate of



Equation 3. Due to the contrasting hypotheses of underwriter pricing outlined above, the relationship between ‘Pr(CURR\_UW)’ and underwriter spreads is uncertain.

### 2.2.2. Currency Segment Liquidity

As investor demand for Eurobonds is segmented by the currency of denomination (Denaus (1996), Eurobonds denominated in less liquid currency segments face greater distribution costs. We proxy the size of the Eurobond’s currency segment by ‘CURR\_VOL’, the currency segment’s liquidity defined in Section 2.1.1. We expect an inverse relationship between the currency segment size and the underwriter gross spread to reflect lower distribution costs for Eurobonds denominated in more liquid currency segments.

### 2.2.3. Underwriter Competition

Eurobonds issued in more contested currency segments are likely to reflect increased competitive pressures on the underwriter gross spread. The contestability of underwriter services within currency segments is measured as the Herfindahl index of underwriter market shares within the Eurobond’s currency of denomination, ‘UW\_COMP’. We construct a Herfindahl concentration measure based on the underwriter’s market shares for all currency segments in the Eurobond market. The Herfindahl index is the sum of the squared market shares of all underwriters within each currency segment in the Eurobond market, defined as:<sup>27</sup>

$$UW\_COMP_{it} = \sum_{j=1} \left[ \left( \frac{UW\_VOL_{itk}}{\sum_{j=1} UW\_VOL_{itk}} \right) * 100 \right]^2 \quad (5)$$

<sup>27</sup> We calculate the Herfindahl measure across all Eurobond types and issuer categories, including government and supra-national. Multiple lead underwriters are given equal credit for each issue. The variable is scaled by 10,000 for ease of presentation.

Where ‘i’ is the currency of denomination, ‘t’ is the year, and ‘j’ is the underwriter’s parent. ‘UW\_VOL’ is the sum of the issue sizes that underwriter ‘j’ lead managed in year ‘t’ denominated in currency ‘i’. The maximum value of Herfindahl index is 10,000 for a single underwriter with a perfect 100% market share of a currency segment of the Eurobond market in any given year, and approaches zero for an infinite pool of underwriters. The variable ‘UW\_COMP’ takes the value of the Herfindahl index of the currency of denomination for the year prior to the issue.<sup>28</sup> Eurobonds denominated in more concentrated, lower competition currency segments will carry a higher ‘UW\_COMP’ value. We expect a direct relationship between the concentration of underwriters and the underwriter gross spread.

#### *2.2.4. Underwriter Reputation*

The underwriter’s reputation serves as a signal to the market as to the true quality of the issue. Chemmanur and Fulghieri (1994) argue that high reputation underwriters provide superior certification services that low reputation underwriters are unable to replicate.<sup>29</sup>

Prior studies of underwriter spreads in U.S. debt and equity markets have used numerous approaches to proxy underwriter reputation: (i) Carter and Manaster (1990) use an integer ranking based on the underwriter’s hierarchical bracket position in new issue tombstone announcements; (ii) Megginson and Weiss (1991) use the underwriter’s market share (in dollar terms) over a prior period. Megginson and Weiss (1991, p. 890) find a high positive correlation between their market share proxy

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<sup>28</sup> For Euro issues in 1999, we use the aggregate underwriter shares across all of the legacy currencies that constituted the Euro in 1998, including the E.C.U. Therefore, we assume that the concentration of underwriters in the Euro segment in 1999 would have been similar in 1998 if the Euro had been introduced at that time. If there were no issues in the currency, the variable takes the value of zero. For multiple underwriters, we credit each underwriter equally from the proceeds amount. Santos and Tsatsaronis (2003) and Esho, Kollo and Sharpe (2003) construct similar measures of underwriter market share concentration in the Eurobond market.

<sup>29</sup> While the authors focus on the behaviour of underwriters in the equity market, they note that their model is also applicable to an asymmetrically informed debt market (Chemmanur and Fulghieri (1994, p58)).

and that of Carter and Manaster's (1990) tombstone hierarchical bracket ranking. As a tombstone ranking of underwriters in the Eurobond market is not available, in this study we use the market share approach.<sup>30</sup> First, we construct underwriter league tables for each year 1992 to 2002. The lead underwriter's parent of each tranche<sup>31</sup> is credited with the nominal U.S. Dollar issue amount, and the issue amounts are summed for each underwriter parent for each year.<sup>32</sup> The top twenty lead underwriter parents for each year are given rankings; twenty for the top underwriter, nineteen for the second and so forth. Underwriter parents outside the top twenty are given a ranking of zero. Second, for each issue, we match the lead underwriter's ranking in year prior to the issue date. If the underwriter has merged with another underwriter within the last year, we use the highest ranking in the previous year of the two merging entities.<sup>33</sup> We expect a direct relationship between underwriter reputation and underwriter gross spreads to reflect the higher quality of service provided by a higher reputation underwriter (Chemmanur and Fulghieri (1994) and Puri (1999)).

#### 2.2.5. *Default Risk and Maturity*

Jewell and Livingston (1998) find that lower rated bonds carry a lower underwriter spread, and that this is specifically pronounced for sub-investment grade issues. We include the indicator variables, 'INVGR' and 'NR\_RATE' defined in

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<sup>30</sup> One such ranking is provided by the institutional publication 'Euromoney' based on a survey of institutional investors and issuers. Unfortunately, the available survey information does not extend to our full sample period. With the generous contribution of the Euromoney editor, we obtained Euromoney rankings based on the total ranking (underwriting, advisory and research) for the lead underwriters in our sample for the four years 1999–2003. We assign the lead underwriter's Euromoney ranking for the previous year. The correlation of this ranking with our measure 'UW\_REP' for issues from 1999 to 2003 is 0.905.

<sup>31</sup> We use all non-equity linked Eurobonds issued by non-financial, financial, supranational, and sovereign issuers over this period.

<sup>32</sup> For multiple lead underwriters, we split the issue amount evenly between the lead underwriters. We follow over 400 underwriters in the Eurobond market, including foreign subsidiaries and parent companies. We credit the underwriter parents manually by amalgamating all issues done by subsidiaries under the parent's name.

<sup>33</sup> We follow and adjust over 400 underwriters through mergers over our sample period, including foreign subsidiaries. Fortunately, mergers between underwriters with significant league table rankings in the Eurobond market are rare. For example, the mergers of large investment banks like SBC and UBS and BNP and Paribas. Moreover, our results are qualitatively unaffected by our assumptions with relation to assigning credit to underwriter parents that have merged.

Section 2.1.3. The coefficients are measured relative to the sub-investment grade category and are expected to be negative to reflect lower underwriter spreads for higher rated issues. Moreover, we include the natural log of the years to maturity, ‘LN(MAT)’ of the Eurobond. Longer maturity bonds carry greater risk to investors and therefore higher placement costs. A direct relationship is expected between ‘LN(MAT)’ and the underwriter spread.

#### *2.2.6. Placement Type*

Eurobond private placements are confined to a relatively small investor base, are generally unlisted, and therefore disclosure, distribution, and marketing costs are relatively small. Public offers require greater disclosure, a road show (dependent on size of the issue), and a greater marketing effort. A public offer often requires a large underwriting syndicate resulting in greater costs for the lead underwriter in managing syndicate members (Chen and Ritter (2000)). These administrative and management costs are expected to add to the distribution costs of a public offer and result in higher underwriter spreads.<sup>34</sup> We proxy the placement costs for the underwriter by including an indicator variable, ‘PRIV\_PL’, that takes the value of unity for private placements defined in Section 2.1.4. The relationship between ‘PRIV\_PL’ and underwriter spreads is expected to be negative to reflect lower fees for private placements vis-à-vis public issues of Eurobonds.

#### *2.2.7. Controls*

The choice of an underwriter local to the currency of denomination is usually equivalent to the choice of an underwriter from the same nation as the issuer if the Eurobond is denominated in the issuer’s home currency. In these cases, the

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<sup>34</sup> There is an important distinction in the use of the terms “private placement” and “public offering” between the Eurobond and U.S. domestic markets. For Eurobonds the term “private placement” refers to the distribution technique used to place the bonds, not a Rule 144A exemption as in U.S. markets. Thus a private placement of Eurobonds is “an offer of securities made to a limited number of investors or a single investor (and which are) generally not listed” (Fisher (1988, p. 222))

underwriter choice also captures the effect of using the issuer's domestic underwriter. We control for the effect of using an underwriter local to the issuer's home nation by including the indicator variable 'HOME\_CURR' defined in Section 2.1.5.<sup>35</sup>

Santos and Tsatsaronis (2003), Kollo and Sharpe (2004) and Esho, Kollo and Sharpe (2004) find a negative time trend in underwriter gross spread in the Eurobond market. We include a time trend control variable, 'YEAR' that takes the value of the year of the issue. We expect a negative coefficient for 'YEAR', in evidence of declining underwriter spreads in the Eurobond market.

We control for economies of scale in underwriting fees by including 'ISSUE\_SIZE' defined in Section 2.1.1. (Altinkiliç and Hansen (2002)). In the presence of economics of scale, we expect a negative relationship between issue size and the underwriter gross spread. We include an indicator variable for new issuers, 'NEW\_ISSUER' that takes the value of unity if the issuer has not issued any Eurobonds over the past three year period. Kollo and Sharpe (2004) find a positive and significant relationship in their corporate sample between new issuers and underwriter spreads. We include the indicator variable 'CALL\_OPTION' that takes the value of unity if the Eurobond carries a call option (Jewell and Livingston (1998) and Livingston and Miller (2000)). The presence of a call option decreases the effective maturity of the Eurobond and is therefore expected to have a negative relationship with the underwriter spread.

Finally, we include indicator variables for the currency of denomination and the underwriter's parent's nationality.<sup>36</sup> Our control variables control for currency and nationality fixed effects in the underwriter gross spread.

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<sup>35</sup> A different way to control for this effect is to include an indicator variable if the issuer's home nation is the underwriter's home nation. For consistency with the underwriter choice model, we use 'HOME\_CURR'. The results are qualitatively unaffected by this choice.

<sup>36</sup> For multiple lead underwriters, the indicator variable takes the value of unity if any of the lead underwriters are of the proxied nationality.

### 3 Data and Summary Statistics

Our sample of straight/fixed-rate Eurobonds issued by industrial firms between January 1993 and December 2003 is drawn from Thomsons Deals.<sup>37</sup> Industrial firms are chosen to provide a homogeneous sample of issuers, following the previous U.S. domestic bond studies of underwriter spreads by Gande et al (1997), Jewell and Livingston (1998) and Livingston and Miller (2000). Financial firms are excluded due to their internal placement capacity that may bias the underwriter choice. We include only straight/fixed-rate Eurobonds to control possible heterogeneity due to the institutional differences in the security type. Panel A of Table 1 shows that fixed-income issues comprised a majority (70.2%) of the total volume of non-equity linked Eurobond issues from 1993 to 2003. Our sample selection criterion captures an economically significant part of the Eurobond market.

We treat multiple tranches of a single deal as separate observations if their issue characteristics and/or underwriter spreads are different. Initially, our sample consisted of 4920 non-equity linked fixed-rate Eurobonds issued by non-financial firms that met this criterion. We exclude a further 238 observations due to missing underwriter spreads, 28 due to missing ratings, 9 due to missing maturity, 5 due to missing issue size and a further two due to missing underwriter parent information. We exclude four observations with the implausibly high underwriter spreads of 22.42%, 42.09%, 93.92% and 165%. The final sample consists of 4634 Eurobonds issued by 925 non-financial issuers from 48 different nations. Of the Eurobonds in our sample, 22% denominated in U.S. Dollars, 18% in Euro, and 32% in Japanese Yen.<sup>38</sup> U.S., European, and Japanese underwriters are the dominant nationalities, lead managing

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<sup>37</sup> Thomsons Deals is the same research database (SDC Platinum) used by Livingston and Miller (2000), Livingston and Zhou (2002) and Kollo and Sharpe (2004).

<sup>38</sup> Further summary statistics (unreported) show that Japanese Yen issues were generally smaller in size and declined significantly over the sample period.

32%, 37%, and 34% of issues respectively. Similarly, the dominant issuers of U.S., Japanese, and European origin form 83% of the Eurobond issues in the sample.

The summary statistics for the total sample are displayed in Table II, while Table III shows the sample disaggregated into Eurobonds with ‘local’ underwriters (CURR\_UW=1) and those with non-‘local’ underwriters (CURR\_UW=0). The mean underwriter spread in the sample is 96 basis points (bps), while the difference in mean underwriter gross spread for Eurobonds with ‘local’ underwriters to non-‘local’ is 34 bps.

On average, 62% of Eurobonds used at least one underwriter local to the currency of denomination. The mean issue size for the sample of Eurobonds is \$US178 million. This figure is slightly higher for issues underwritten by ‘local’ underwriters vis-à-vis non-‘local’ underwriters, at \$US186 million and \$US165 million respectively. The average twelve month volume of new issues in the currency of denomination is \$US30,171 million while the mean Herfindahl index of concentration is a low 930 (CURRVOL=0.0930), which suggests that the environment for Eurobonds is generally very competitive.<sup>39</sup> The average league table rank of the lead underwriter is 9.22 with Eurobonds that used a ‘local’ underwriter employing on average lower reputation underwriters at a mean rank of 8.00 vis-à-vis non-‘local’ underwritten Eurobonds of 11.22. The differences suggest that ‘local’ underwriter expertise and a more general underwriter reputation may act as substitutes for one another. Eurobonds are generally issued by high rated firms, reflected in the 5% of the Eurobonds rated sub-investment grade. This is in contrast with U.S. domestic market studies by Jewell and Livingston (1998) and Livingston and Miller (2000) that report 22% and 18% of their sample below investment grade. Private

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<sup>39</sup> Populations are classified as low concentration for Herfindahl values below 1,000; medium concentration for values between 1,000 and 1,800; and highly concentrated for values above 1,800 (see Department of Justice website).



placements of Eurobonds are 22% of the sample, while only 1% of bonds have a call option attached. Private placements constitute 21.8% of the total sample, the majority of which used a ‘local’ underwriter (778 vis-à-vis 230 issues).

## 4. Results

### 4.1. ‘Local’ Underwriter Choice Results

The empirical results for the ‘local’ underwriter choice are reported in Table IV. The base model is estimated using Logit regression and reported in REG 1. The Pseudo  $R^2$  is 0.23, suggesting a generally good explanatory power of the model, while the  $\chi^2$  is 941, significant at the 99% confidence level. The model estimated for the Eurobonds denominated in pre-Euro legacy currencies, the Euro, and the U.S. Dollar is reported in REG 2, REG 3, and REG 4 respectively. The significant  $\chi^2$  for all of the models suggest that the choice of an underwriter local to the currency is significantly related to our model variables.

#### 4.1.1. Issue Size and Liquidity

The coefficient of the measure of issue size, ‘ISSUE\_SIZE’, is positive and statistically significant at the 99% confidence interval. The result is consistent with the hypothesis that larger sized issues require greater placement capacity and are more likely to employ the services of a ‘local’ underwriter.<sup>40</sup> The positive coefficient is consistent across all currency segments, except the U.S. Dollar where it is positive but not significant at the 90% confidence interval. The relationship between issue size and the choice of local underwriter is quadratic for legacy denominated issues pre-1999, where very large issues are less likely to use a ‘local’ underwriter than medium sized

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<sup>40</sup> Our sample consists of individual tranches of Eurobond issues that may belong to a larger single deal. As the choice of a local underwriter is determined at the deal level, we observe only a single underwriter choice for a issues with multiple tranches that may vary in issue size. We address this by excluding all multiple tranche observations (N=858) from our base model. Our results are not significantly affected by excluding multiple tranche observations.

issues. Moreover, this effect is not significant for Euro denominated issues. The result suggests that European underwriters in the Eurozone were generally unsuccessful in underwriting very large Eurobond issues denominated in their home currencies. The European underwriters appear to have gained the ability to place very large issues denominated in Euros after 1999, similar to U.S. underwriters for U.S. Dollar issues.

The regression coefficient for liquidity, 'CURR\_VOL', is negative and not significant in the base REG 1 and is negative and significant at the 95% confidence interval for Eurobonds denominated in legacy currencies reported in REG 2. The result implies that more liquid currency segments of the legacy currency Eurobond market were less likely to employ the services of a 'local' European underwriter. Moreover, it implies that the issue volume was largely generated by Eurobonds managed by non-'local' underwriters. This is consistent with the negative coefficient of 'ISSUE\_SIZE^2' that suggests that very large issues in the legacy currency segment of the Eurobond market are more likely to employ the services of a non-'local' underwriter. Finally, this relationship is not significant post-1999 in the Euro segment of the Eurobond market or in the U.S. Dollar Eurobond market.

#### *4.1.2. Default Risk and Maturity*

The coefficients for 'INVGR' and 'NR\_RATE' are both positive and significant, suggesting that investment-grade Eurobonds are more likely to employ a 'local' underwriter vis-à-vis sub-investment grade Eurobonds. This is inconsistent with the hypothesis that sub-investment grade issuers require greater overall placement strength and are therefore more likely to use a 'local' underwriter. Our results may be due to insufficient variation in the sub-investment grade and investment grade samples. In their U.S. domestic bond sample, Jewell and Livingston (1998) note that underwriting risk increases with default risk exponentially only within the sub-

investment grade category. While their sample contained approximately 22.4%<sup>41</sup> sub-investment grade bonds, our sample contains only 4.70% which reflects the high quality issuers in the Eurobond market. The observed relationship between default risk and the choice of a ‘local’ underwriter is primarily driven by the Euro denominated Eurobonds reported in REG 3.

The natural log of maturity, ‘LN(MAT)’, is positive and significant indicating that longer maturity Eurobonds are more likely to use a ‘local’ underwriter. The result is consistent with longer maturity Eurobonds requiring the greater placement strength afforded by underwriters in their local currencies.

#### *4.1.3. Placement Type*

The coefficient of the private placements indicator variable, ‘PRIVPL’, is negative and significant at the 90% confidence level, suggesting that public issues of Eurobonds are more likely to employ ‘local’ underwriters vis-à-vis private placements. Our results indicate that the expertise of ‘local’ underwriters is more important to place public issues vis-à-vis private placements. There is insufficient variability in private placement in our sample of legacy denominated Eurobonds, and thus ‘PRIVPL’ is excluded from REG 2. The coefficient of ‘PRIVPL’ is negative and significant at the 95% confidence interval for U.S. Dollar Eurobonds, but not for Euro denominated Eurobonds.

#### *4.1.4. Controls*

The coefficient of the control variable for the issuer’s home currency Eurobonds, ‘HOME\_CURR’, is positive and significant. The results suggest the presence of a relationship between the choice of an underwriter local to the currency and the choice of an underwriter local to the issuer’s home nation. This result is

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<sup>41</sup> Jewell and Livingston (1998) report 16 observations with split ratings that are on the investment grade cut-off of BBB- (Baa3). We do not count these as sub-investment grade issues.

especially pronounced for legacy and Euro denominated Eurobond issues but not for U.S. Dollar issues. We control for the effect of issuers domestic relationships with underwriters on the choice of a local underwriter in the second stage underwriter gross spread regressions.

## 4.2 Underwriter Gross Spread Results

The empirical results for the underwriter gross spread are reported in Table V and Table VI. The base model is estimated using multivariate Ordinary Least Squares and reported in REG 1 of Table V. The adjusted-R<sup>2</sup> is 0.48 consistent with the those found in previous Eurobond market models of underwriter spreads of 0.243 in Esho, Kollo and Sharpe (2003) and 0.476 in Kollo and Sharpe (2004).

### 4.2.1 Choice of 'Local' Underwriter

The predicted continuous choice of a 'local' underwriter, 'Pr(CURR\_UW)', is negative and statistically significant at the 99% confidence interval. The coefficient value suggests an economically significant maximum<sup>42</sup> 35bps discount for Eurobonds that employ the services of a 'local' underwriter as the lead manager. The results are consistent with the hypothesis that 'local' underwriters face lower underwriting costs that are reflected in lower underwriter gross spreads. We explore the robustness of this result by interacting 'Pr(CURR\_UW)' with the indicator variable for (i) private placements, (ii) underwriter reputation and (iii) the home currency indicator variable.

The interactive term for private placements, 'Pr(CURR\_UW)\*PRIVPL' is introduced in REG 2. The interactive term is not significant, indicating that 'local' and non-'local' underwriters price their services homogeneously across private placements and public issues.

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<sup>42</sup> We discuss the effect of 'Pr(CURR\_UW)' on the underwriter gross spread as a maximum due to the continuous nature of the predicted probability. We set 'Pr(CURR\_UW)' = 1 to evaluate the maximum effect of the 'local' underwriter choice.

The interactive term with the underwriter reputation and home currency indicator variable is introduced in REGs 3 and 4 of Table V. The underwriter reputation interactive term, 'Pr(CURR\_UW)\*UW\_REP', is positive and statistically significant at the 99% confidence level. The coefficient of 0.012 suggests an economically small one basis point difference in underwriter spreads for 'local' versus non-'local' underwriters with the same reputation. The result suggests that reputable 'local' underwriters price their services marginally higher than non-'local' underwriter in the underwriter gross spread.

The home currency interactive term, 'Pr(CURR\_UW)\*HOME\_CURR', is positive but not statistically significant. The result suggests no significant difference in underwriter gross spreads between 'local' underwriters that are also domestic to the issuer's home market relative to those that are not.

#### *4.2.2. Currency Segment Liquidity*

The coefficient of the currency segment liquidity variable, 'CURR\_VOL' is negative and significant at the 99% confidence interval. The result is consistent with the hypothesis that more liquid currency segments require lower distribution effort and cost from the underwriter, resulting in a lower underwriter gross spread. The coefficient of -0.036 suggests an economically small discount of 4 bps for a difference of \$US10,000 million between the cumulative sum of issues over the past twelve months of currency segments.

#### *4.2.3. Underwriter Competition*

The variable for underwriter competition, 'UW\_COMP', is positive and statistically significant. The result supports our hypothesis that Eurobonds issued in more competitive currency segments of the Eurobond market carry a lower underwriter gross spread. Our results contrast Santos and Tsatsaronis (2003) who find an inverse relationship between their measure of the Herfindahl concentration of

underwriters and the underwriter gross spread. The authors concede that their results are inconsistent with their model predictions of a positive relationship. The coefficient of 0.983 suggests a 9.8 bp difference for Eurobonds offered in currency segments with 1,000 difference in underwriter Herfindahl values. For example, the underwriter gross spread for a Eurobond issued in a very concentrated currency segment (Herfindahl = 5,000) would carry a 39.2 bps higher underwriter gross spread relative to a low concentration currency segment (Herfindahl = 1,000).

#### *4.2.4. Underwriter Reputation*

The coefficient of the underwriter competition variable, 'UW\_REP' is positive and significant at the 99% confidence level. Our results are consistent with the hypotheses of Chemmanur and Fulghieri (1994) and Puri (1999) that more reputable underwriters charge a higher underwriter gross spread. We find evidence in contrast with Livingston and Miller (2000) that find a significant negative relationship between underwriter reputation and fees. The coefficient value of 0.007 suggests an economically small 14 bp premium between the top ranked underwriter (UW\_REP=20) and the bottom ranked underwriter (UW\_REP=0).

#### *4.2.5. Default Risk and Maturity*

The indicator variables for investment grade issues, 'INVGR', and 'Not-rated' issues, 'NR\_RATE', are statistically significant and negative. The coefficients suggest a large discount of 93 bps for investment grade issues and 87 bps for 'Not-rated' issues vis-à-vis sub-investment grade issues. The maturity risk variable, 'LN(MAT)', is positive and statistically significant. Studies of underwriter spreads in the Eurobond market (Esho, Kollo and Sharpe (2003) and Kollo and Sharpe (2004)) and the U.S. domestic market (Jewell and Livingston (1998), Livingston and Miller (2000) and Gande et al (1997)) also find a positive relationship between default risk, the maturity of bonds, and the underwriter gross spread.

#### 4.2.6. Placement Type

The private placement indicator variable, 'PRIVPL', is statistically significant although small in size. The coefficient value of -0.011 suggests an economically small discount of 11 bps for private placements vis-à-vis public issues. The results support the model hypothesis that private placements incur lower marketing and distribution costs and therefore carry lower underwriter spreads. Studies by Esho, Kollo and Sharpe (2003) find a similar difference in underwriter spreads for their sample of private placements and public issues of Eurobonds.

#### 4.2.7. Controls

For brevity considerations, we limit our discussion of the controls to the issuer's home currency, 'HOME\_CURR', trend variable, 'YEAR', and call option, 'CALL\_OPTION'. The coefficient of the 'HOME\_CURR' is negative and not significant. The result indicates there is no significant effect of issuer's home country and the currency's home market on the underwriter spread. The coefficient of 'YEAR' is negative and statistically significant. The coefficient variable suggests an economically significant decline of 85 bps over the ten year sample period 1993 to 2003. The results are supportive of increasing competitive pressures in the Eurobond market that result in a decline of the underwriter spread.<sup>43</sup> Finally, the call option indicator variable, 'CALL\_OPTION', is negative and significant, consistent with our hypothesis that call options lower the effect maturity of bonds and therefore carry a lower underwriter gross spread (Livingston and Miller (2000)).

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<sup>43</sup> For further evidence of falling underwriter gross spreads in the Eurobond market see Santos and Tsatsaronis (2003) for fixed rate issues and Kollo and Sharpe (2004) for floating rate notes. Our model examines the decline in underwriter spreads due to underwriter competition. Our model does not consider other factors that may have contributed to a lower gross underwriter spread such as increased liquidity or a boom in new issuance resulting from exogenous factors.



#### 4.2.8. *Underwriter Gross Spreads after the Euro*

To examine the effect of increased competition in the Eurozone currency Eurobond segment, we introduce the legacy currency, 'LEGACY', and Euro currency, 'EURO', indicator variables interactively with the underwriter choice variable 'Pr(CURR\_UW)'. The coefficients are expected to capture the different pricing of underwriter services by Eurozone underwriters pre and post the introduction of the Euro in 1999. We include the interactive terms for legacy denominated Eurobonds and Euro denominated Eurobonds underwritten by U.S. underwriters as 'US\_UW\_LEGACY' and 'US\_UW\_EURO' respectively. Our test is to examine if 'local' Eurozone and the main non-'local' entrant, U.S. underwriters, lowered their underwriter spreads after the introduction of the Euro. The results are reported in REG 1 of Table V.

The coefficient of 'Pr(CURR\_UW)\*LEGACY' is positive and significant at the 99% confidence interval, while the 'Pr(CURR\_UW)\*EURO' term is not statistically significant. The F-statistics for the test of difference between the two coefficients is  $F(1,4608) = 3.46$  and significant at the 90% confidence interval. The results indicate that Eurozone 'local' underwriters decreased their underwriter gross spreads significantly after the introduction of the Euro in 1999. The coefficients of 'US\_UW\_LEGACY' and 'US\_UW\_EURO' are positive and significant at the 95% confidence interval. The difference of coefficients is  $F(1,4608) = 0.02$  and not significant indicating that the non-'local' U.S. underwriters did not significantly change the pricing of their underwriter services after the introduction of the Euro.

Our results are generally consistent with Figure 3 that shows the average gross underwriter spread U.S., Eurozone and ex-Eurozone European underwriters for legacy and Euro denominated Eurobonds. The results suggest that the decline in underwriter spread is a result of increased internal competitive pressures rather than the increased

entry of U.S. investment banks as argued by Santos and Tsatsaronis (2003). Our results find support in institutional publications like *Euromoney*.<sup>44</sup> Practitioners argue that second-tier European underwriters significantly under-priced their services as a response to the introduction of the Euro. They point to the relatively stable underwriter spread in U.S. Dollar Eurobond and U.S. domestic market as evidence of a ‘gentleman’s agreement’ not to heavily undercut underwriter gross spreads among the U.S. underwriters.

To examine the type of internal competitive pressures that resulted in the lower underwriter gross spread after the introduction of the Euro, we limit our attention to European underwriters in the Eurobond market. Our goal is to investigate the pricing reaction of Eurozone underwriters to the increased entry of other Eurozone underwriters into their currency segment.<sup>45</sup> Our limitation lies in the classification of ‘local’ underwriters. After the introduction of the Euro, all Eurozone underwriters are classified as ‘local’ for Euro denominated issues. We are therefore unable to differentiate between those that acted aggressively to extend their market share within the Eurozone and those that reacted to defend their market share. To overcome this limitation, we classify Eurobonds as those issued by firms in their home currencies and (i) managed by underwriters from the issuing firm’s domestic market, ‘HOMEUW’ or (ii) managed by underwriters not from the issuing firm’s domestic market, ‘NON\_HOMEUW’. We denoted the first category as those issues where the underwriter consolidates his home market share and second where the underwriter is expanding their market share to other currency segments and/or issuers.

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<sup>44</sup> “Banks feel the fee-war squeeze”, May 2003, *Euromoney Publications*.

<sup>45</sup> For example, a German and French underwriter compete for Deutschemark Eurobonds. The German is the ‘local’ and the French is the ‘foreign’. When the Euro is introduced, the French and German underwriters are both ‘local’, and compete equally.

It is not clear which category of underwriter lowered their underwriter gross spread, the ‘HOMEUW’ underwriter reacting to the increased entry of other underwriters or the ‘NON\_HOMEUW’ underwriter acting to capture market share post the introduction of the Euro. We interact the two classifications with legacy and Euro currency indicator variables denoted ‘HOMEUW\_LEGACY’, ‘NON\_HOMEUW\_EURO’, ‘HOMEUW\_EURO’, ‘HOMEUW\_LEGACY’ to provide the empirical test. We limit our sample to Eurobonds denominated in legacy and Euro and underwritten by Eurozone underwriters (N=814). Finally, we exclude all deals with more than one lead underwriter to avoid biases from multiple nationality underwriters, leaving 366 observations. Limiting the sample is expected to produce a cleaner test of our coefficients.

The results are reported in REG 2 of Table VI. The coefficient of the ‘HOMEUW\_EURO’ is negative and significant at the 90% confidence interval. The F-statistics of the difference in coefficients between ‘HOMEUW\_LEGACY’ and ‘HOMEUW\_EURO’ is  $F(1,349) = 4.76$  that is significant at the 95% confidence interval. The results suggest that underwriters consolidating their domestic market issues were the first to reduce the underwriter gross spread as a reaction to the threat of increased competition from other Eurozone underwriters.

In summary, our model highlights the differences in pricing of underwriter services by ‘local’ and non-‘local’ underwriters pre and post the introduction of the Euro in 1999. Our results indicate that ‘local’ Eurozone underwriters lowered their underwriter gross spreads significantly and that the main entrant, the U.S. investment banks, did not significantly change their underwriter gross spreads. Finally, among ‘local’ underwriters, the lower gross underwriter spread is primarily attributed to those that reacted to the increased entry of other Eurozone underwriters into their domestic market.

### 4.3 Robustness

Chen and Ritter (2000) report a high instance of exactly 7% underwriter spreads in U.S. domestic initial public offers of equity. Esho, Kollo and Sharpe (2003) show a medium level of clustering in Eurobond underwriter gross spreads for their sample of fixed rate Eurobonds issued by U.S. firms between 1992 and 2002. Clustering in the dependent variable can bias econometric estimation methods that rely on a continuously and normally distributed dependent variable. To address clustering in the dependent variable, we construct a new dependent variable that takes the values of zero to five based on the percentile distributions of the underwriter spread.<sup>46</sup>

The ‘ORDERED\_FEE’ variable provides an ordinal ranking of underwriter spread, as ‘ORDERED\_FEE’ = 2 represents a higher fee category vis-à-vis ‘ORDERED\_FEE’ = 3. Moreover, ‘ORDERED\_FEE’ does not differentiate in the magnitude of the underwriter spread difference and therefore only provides a general measure of higher vis-à-vis lower underwriter spreads. Following Esho, Kollo and Sharpe (2003), the ordinal ranking variable ‘ORDERED\_FEE’ is estimated using an ordered logit regression<sup>47</sup> and the results are reported in REG 3 of Table VI. The base multivariate model results of REG 1 Table V are supported by the ordered logit regression results.

## 5 Conclusion

We examine the effect of the choice of an underwriter local to the currency of denomination on underwriter gross spreads in the Eurobond market. Underwriters local to the Eurobond’s currency of denomination’s home market are more likely to

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<sup>46</sup> If ‘UW\_SPREAD’ in 0% to 5% percentile,  $p(0,5)$ , then ‘ORDERED\_FEE’ = 0. If  $p(5,25)$  then ‘ORDERED\_FEE’ = 1, if  $p(25,50)$  then ‘ORDERED\_FEE’=2, if  $p(50,75)$  then ‘ORDERED\_FEE’=3, if  $p(75,95)$  then ‘ORDERED\_FEE’=4 and if  $p(95,100)$  then ‘ORDERED\_FEE’=5.

<sup>47</sup> The statistical package used to estimate the results is STATA (www.stata.com).

benefit from greater expertise and placement capacity when competing to underwrite the issue. There is likely to be significantly different pricing of underwriter services by ‘local’ and non-‘local’ underwriters. Our model employs a two-stage estimation technique with the Logit ‘local’ underwriter choice as the first stage and the OLS underwriter gross spread as the second. We have four main findings.

First, we find that the proportion of Eurobonds underwritten by ‘local’ underwriters decreases over our sample period of 1993 to 2003. Our results show that the likelihood of using a ‘local’ underwriter increases with the issue size, the maturity, and the default credit rating of new Eurobond issues. Moreover, it is more likely for public issues vis-à-vis private placements. Our results are generally robust within currency segments, though some determinants vary. Rule 144a issues are more likely to employ the services of a ‘local’ underwriter for U.S. Dollar issues while ‘Not Rated’ issues are more likely to use local underwriters for Euro denominated Eurobonds relative to U.S. Dollar Eurobonds.

Second, Eurobonds that employ a ‘local’ underwriter carry a significantly lower underwriter gross spread. Our results suggest that ‘local’ underwriters face lower distribution costs for issues denominated in their home currencies and pass these on to the issuer through a lower underwriter gross spread. The lower underwriter gross spread is invariant to placement type and the issuer’s home currency status but varies significantly across the reputation of the underwriter. More reputable ‘local’ underwriters pass on a lower amount of cost saving to the issuer in the form of gross underwriter spreads than less reputable ‘local’ underwriters.

Third, we find that underwriter gross spreads are higher for Eurobonds denominated in less liquid, higher underwriter concentration currency segments. Our results show that higher reputation underwriters charge greater underwriter gross spreads consistent with the trade-off model of Chemmanur and Fulghieri (1994).

Fourth, we find a significant decline in Eurozone underwriter market share for legacy/Euro denominated Eurobonds complimentary to a significant decline of underwriter gross spread post the introduction of the Euro in 1999. The decline in underwriter gross spread suggests that increased competition by Eurozone and U.S. underwriters played a significant role in the decline of the underwriter gross spread for Euro denominated Eurobonds. Our results show that the decline in underwriter gross spread was a result of discounting by Eurozone underwriters seeking to protect their domestic market shares. Our results are in contrast with Santos and Tsatsaronis (2003) who suggest that the decline in underwriter gross spreads was due to the increased entry of U.S. investment banks.

Increased globalisation of banking services have most likely worked to erode the competitive barriers of entry enjoyed by underwriters local to the currency segments in the Eurobond market. Balder et al (1991) suggests that, in the absence of competitive advantages due to currency of denomination, issuer relationships will increase in significance as a determinant of the underwriter choice and underwriter spread. Future studies in the international debt market may further examine the nature of domestic and international banking relationships within the context of a single multinational capital market, the Eurobond market.

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**Figure 1**  
**Eurozone / Euro Denominated Eurobond Market Shares**

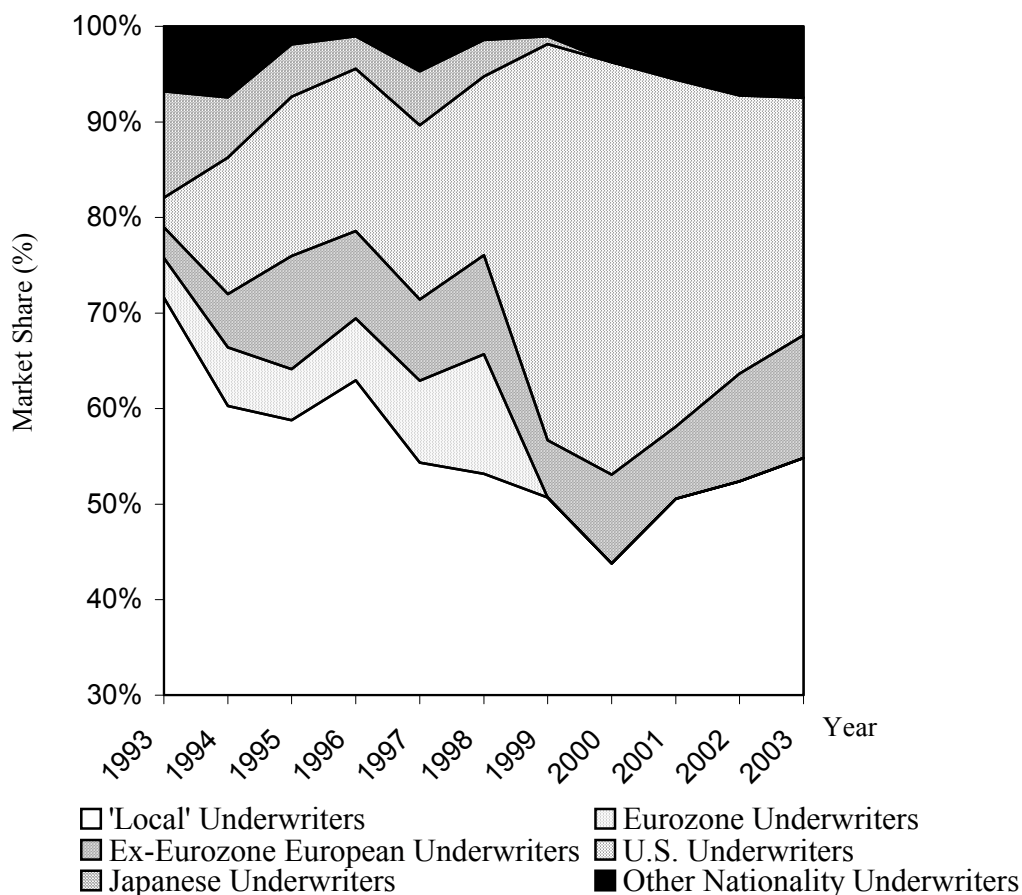


Figure 1: Eurozone / Euro Denominated Eurobond Underwriter Market Share for 2118 non-equity linked Eurobonds issued by non-financial firms denominated in the legacy currencies (pre 1999) and the Euro (post 1999). Market shares are allocated to the lead manager using the proceeds amount. In the case of multiple lead underwriters, each lead underwriter is credited with equal share of the issue amount. The home currency underwriter is where the underwriter's home nation is the currency's domestic market. The Eurozone underwriters are defined as all underwriters from home nations that adopted the Euro in 1999. The Ex-Eurozone European underwriters are the underwriters from the European nations that did not adopt the Euro. Eurobonds denominated in the European Currency Unit (ECU) are excluded due to their ambiguous home nationality classification. Source: Thomsons Deals.

**Figure 2**  
**Average Underwriter Gross Spread (%)**

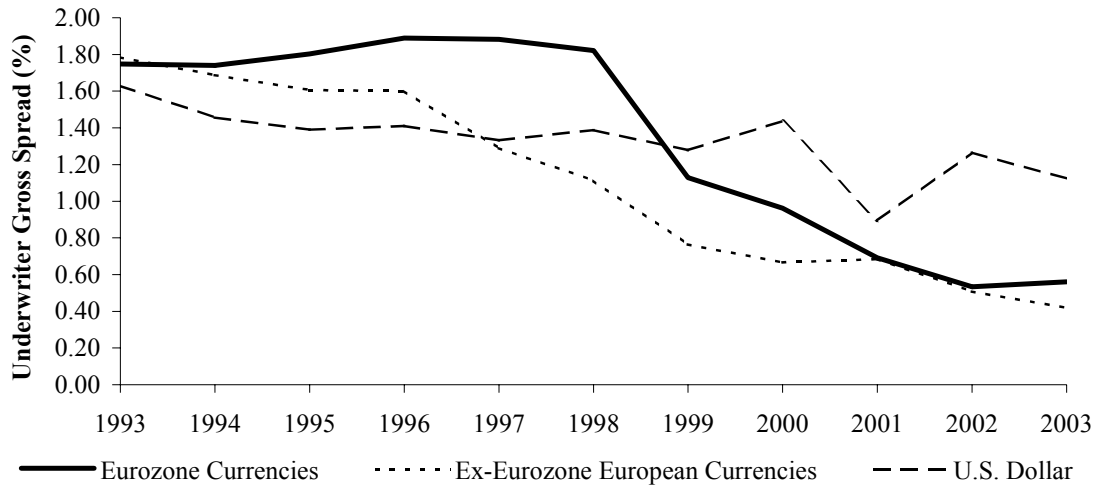


Figure 2: Average Underwriter Gross Spread for non-equity linked fixed/straight Eurobonds denominated in the Eurozone currencies, ex-Eurozone European currencies, and the U.S. Dollar issued by non-financial firms. The Eurozone currencies are those currencies that were replaced by the Euro in 1999. Ex-Eurozone European currencies are those European currencies that were not replaced by the Euro in 1999. Issues denominated in the European Currency Unit are excluded. Source: Thomsons Deals.

**Figure 3**  
**Average Underwriter Gross Spread (%) for Legacy/Euro Eurobonds**

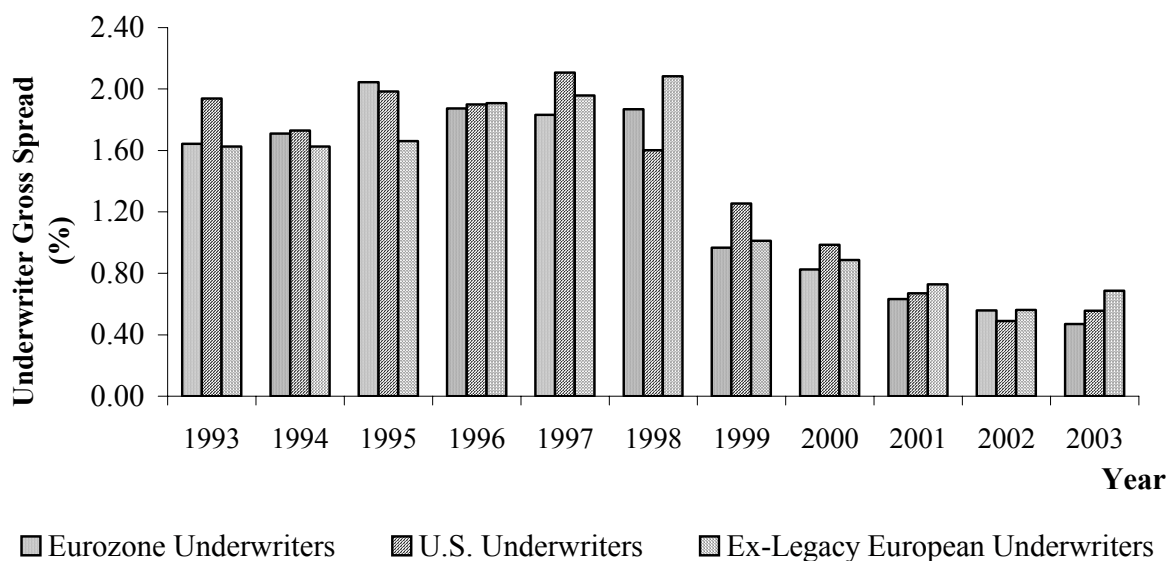


Figure 3: Average Underwriter Gross Spread (%) for non-equity linked fixed/straight Eurobonds issued by non-financial firms denominated in the legacy currencies (pre 1999) and the Euro (post 1999) underwritten by Eurozone, U.S. and ex-legacy European underwriters. Eurozone underwriters are those whose nations adopted the Euro in 1999. Ex-legacy European underwriters are those European underwriters whose nations did not adopt the Euro in 1999. Eurobonds denominated in the European Currency Unit (ECU) are excluded. Source: Thomsons Deals.

Table I Eurobond Market Summary Statistics					
Panel A: Eurobond Market Volume (\$USD)				Panel B: Fixed-rate Eurobond Gross Underwriter Spread (%)	
	Total Volume Eurobond Market	Volume of Fixed-Rate Eurobonds	Market share Fixed-Rate Eurobonds	Underwriter Gross Spread (%)	
Year	(\$USD Millions)	(\$USD Millions)	(%)	Mean (%)	N
1990	\$166,532	\$126,158	75.8	1.590	936
1991	\$232,693	\$214,763	92.3	1.591	1164
1992	\$252,531	\$210,431	83.3	1.529	994
1993	\$356,112	\$283,972	79.7	1.463	1317
1994	\$337,345	\$237,063	70.3	1.275	1181
1995	\$325,069	\$252,423	77.7	0.993	1724
1996	\$465,556	\$350,303	75.2	1.011	2676
1997	\$515,853	\$360,901	70.0	1.121	2473
1998	\$517,404	\$374,980	72.5	1.064	2011
1999	\$678,995	\$458,856	67.6	1.019	1846
2000	\$616,699	\$365,079	59.2	0.828	1526
2001	\$641,690	\$430,166	67.0	0.818	1357
2002	\$595,786	\$417,335	70.0	0.852	1264
2003	\$733,444	\$528,324	72.0	0.751	1105
Total	\$6,435,709	\$4,610,754	71.6	1.102	21574

Panel A: figures calculated using the population of 33,450 non-equity linked Eurobonds distributed solely in the Eurobond market with available tranche size information. The average gross underwriter gross spread is calculated using the fixed-rate Eurobond sample of Panel A with available underwriter spread information. Source: Thomson Deals.

Table II  
Model Summary Statistics

	Mean	Median	Std. Dev.	Min	Max	Model Relationship with CURR_UW	Model Relationship with UW_SPREAD
<i>Dependent Variables</i>							
CURR_UW	0.619	1.000	0.486	0.000	1.000	--	Negative
Pr(CURR_UW)	0.621	1.000	0.255	0.030	0.981	--	Negative
UW_SPREAD (%)	0.956	0.500	0.810	0.005	5.613	--	--
<i>Issue Size</i>							
ISSUE_SIZE	178.38	102.92	211.32	3.902	1134.8	Positive	Negative
<i>Currency Segment Liquidity</i>							
CURR_VOL	30171.4	16543.6	34088	0.000	128657	Negative	Negative
<i>Underwriter Competition</i>							
UW_COMP	0.093	0.0758	0.078	0.000	1.000	--	Positive
<i>Underwriter Reputation</i>							
UW_REP	9.224	10.00	7.869	0.000	20.000	--	Positive
<i>Default Risk and Maturity</i>							
INVGR	0.677	1.000	0.468	0.000	1.000	Unkown	Negative
SUBINVGR	0.047	0.000	0.211	0.000	1.000	Control	Control
NR_RATE	0.276	0.000	0.447	0.000	1.000	Unkown	Negative
YTM	6.156	5.049	4.424	0.307	30.915	Unkown	Positive
LOG(YTM)	1.628	1.619	0.612	-1.181	3.431	Unkown	Positive
<i>Placement Type</i>							
PRIVPL	0.218	0.000	0.413	0.000	1.000	Unkown	Negative
US_R144A	0.056	0.000	0.230	0.000	1.000	Unkown	--
<i>Controls</i>							
HOME_CURR	0.541	1.000	0.498	0.000	1.000	Unkown	Unkown
YEAR	1997	1997	2.718	1993	2003	Negative	Negative
NEW_ISSUER	0.181	0.000	0.385	0.000	1.000	--	Positive
CALL_OPTION	0.013	0.000	0.112	0.000	1.000	--	Negative

**Table III**  
**Model Summary Statistics Across ‘Local’ and Non-‘Local’ Underwriters**

	‘Local’ Underwriter (CURR_UW=1) Eurobond Issues					Non-‘Local’ Underwriter (CURR_UW=0) Eurobond Issues				
	N	Mean	Std. Dev.	Min	Max	N	Mean	Std. Dev.	Min	Max
<i>Dependent Variables</i>										
UW_SPREAD (%)	2877	0.825	0.769	0.005	5.613	1757	1.169	0.829	0.010	5.015
Pr(CURR_UW)	2877	0.725	0.206	0.046	0.973	1757	0.450	0.233	0.030	0.981
<i>Issue Size</i>										
ISSUE_SIZE	2877	186.23	235.60	3.901	1134.76	1757	165.48	163.38	3.901	1134.76
<i>Currency Segment Liquidity</i>										
CURR_VOL	2877	32817.1	35641.6	0.000	128657	1757	25832.8	30921.1	0.000	128657
<i>Underwriter Competition</i>										
UW_COMP	2877	0.086	0.054	0.000	0.470	1757	0.106	0.105	0.000	1.000
<i>Underwriter Reputation</i>										
UW_REP	2877	8.007	7.944	0.000	20.00	1757	11.219	7.322	0.000	20.000
<i>Default Risk and Maturity</i>										
INVGR	2877	0.632	0.482	0.000	1.000	1757	0.751	0.433	0.000	1.000
SUBINVGR	2877	0.042	0.202	0.000	1.000	1757	0.054	0.226	0.000	1.000
NR_RATE	2877	0.326	0.469	0.000	1.000	1757	0.195	0.396	0.000	1.000
YTM	2877	6.384	4.173	0.307	30.107	1757	5.782	4.786	1.000	30.915
LOG(YTM)	2877	1.693	0.564	1.181	3.405	1757	1.521	0.670	0.000	3.431
<i>Placement Type</i>										
PRIV_PL	2877	0.271	0.444	0.000	1.000	1757	0.131	0.337	0.000	1.000
US_R144A	2877	0.061	0.240	0.000	1.000	1757	0.047	0.212	0.000	1.000
<i>Controls</i>										
HOME_CURR	2877	0.683	0.465	0.000	1.000	1757	0.310	0.462	0.000	1.000
YEAR	2877	1997.21	2.68	1993	2003	1757	1997.70	2.76	1993	2003
NEW_ISSUER	2877	0.173	0.379	0.000	1.000	1757	0.194	0.395	0.000	1.000
CALL_OPTION	2877	0.0149	0.121	0.000	1.000	1757	0.009	0.095	0.000	1.000

Table IV  
Discrete Underwriter Choice Results

	REG 1		REG 2		REG 3		REG 4	
	<i>ALL</i>		<i>Legacy (1993-1999)</i>		<i>Euro (1999-2003)</i>		<i>USD (1993-2003)</i>	
INDEPENDENT VARIABLES	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
Constant	-2.630	(-7.69)***	-3.144	(-2.13)**	-1.894	(-2.64)***	-1.597	(-1.35)
<i>Issue Size and Liquidity</i>								
ISSUE_SIZE	15.25	(2.58)***	64.24	(3.01)***	30.56	(2.56)***	25.51	(1.61)
ISSUE_SIZE^2	-35.47	(-0.55)	-555.51	(-2.55)**	-142.32	(-1.36)	70.60	(0.34)
CURR_VOL	-0.011	(-0.35)	-1.413	(-2.45)**	-0.015	(-0.33)	-0.094	(-0.51)
<i>Default risk and Maturity</i>								
INVGR	0.687	(3.43)***	-0.012	(-0.01)	0.821	(2.23)**	0.479	(1.22)
NR_RATE	0.554	(2.68)***	-0.636	(-0.70)	1.847	(3.88)***	-0.807	(-1.95)*
LN(MAT)	0.673	(10.04)***	1.181	(3.29)***	-0.078	(-0.39)	0.547	(3.06)***
<i>Placement Type</i>								
PRIVPL	-0.217	(-1.86)*			-0.281	(-0.73)	-0.582	(-2.04)**
US_R144A	0.974	(4.94)***	-0.265	(-0.24)	-1.044	(-2.46)**	1.718	(5.91)***
<i>Controls</i>								
HOME_CURR	0.906	(10.85)***	1.506	(3.37)***	1.325	(3.80)***	-0.111	(-0.19)
Currency Dummies	Yes		Yes		Yes		Yes	
Year Dummies	Yes		Yes		Yes		Yes	
Industry Dummies	Yes		Yes		Yes		Yes	
<i>Summary Statistics</i>								
Observations	4634		408		815		1009	
Wald . <sup>2</sup>	949.1***		71.3***		129.5***		269.0***	
Pseudo R <sup>2</sup>	0.23		0.19		0.18		0.26	

The sample consists of 4634 straight/fixed Eurobonds issued by non-financial firms between 1993 and 2003. Reg 2 includes only legacy currency Eurobonds (N=408), Reg 3 only Euro denominated Eurobonds (N=815) and Reg 4 only U.S. Dollar denominated Eurobonds (N=1009). The dependent variable is the indicator for 'local' underwriters CURR\_UW that takes the value of unity when the underwriter's nationality is the currency of denomination's home nation. The ISSUE\_SIZE is the real issue size, while the CURR\_VOL is real volume of new issues denominated in the Eurobond's currency of denomination in the past 12 months. INVGR and NR\_RATE are indicator variables for investment grade and 'Not rated' issues respectively. Ln(Mat) is the natural log of maturity, PRIVPL takes the value of unity for private placements and zero otherwise and US\_R144a is an indicator variable that takes the value of unity if the Eurobond is distributed to U.S. investors under SEC Rule 144a. HOME\_CURR is an indicator variable that takes the value of unity where the currency of denomination is the issuer's parent's home currency. All regressions include unreported indicator variables for the currency of denomination, the year of the issue and the first digit of the issuer's parent's SIC code. The model is estimated using logit regression. '\*\*\*', '\*\*' and '\*' denote significance at the 99%, 95% and 90% confidence intervals respectively. Source: Thomsons Deals.

**Table V**  
**Multivariate Underwriter Gross Spread Regression with Endogenous ‘Local’ Underwriter Choice Results**

INDEPENDENT VARIABLES	REG 1		REG 2		REG 3		REG 4	
	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
Constant	171.66	(19.21)***	170.96	(19.08)***	170.61	(19.08)***	171.29	(19.16)***
<i>‘Local’ Underwriter Choice</i>								
Pr(CURR_UW)	-0.346	(-2.70)***	-0.370	(-2.84)***	-0.478	(-3.47)***	-0.384	(-2.93)***
Pr(CURR_UW)*PRIV_PL			0.119	(1.05)				
Pr(CURR_UW)*UW_REP					0.012	(2.60)***		
Pr(CURR_UW)*HOME_CURR							0.151	(1.34)
<i>Currency Segment Liquidity</i>								
CURR_VOL	-0.036	(-5.38)***	-0.036	(-5.39)***	-0.036	(-5.32)***	-0.036	(-5.34)***
<i>Underwriter Competition</i>								
UW_COMP	0.963	(7.04)***	0.966	(7.06)***	0.919	(6.67)***	0.937	(6.78)***
<i>Underwriter Reputation</i>								
UW_REP	0.007	(5.30)***	0.007	(5.30)***	0.000	(0.01)	0.007	(5.34)***
<i>Default Risk and Maturity</i>								
INVGR	-0.931	(-21.05)***	-0.933	(-21.07)***	-0.934	(-21.12)***	-0.933	(-21.08)***
NR_RATE	-0.866	(-18.42)***	-0.867	(-18.44)***	-0.867	(-18.45)***	-0.868	(-18.45)***
LN(MAT)	0.143	(5.97)***	0.141	(5.88)***	0.146	(6.09)***	0.139	(5.78)***
<i>Placement Type</i>								
PRIVPL	-0.111	(-4.16)***	-0.199	(-2.25)**	-0.114	(-4.29)***	-0.108	(-4.04)***
<i>Controls</i>								
HOME_CURR	-0.045	(-1.43)	-0.043	(-1.36)	-0.040	(-1.27)	-0.140	(-1.80)*
YEAR	-0.085	(-18.96)***	-0.084	(-18.82)***	-0.084	(-18.82)***	-0.085	(-18.90)***
ISSUE_SIZE	0.058	(0.09)	0.138	(0.22)	-0.102	(-0.16)	0.032	(0.05)
NEW_ISSUER	-0.013	(-0.53)	-0.011	(-0.47)	-0.011	(-0.45)	-0.009	(-0.37)
CALL_OPTION	-0.249	(-3.11)***	-0.247	(-3.08)***	-0.245	(-3.06)***	-0.248	(-3.10)***
Currency Dummies	Yes		Yes		Yes		Yes	
Underwriter Dummies	Yes		Yes		Yes		Yes	
<i>Summary Statistics</i>								
Observations	4634		4634		4634		4634	
Adjusted R-Square	0.48		0.48		0.48		0.48	

The model is estimated using 4634 fixed/straight Eurobonds issued by non-financial firms between 1993 and 2003. The dependent variable is underwriter gross spread. Pr(CURR\_UW) is the endogenous choice of an underwriter of the same nationality as the currency of denomination from REG 1 in Table IV. UW\_COMP is the Herfindahl index of underwriter market shares within the currency of denomination in the year prior to the issue. CURR\_VOL is the real volume of Eurobond issues in the currency of denomination over the past 12 months. UW\_REP is the underwriter reputation league table ranking based on the nominal issue amounts in the Eurobond market in the year prior to the issue. PRIVPL is an indicator variable for private placements. INVGR and NR\_RATE takes the value of unity for investment grade issues and for ‘Not Rated’ issues respectively. Ln(Mat) is the natural log of the year to maturity. YEAR takes the value of the year of the issue, NEW\_ISSUER is an indicator variable where the issuer has not made an issue in the past three years in the Eurobond market. SIZE is the real issue size and CALL\_OPTION is an indicator variable that takes the value of unity if the Eurobond carries a call option. HOME\_CURR is an indicator variable that takes the value of unity if the currency’s domestic market is the same as the issuer’s parents nationality. All regressions contained unreported indicator variables for the currency of denomination and the underwriter’s parent’s nationality. The regressions are estimated using Ordinary Least Squares. ‘\*\*\*’, ‘\*\*’ and ‘\*’ denote significance at the 99%, 95% and 90% confidence intervals respectively. Source: Thomsons Deals.



**Table VI**  
**Multivariate Underwriter Gross Spread Regression with Endogenous ‘Local’ Underwriter Choice Results**

INDEPENDENT VARIABLES	REG 1		REG 2		REG 3	
	Coef	T-stat	Coef	T-stat	Coef	T-stat
Constant	173.80	(19.24)***	-20.63	(-0.39)		
<i>‘Local’ Underwriter Choice</i>						
Pr(CURR_UW)	-0.39	(-2.85)***	0.45	(0.80)	-1.33	(-3.51)***
Pr(CURR_UW)*LEGACY	0.52	(2.58)***				
Pr(CURR_UW)*EURO	0.11	(0.71)				
HOMEUW_LEGACY			0.08	(0.38)		
NON_HOMEUW_LEGACY			-0.28	(-0.15)		
HOMEUW_EURO			-0.38	(-1.74)*		
NON_HOMEUW_EURO			-0.24	(-0.29)		
<i>Currency Segment Liquidity</i>						
CURR_VOL	-0.04	(-5.33)***	-0.07	(-3.50)***	-0.09	(-4.16)***
<i>Underwriter Competition</i>						
UW_COMP	0.89	(6.45)***	-2.35	(-4.63)***	2.82	(6.61)***
<i>Underwriter Reputation</i>						
UW_REP	0.01	(5.46)***	0.00	(0.72)	0.01	(3.04)***
<i>Default Risk and Maturity</i>						
INVGR	-0.93	(-20.99)***	-0.80	(-4.36)***	-2.25	(-13.85)***
NR_RATE	-0.87	(-18.44)***	-0.68	(-3.47)***	-1.89	(-11.14)***
LN(MAT)	0.14	(5.95)***	0.15	(1.30)	1.19	(15.34)***
<i>Placement Type</i>						
PRIVPL	-0.11	(-4.08)***	-0.34	(-1.46)	-0.37	(-4.26)***
<i>Controls</i>						
HOME_CURR	-0.05	(-1.68)*			-0.17	(-1.80)*
YEAR	-0.09	(-18.99)***	0.01	(0.44)	-0.26	(-18.32)***
ISSUE_SIZE	-0.17	(-0.28)	-1.82	(-0.66)	-2.15	(-1.08)
NEW_ISSUER	-0.01	(-0.38)	0.01	(0.10)	-0.08	(-0.85)
CALL_OPTION	-0.25	(-3.07)***			-1.05	(-4.29)***
US_UW_LEGACY	0.18	(2.29)**				
US_UW_EURO	0.17	(3.32)***				
Currency Dummies	Yes		Yes		Yes	
Underwriter Dummies	Yes		No		Yes	
<i>Summary Statistics</i>						
Observations	4634		366		4634	
Adjusted R-Square	0.48		0.43			
Pseudo R-Square					0.23	

The sample consists of 4634 fixed/straight Eurobonds issued by non-financial firms between 1993 and 2003. The dependent variable in REG 1 and 2 is underwriter gross spread, UW\_SPREAD. The dependent variable in REG 3 is ORDERED\_FEE that takes the value of 0 to 5 based on UW\_SPREAD. Pr(CURR\_UW) is the continuous predicted measure of CURR\_UW from REG 1 in Table IV. UW\_COMP is the Herfindahl index of underwriter market shares within the currency of denomination in the year prior to the issue while CURR\_VOL is the real volume of Eurobond issues in the currency of denomination over the past 12 months. UW\_REP is the underwriter reputation league table ranking based on the nominal issue amounts in the Eurobond market in the year prior to the issue. PRIVPL is an indicator variable for private placements. INVGR and NR\_RATE takes the value of unity for investment grade issues and for ‘Not Rated’ issues respectively. Ln(Mat) is the natural log of the year to maturity. YEAR takes the value of the year of the issue, NEW\_ISSUER is an indicator variable where the issuer has not made an issue in the past three years in the Eurobond market. SIZE is the real issue size and CALL\_OPTION is an indicator variable that takes the value of unity if the Eurobond carries a call option. HOME\_CURR is an indicator variable that takes the value of unity if the currency’s domestic market is the same as the issuer’s parents nationality. All regressions contained unreported indicator variables for the currency of denomination and the underwriter’s parent’s nationality. The REG 1 and 2 are estimated using Ordinary Least Squares, while REG 3 is estimated using Ordered Logit. ‘\*\*\*’, ‘\*\*’ and ‘\*’ denote significance at the 99%, 95% and 90% confidence intervals respectively. Source: Thomsons Deals.

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