Combine and Conquer.

Investor Relationships, Global Reputation and Underwriter Competition.

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ABSTRACT

I study the competition for underwriting services in the international bond market. Underwriters differentiate their services through relationships with investors in different domestic markets, through global reputation and through their balance sheet size. Investors are segmented by the bond’s currency of denomination due to domestic regulatory frictions. Empirical results of a structural demand model show that investor relationships are important when the bond’s investors are small and segmented. Underwriters differentiate their services on global reputation for bonds denominated in the more liquid currencies of the U.S. Dollar and the Euro. The introduction of the Euro is used as a natural experiment to measure the change in the value of investor relationships when segmentations in the European investor pool are removed. Estimates of a structural model show that the value of investor relationships falls after the Euro, consistent the observed decline in market shares of the European banks.

Key words: Underwriter competition, Underwriter fees, international finance, industrial organisation

Journal of Economic Literature Classification Codes: G15 and G24.
Underwriters in debt capital markets form the bridge between issuers and investors by filling a dual role of certification and distribution. While the role of certification is a well studied aspect of underwriter competition, few studies have examined distribution capability as a source of differentiation among underwriters. The importance of distribution capability arises from the underwriter’s dependence on its relationships with investors to promote, price and ultimately place new securities. The importance of investor relationships in underwriting distribution is discussed by Wilhelm (1999) and Pichler and Wilhelm (2001), and evidenced in the survey of issuing firms by Krigman, Shaw and Womack (2001). However, in spite its apparent importance for underwriters, it remains untested in the empirical literature. In this paper, I empirically investigate the importance of investor relationships for the placement of new bonds in the international debt market.

I examine the market for underwriting services as a differentiated product market, where firms are the consumers of the underwriting services. Differentiation among underwriters arises due to differences in reputation, relationships with investors and balance sheet size. Investors are limited to purchasing bonds denominated in their home market currency due to regulatory frictions. Underwriters use their investor relationships gained through their home domestic market and through subsidiaries in other domestic markets to differentiate themselves. The segmentation in the investor pool gives rise to underwriter differentiation and may lead to greater barriers of entry to external financing by borrowing firms. I identify the effect of investor segmentation on underwriter competition by using as a natural experiment, the introduction of the Euro in 1999. The Euro was an exogenous event that removed segmentation in the European investor pool by consolidating the legacy currencies.
Reputation in underwriting markets is often cited as a certification device that differentiates underwriters in the equity—and indeed, debt—markets.¹ Fang (2005) finds that reputable underwriters provide a lower borrowing cost for firms after accounting for their fees, a result that is most significant for sub-investment grade issuers. It is, however, not clear if reputation is a source of differentiation when the issuer is information transparent and externally certified as is often the case in bond markets. I empirically estimate the value that firms place on underwriter reputation after controlling for the direct costs of the bonds’ placement.

I estimate the choice of underwriter by the issuing firm using a structural model of differentiated product competition. In doing so, I pay particular attention to the endogeneity problem associated with the effect of the firm’s direct cost of financing (fees and the yield on the bond) on its demand for an underwriter. By using an aggregated form of the well-known nested logit model (McFadden (1973)), I am able to address the endogeneity of the fees and the yield to maturity in a single, tractable framework that allows for the exercise of market power by underwriters. In estimating the degree of differentiation between underwriters, I hope to inform understanding of the nature of imperfect competition in these markets. My structural approach relaxes the assumption of perfect competition and allows for a richer investigation of the market for underwriting services.

I gather information on the contract characteristics and fees for 2,535 debt issues, denominated in nine currencies and underwritten by 90 international banks, from 1994 to 2003. The dates are chosen to cover five years before and after the introduction of the Euro. When the Euro replaced the legacy currencies, new bond issuance increased, and underwriting fees fell by more than 50%. The landscape for underwriting competition was similarly impacted. Smaller European underwriters with investor relationships lost significant market share to larger and more reputable U.S. underwriters. I argue that this was, in part, due to the removal of exclusive investor relationships as a source of differentiation for European banks.

I find that underwriters compete through their investor relationships and reputation in the international debt market. The importance of investor relationships declines significantly with the decline in the segmentation of the investor pool. Differentiation among underwriters is greater when their investor relationships are more exclusive, and costly, to acquire. Underwriters compete using their global reputations in the larger and more liquid U.S. dollar and Euro currencies, and in those currency segments with lower credit-rated bonds. This result is consistent with the certification role of reputation, though the economic magnitude suggests that fees are not perfectly elastic over reputation; that reputable underwriters do not extract the full value of their reputation in the form of higher fees.

The remainder of the paper is structured as follows: Section I provides a brief review of the related literature on frictions to competition in financial services; Section II outlines the data and summary statistics; Section III summarizes the potential determinants of the choice of underwriter; Section IV presents the formal model; Section V details the estimation, results and robustness tests; and Section VI concludes.

1 Previous Literature

Recent studies have sought to identify sources of differentiation among underwriters that impact the provision and the pricing of financial services that impacts pricing of banking services, and as a consequence, firms’ access to capital. The study of underwriting competition covers a large and varied number of factors that impact competition and ultimately pricing. I explore a select number of the main themes in this literature, and outline how I differentiate and add to this literature.

The most commonly studied source of differentiation among competing banks and underwriters arises due to information asymmetries relating to the quality of the issuer. Models of information asymmetry leading to market power between the intermediary and firm appear in the audit (DeAngelo (1981)), banking (Rajan (1992)) and underwriting literatures (James (1992)). The provider of the financial service invests some sunk costs into acquiring soft information that is necessary to provide
their certification and/or monitoring services. In the case of banks, this may be a screening technology. Given that the information investment retains some value, it provides the incumbent supplier with a cost advantage compared to other competing intermediaries. The decision to switch suppliers of capital may also act as a negative signal proportional to the level of adverse selection in an asymmetrically informed market (Broecker (1990)). The direct implications are that firms switching suppliers are likely to face different fees than those firms that retain their underwriters (Burch, Nanda and Warther (2004), Kollo and Sharpe (2006)). In addition, Yasuda (2005) finds that prior relationships can positively impact the choice and not just pricing of underwriting services, a finding supported by Ljungqvist, Marston and Wilhelm (2006). Krigman, Shaw and Womack (2001) also show that firms are also more likely to switch when graduating to higher reputation (quality) underwriters. Reputation in the underwriting market acts a significant source of differentiation between underwriters. Reputation indicates the underwriter’s ability to credibly communicate the true value of the new security. The underwriter’s inherent ability to distribute an offering to investors is often bundled with its ability to act as a credible certification agent, when these two factors may not be synonymous. This study investigates the former, and focuses on the underwriter’s investor relationships as an indicator of its placement capacity of different kinds of bonds that will be bought by different investors.

Recent studies of underwriter competition have begun to apply structural models of demand to estimate sources of differentiation among underwriters (Yasuda (2005) and Schroth (2006)). Yasuda (2005) estimates a nested logit choice model focusing on the role of prior relationships, and includes an imputed (estimated) fee of an underwriter. This approach does not allow for imperfect competition or mark-ups arising from market power, an assumption that may be limiting with a market where reputation is important. Schroth (2006) employs a similar structural model to study the value of innovation to underwriters. This study uses a similar methodology to Schroth (2006), but focuses on the structure of underwriter competition when investors are segmented and underwriters have different relationships with different segments.
There are no prior studies that investigate the role of investor segmentation in the supply of capital and the underwriting markets. Related work by Coval and Moskowitz (2001) highlights the importance of geographic proximity of investors and the investment location. The authors show how mutual funds in the U.S. domestic market favour investments with close geographical proximity and earn higher abnormal returns on these investments. As geographic segmentation forms a component in the performance, it may also play a determining role in the ability of competing funds to attract new capital.

Similar patterns of geographic segmentation are identified by Becker (2006) that examines segmentation in the supply of capital in the form of higher deposits of (retired) seniors. Becker shows that the heterogeneity in the supply of capital is a significant factor in regional economic outcomes, and effectively acts to create segmentation in the market for deposits. The geographic segmentation is shown to be reduced by deregulation of interstate branching (Kroszner and Strahan (1999)) resulting in the geographic integration of banking markets. My paper examines a similar phenomenon in the international debt market where segmentations in the investor base results in differentiation in investor relationships and therefore competition for underwriter services.

2 Data and Summary Statistics

2.1 Sample Selection and Variables

I obtain pricing, yield, issuer identity and lead manager identity information for 4770 non-equity linked straight/fixed-rate international debt securities issued by industrial firms between January 1994 and December 2003 from Thomsons Deals. Financial firms are excluded due to their industry knowledge and internal underwriting capacity that may bias their demand for external underwriting services (see Gande, Puri and Saunders (1999), Jewell and Livingston (1998) and Livingston and Miller (2000) among others).

The aim is to construct a homogeneous sample of fixed-rate issues in which the components of the bond’s yield to maturity and the underwriter fees are easily identified. I therefore exclude all deals with multiple tranches\(^3\), equity warrants\(^4\) and implausible values of fees and yields\(^5\). International debt instruments can be denominated in any currency, though most issues favour the larger and more liquid currencies. I therefore include issues denominated in the most liquid currencies of the U.S. Dollar, the Yen, the Euro\(^6\), the pre-Euro legacy currencies (the Deutschemark, the Italian Lira and the French Franc) and the commonwealth currencies (the British Pound, the Canadian Dollar and the Australian Dollar). The underwriting fees are commonly termed ‘gross spread’ and expressed a percentage of the total amount. I standardise the yield to maturity of the bond by the relevant government bond rate to obtain the yield premium. The government bond data and methodology are described in the Appendix A1.

I identify the lead manager (book-runner)\(^7\) of a transaction as the lead bank and obtain consolidated group accounting information for the parent entity from Compustat Global and Mergent Online. In case of discrepancy, I use the Compustat Global figure. Due to different national banking laws regulating bank capital and reporting of accounts, I adopt a conservative approach to measure bank size using the book value of assets. The approach seeks to minimise cross-country differences in banking regulation that may lead to disparities in asset size management and reporting.

I treat mergers carefully by identifying newly merged underwriters as separate entities, except for reputation where the reputation carries on from the pre-merger

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\(^3\) Multiple trenches are groups of smaller bond offerings with different characteristics that are underwritten as part of a larger deal. The reported fees and yield to maturity of individual bonds within a larger deal may reflect aggregation of underwriter services across the deal, and therefore may not be comparable to stand-alone offerings.

\(^4\) Equity warrants attached to bonds alter the final yield the maturity reported by Thomsons Deals.

\(^5\) Livingston and Zhou (2002) note among others that SDC Platinum has some errors in variables. I exclude four observations with the implausibly high underwriter spreads of 22.42%, 42.09%, 93.92% and 165%.

\(^6\) The Euro was introduced and replaced the European legacy currencies in 1999 in trading, though the physical currency did not enter circulation till a few years later. The Euro effectively removed the barriers of segmentation between the investors of legacy currencies, with the direct effect of reducing exchange rate transaction costs and increasing liquidity. For a detailed analysis of the introduction of the Euro see Detken and Hartmann (2000).

\(^7\) In the case of multiple co-leads, I credit each bank with an equal share of total transaction amount.
firms. A full description of the merger treatment is described in the Appendix A2. I hand-collect information on the underwriter’s reputation by using published survey polls from the practitioner periodical Euromoney Institutional. Euromoney publishes annual rankings of underwriters in the international debt markets based on responses from institutional investors and the investment banking community on the perceived quality of service in underwriting activities. The top ranked banks receive special editorials and receive accolades for their performance. The overall ranking is a combination of scores for the underwriting, trading, advisory and transaction processing of the bank. I use the underwriting score to rank the top twenty banks.

The final sample consists of 90 underwriters that managed at least two deals from 1994 to 2003 in the top nine currency segments of the international debt market. The evolution of the sample from deal-by-deal to underwriter-market-year is also summarised in the Appendix.

2.2 Market volume and issuers

The new issue volume and underwriter spreads for the same currency segments are reported in Table I. The market for Euro denominated fixed-rate international debt issues increased enormously from legacy levels from US $62 billion (94-98) to $217 billion (99-03). The average (median) size of international debt issues rose from U.S. $194 ($192) million for legacy currencies to U.S. $362 ($264) million for Euro denominated issues, consistent with greater liquidity of the new Euro currency. In support, the average underwriter fee declined by over 50% from 186 basis points for legacy currency issues to only 84 basis points for Euro denominated issues. The fees for U.S. Dollar issues declined only marginally from 134 to 121 basis points over the same period. The decline in average underwriter spreads was more than offset by the rise in volume of new issues. Underwriting revenue rose from a combined US $230.3 million a year from bonds in the Deutschemark, French Franc and Italian Lira legacy currencies to US $364 million a year for Euro issues.

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8 The boom in new issuance is also documented by Galati and Tsatsaronis (2003) and Santos and Tsatsaronis (2003).
9 This is consistent with the economies of scale in direct issue costs found by Altinkılıç and Hansen (2000).
The model used in this study assumes that investors display similar characteristics (and therefore preferences) across currencies and time. I thereby show the distribution of issuer and bond characteristics across currencies in Table II. A majority 94.3% of the number of pre-Euro legacy issues and 80.5% of the Euro issues are made by infrequently issuing firms. Those that are repeat issuers are usually large multinational manufacturing firms with high credit rating, i.e. the U.S. multinational firm General Electric, that change underwriters frequently also shown in Kollo and Sharpe (2006). Issues are largely high quality, with only 6.6% of issues in U.S. Dollars and 0.2% in the Yen rated sub-investment grade rated by Moody’s. It is interesting to note that the proportion of sub-investment grade debt rose from 2.3% in the pre-Euro legacy currencies to 7.5% in the Euro. The greater liquidity and market participation of the new currency appears to have led to greater participation by lower ranked issuers.

2.3 Underwriter characteristics

The underwriters in the international debt markets are large predominantly European, Japanese and U.S. commercial and investment banks. Table III shows the underwriter characteristics in the sample. A total of 22 European underwriters operated in the legacy currency segment, 19 of whom acted as lead managers in their home markets. Reputation clearly favoured the U.S. underwriters with a mean value of 12.95 for the U.S. Dollar segment, while the European underwriters lagged behind with only 1.1 and 3.19 in the legacy and Euro currencies respectively.

3 Potential Determinants of the Choice of Underwriter

I present three potential sources of differentiation for underwriters in the international debt market as: (i) investor relationships, (ii) global reputation and (iii) the underwriter’s balance sheet. These sources of differentiation are in addition to the direct costs to issuers of the fee and the yield to maturity of the newly issued debt instrument.

10 This suggests that three European underwriters acted only in currency segments other than their own. These are ABN Amro and two smaller European underwriters whose local currency segments were excluded due to insufficient observations.
3.1 Underwriter’s investor relationships

I propose that investor relationships are a significant source of differentiation among competing underwriters. The hypothesis contains two parts: (i) potential investors for new issues are segmented and (ii) underwriters have different access to pools of investors. First, investors are segmented due to home to ‘home-bias’ and/or restrictive domestic regulation that limits their exposure to foreign currency denominated assets.\(^{11}\) This suggests that the bond’s currency of denomination largely determines the investor group that will purchase the issue that is most likely domiciled in the currency’s domestic market. Issuers rely on the underwriter’s investor relationships to market and distribute the security to a target investor group. The issuers benefit from the underwriter’s investor relationships by receiving direct access to the target investor group that may improve the pricing and distribution of the bond, and reduce the risk that the security will remain unsold (placement risk).

I identify an underwriter’s relationship to an investor group using (i) the domicile of the underwriter’s parent and (ii) the underwriting activities of the underwriter’s subsidiaries. The first measure is an indicator variable that takes the value of unity if the underwriter’s home market is that of the target investors (the currency of the bond). This indicator captures the investor relationships arising from lending and/or other intermediary activities in the home market of an underwriter. The second indicator is the underwriter’s market share of newly issued securities\(^{12}\) in the investors’ domestic market. Higher market share is likely to be associated with access to investors necessary to place new securities.

The relationships between the bond’s currency of denomination and the chosen underwriter’s home market was first shown as anecdotal evidence by McCauley and White (1997) and McCauley (1999) in the international debt market. Figure 1 shows the European banks’ market share of bonds denominated in their home currencies as being significantly large before the introduction of the Euro. What is perhaps

\(^{11}\) 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.

\(^{12}\) This measure is based on the market shares of underwriters for all debt, equity and hybrid instruments within the sample currencies’ domestic markets.
surprising is the significant decline in market share for the incumbent European banks with the introduction of the Euro from 70% to 50%. The anecdotal evidence suggests that the importance or exclusivity of investor relationships declined with the widening of the investor base resulting from the introduction of the Euro.

I expect that the importance of specific investor relationships as a means of differentiation among competing underwriters should decline with declining segmentation, as in the case of the introduction of the Euro. I measure this decline by examining the importance of investor relationships in the transition from the legacy to the Euro currency.

3.2 Underwriter’s global reputation

Fernando, Gatchev and Spindt (2005) argue that higher reputation underwriters generate a higher value for the issuer in their ability to ‘certify, promote, place and support’ an offering. The accepted view of reputation is that it is valued by issuers when choosing a lead underwriter (see Carter and Manaster (1990), Chemmanur and Fulghieri (1994), Krigman, Shaw and Womack (2001), Fang (2005) and Ljungqvist, Marston and Wilhelm (2006) among others). It is not clear however how important reputation is for investment grade issuers. Fang (2005) finds that reputable underwriters tend to choose high quality issuers, and that they can obtain a better yield, though at the cost of a higher fee. Alternately, the value of using a high quality underwriter may lie in an indirect signal of the overall quality of the firm. Associating with higher reputation underwriters can translate to a number of indirect benefits for an issuer, including greater future access to capital markets, lower costs of capital and/or increased marketing and exposure of the firms in capital markets. All of these benefits may manifest in future capital raisings as opposed to the current issue.

I estimate the value placed on underwriter reputation when firms choose underwriters to place different currency bonds. My model provides the economic value of differentiating low and high reputation underwriters. In line with the certification role of reputation, I expect that reputable will be more valuable for lower (average) credit grade bonds.
Empirical identification of the concept of reputation is challenging. The general approach is to obtain rankings from information on completed transactions by using published tombstone\textsuperscript{13} and league table rankings\textsuperscript{14} (Carter and Manaster (1990) and Megginson and Weiss (1991), Yasuda (2005) and Fang (2005)). A common criticism of the league table rankings is that they may be correlated with underwriter size (capacity) rather than quality of service. I employ a measure that I believe is largely free of this size bias by using investor survey information from a publicly available periodical (\textit{Euromoney Institutional}).\textsuperscript{15} I rank underwriters by assigning a value of 20 for the top underwriting bank, 19 for the second and so on. I expect a positive coefficient on the proxy for underwriter reputation to reflect the higher value associated with higher reputation underwriters (Chemmanur and Fulghieri (1994), Puri (1999) and Fang (2005)). I directly control for underwriter size and provide a discussion of the relationship between size and reputation in the robustness section.

It is interesting to note that U.S. underwriters held a clear majority in reputation over my sample period. Figure 2 shows that U.S. underwriters competing in the European currency segments were very high reputation, and maintained a clear dominance over their European counterparts. The U.S. banks are large, well established multinational underwriters with presence in multiple markets that earned them on average, higher rankings. Many of the European underwriters were smaller local banks with limited market shares constrained usually to their domestic markets, and often did not feature in published rankings. My study shows that in spite of their lacking reputation, these banks competed successfully against their reputable rivals prior to the Euro due to their exclusive investor relationships.

### 3.3 Underwriter’s Balance Sheet

\textsuperscript{13} Tombstone announcements are publicly available advertisements of upcoming new issues that list the underwriters involved in order of importance.  
\textsuperscript{14} League table are published by the major data vendors and rank underwriters by the volume of transactions in a given security type.  
\textsuperscript{15} Some of the bias toward favouring larger underwriters with higher reputation may remain even in survey data. This is because investors may not be familiar with smaller underwriters, and therefore can not provide favourable opinions. I further address this bias in two ways. Firstly, by including variables for underwriter (book) size, I control for large differences in capacity. Secondly, the sample only includes relatively large, multinational banks that are likely to be widely known in the investor community.
Underwriters provide insurance for unsold bonds by purchasing and holding them on their balance sheet. The underwriter’s ability to pledge the economic capital on its balance sheet to support the issue placement is directly related to the value of the insurance it provides. Larger issues may demand underwriters with larger balance sheets to provide credible insurance against unsold bonds.\(^{16}\) Insurance for unsold bonds is just one reason why book value may differentiate underwriters.

Economies of scope across multiple banking products may allow banks to offer services simultaneously. The ability of some banks to bundle their lending and underwriting services by having larger, more robust balance sheets may also differentiate them (Fang (2005)).\(^{17}\) In both these cases, there is an argument for the positive relationship between the bank’s size and the demand for underwriting services. As lending relationships are unobservable in this market, I focus my discussion on the value of insurance against unsold securities.

Anecdotal evidence of the relationship between underwriter size and market share is in the legacy and the Euro segments are shown in Figure 3. I sort underwriters by their balance sheet size into four equal deciles in each year. I then calculate the market shares of the underwriters in each of the declines for the legacy currencies and the Euro. The figure shows a positive shift in market shares to the largest (top 25%) underwriters after the introduction of the Euro. This appears to come at the cost of the smallest (bottom 25%) underwriters that capture less than 10% of the underwriting market in the same period.

I use the underwriter’s book value of assets scaled by the mean issue size in the currency segment to represent their ability to commit economic capital to support the new issue.\(^{18}\) The scaling reflects the argument that underwriter’s balance sheets are important relative to the size of the issue. If underwriters differentiate themselves in

\(^{16}\) Another mechanism to provide insurance for unsold bonds may be the use of a co-management and sales syndicate team (Corwin and Schultz (2005)). While syndication is increasingly common, a lion’s share of the issue volume will be committed by the lead underwriter.

\(^{17}\) These loans are largely unobservable in public databases. The exception is of syndicated loans examined by Drucker and Puri (2005).

\(^{18}\) The choice of proxy omits the possibility that of heterogeneous commitment levels across banks. As national regulatory restrictions are likely to be a factor in this, I include underwriter nationality indicator variables and find that the results are qualitatively unchanged.
size, the proxy will be significant in the demand for underwriting services. The demand model will control for a number of factors that may also change during the period and I turn to these now.

3.4 Controls and Fixed-Effects

Yasuda (2005) shows that different bond characteristics may impact the issuer’s choice function. To control for cross-currency differences in bonds, I include the mean bond size, its square, the mean rating and the mean tenure of bonds issued in the currency in a given year. I also include a time-trend effect as well as fixed effect controls for the legacy currencies, U.S. Dollar, Yen and the Euro.

4 The Model of the Demand for Underwriting Services

There are three agents in the international debt markets: firms seeking finance, underwriters providing intermediary services and investors that purchase the bonds. Firms (i = 1…I) seek financing for a positive net present value project in each period in the public bond markets. I assume that investors exhibit strong preferences for assets denominated in their home currencies, for reasons outlined in the previous section.

Issuers employ the services of an intermediary to certify and distribute the new bond to the target investors. Each firm ‘i’ approaches the market for underwriters with specific borrowing requirements denominated in a currency ‘m’. Each firm then makes a discrete choice of a single underwriter. A finite set of underwriters (j=1…J) compete to intermediate between the issuers and investors. Underwriters offer to sell the bond at a set yield premium $y_{jmb}$ (price) and post a fee for their service, $p_{jmb}$. In

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19 As noted before, the usual problems of information asymmetry and certification don’t appear to bind in these markets, however almost 100% of issues are underwritten using a bank. This further raises the question of why underwriters are necessary in these markets.
20 The yield premium is over the relevant government bond (risk-free) benchmark. I use the term yield to refer to yield premium henceforth.
21 This is characteristic of a ‘bought deal’ where the underwriter guarantees the issuer a price (yield) for their security by agreeing to purchase any unsold securities. Intermediaries may the form syndicates with other banks to assist in the sale of the bonds. The ‘fixed-price’ offer obilges the members of the syndicate to sell the bond at the price set by the lead intermediary and prevents price undercutting my
practise, the bond’s final yield is often not observed when the choice of the underwriter is made. In this model, I assume that the ex-post yield is an unbiased (though noisy) indicator of the issuer’s expected yield when choosing the underwriter. Both the yield and fee are publicly observable characteristics of the underwriter’s service and form part of the direct costs of borrowing for the issuing firm.

Underwriters offer heterogeneous services based on their relationships with the target investor group, their reputation and their size. As both the limited supply of reputation and investor relationships can imply market power, I model competition as an oligopoly framework with horizontal differentiation that may vary by market segment and by time. The indirect conditional utility\(^{22}\) of each firm ‘i’ purchasing the services of underwriter ‘j’ to place a bond into currency segment ‘m’ is given as:

\[
V_{ijmt} = \bar{V}_{jmt}(w_{jmt}, y_{jmt}, p_{jmt}, \xi_{j}) + \mu_{ijmt} \tag{1}
\]

The mean value of underwriting services common to firms is denoted by \(\bar{V}_{jmt}\), while the \(\mu_{ijmt}\) is the additive random component of the issuer’s discrete choice function. \(w_{jmt}\) and \(\xi_{j}\) denotes the observable and unobservable (by the econometrician) characteristics of the underwriter. The observable characteristics of the underwriter are its relationship to the target investor group, the underwriter’s reputation and the underwriter’s size. The direct costs of the service are the yield to maturity of the bond \(y_{jmt}\) and the fees \(p_{jmt}\) charged by the bank.\(^{23}\) The term \(\mu_{ijmt}\) specifies the parametric distribution of issuer preferences across different groups of underwriters, markets and over time. A full estimation of correlations is computationally burdensome and requires more detailed dataset that is available to us (Berry, Levinsohn and Pakes (1995)). Therefore, I follow the literature by assuming a particular parametric distribution for heterogeneity in the term \(\{\mu_{ijM}, ..., \mu_{iJM}\}\) that is assumed correlated among underwriters but independent across markets. The correlation in choice between members of a group of underwriters is estimated from the model with the syndicate members. Both ‘bought deals’ and ‘fixed-price’ offers are the dominant form of underwriting bonds in domestic and international markets.

\(^{22}\) It is indirect because the budget constraint is included through the \(p_{jmt}\) and conditional because it is conditional on a choice of an underwriter.

\(^{23}\) These terms are aggregated over individual bonds and issuers, and therefore termed aggregated fee and aggregated yield. The method of aggregation is discussed in later sections.
parameter $\sigma$. I group underwriters into top tier (top ten reputation) and all other.\textsuperscript{24} This assumes that there is a greater tendency for firms to substitute one top tier underwriter for another, vis-à-vis for a lower reputation underwriter. For non-zero values of this correlation, the model is akin to the well known nested logit structure\textsuperscript{25} shown in Figure 4 (McFadden (1978)).

Issuers choose underwriters that maximise their valuation of the service, however if no option is optimal, I allow the firm the option of an ‘outside-choice’, the choice to seek alternate financing outside the international debt market. The utility of this outside choice is set to zero. The empirical definition of an outside good is non-trivial and requires an estimate of the maximum possible market size of all financing demanded by firms to undertake projects. In defining the outside good, I assume that firms seek alternate financing in domestic capital markets of the same currency. The empirical definition is:

$$
O_{0mt} = \sum_i \sum_j B_{ijmt} + \sum_i \sum_j E_{ijmt}
$$

(2)

Where $O_{0mt}$ is the sum of the issue amounts of all domestic debt and equity issues in the currency’s domestic market\textsuperscript{26} in a given year. The total market is therefore the outside good plus the sum of international bonds denominated the currency (inside good) defined as:

$$
M_{mt} = O_{0mt} + \sum_i \sum_j B_{ijmt}
$$

(3)

Given the outside good, Berry (1994) provides a closed-form solution expression which facilitates linear estimation of the multinomial model and the determinants of the mean value $V_{jmt}$ as:

\textsuperscript{24} As a robustness test I also group underwriters by geographic proximity to the target investor group. The results are qualitatively unchanged.

\textsuperscript{25} The nested logit model is a tractable representation where the econometrician specifies ex-ante the correlation pattern between the choices. The structure of choices is therefore represented as a tree-structure where the first level determines the choice of ‘local’ underwriter, while the second level is the choice of a specific underwriter within the ‘local’ underwriter category.

\textsuperscript{26} In the case of the Euro, I take the sum of the European member states’ domestic market new issues for that year.
The dependent variable is the function of the market share of underwriter ‘j’ in market ‘m’ at time ‘t’, $s_{jm_t}$, and the market share of the outside good $s_{omt}$ of the total market $M_{mt}$. The $\Delta_{jm_t}$ is the vector of underwriter characteristics including investor relationships, reputation and underwriter size, while the direct costs of placement are captured by $p_{jm_t}$ and $y_{jm_t}$. The correlation in issuer preferences for underwriters within the upper nests of the choice function is the estimated $\sigma$. The $\hat{s}_{jm_t}$ is the within-group market share of underwriters in the upper nests (Berry (1994)).

4.1 Features and Limitations

The base multinomial model assumes that issuers differ only according to the additively separate idiosyncratic component $\mu_{ijm_t}$. This is clearly a limiting assumption in favour of tractability that future work following Berry, Levinsohn and Pakes (1995) may aim to relax. In this paper, I assume that issuers don’t differ too much in their preferences because they are usually large, listed, well-known and almost always investment grade rated. The high credit rating is required due to the absence of a single domestic regulation framework to protect debt-holders rights. I add proxies for issuer characteristics in segments as additional controls for systematic differences that may arise in issuer characteristics and therefore preferences across currency segments,

Consistent with previous literature, this model captures elements of static interaction between underwriters and issuers, thereby neglecting any dynamic elements in firm-underwriter interaction that may arise. An example of dynamic model may be of dynamic learning, where issuers change their valuation and therefore choice of underwriter services through repeat transactions or by observing the underwriter over time. These models require the formulation and estimation of a dynamic demand model that will require further simplifications of the present framework. While of

\[ \bar{V}_{jm_t} = \ln\left(\frac{s_{jm_t}}{s_{omt}}\right) = \Delta_{jm_t}' \beta - \alpha_1 y_{jm_t} - \alpha_2 p_{jm_t} + \sigma \ln(\hat{s}_{jm_t}) + \varepsilon_{jm_t} \]

(4)

27 As an example, the proportion of fixed-rate sub-investment grade issues is less than 5% (Esho, Kollo and Sharpe (2006)) vis-à-vis over 20% in the U.S. domestic market (Jewell and Livingston (1998)).
interest for future research, the available form of such a dynamic demand model is intractable. Dynamic interactions are less likely to exist in the international debt markets due to infrequent repeat issuance by firms (94% in the legacy and 81% in the Euro). Firms issue infrequently in the international debt markets, and due to their size and transparency, usually employ a number of different intermediaries for different markets. In their sample of floating rates notes in the international debt markets, Kollo and Sharpe (2006) report that 77% of issuers had either not made an issue in the prior three years or switched underwriters in consequent issues. The low instances of repeat interaction between firm and underwriter are likely to suggest lower scope for dynamic interaction due to switching costs or learning.

5 Estimation and Results

Estimating the demand model outlined in (4) requires aggregation over individual bond characteristics to obtain aggregate indicators of the underwriter specific fee and yield. Both the underwriter fee and the yield vary with bond characteristics like tenure and rating, so these characteristics should be used as controls across currency segments and to derive underwriter specific components of pricing and yield. The empirical method used to obtain the fee \( p_{jmt} \) and the yield \( y_{jmt} \) as inputs into equation (4) is outlined in Appendix A3.

The error term in the demand equation \( \xi_{jmt} \) is the unobserved underwriter characteristic\(^{28}\), and may be correlated with the fees \( p_{jmt} \) and the within-group market shares \( \hat{s}_{jmt} \) (Berry (1994)). Such a correlation would mean ordinary least squares estimates of the coefficients of demand will be biased. I therefore estimate the coefficients of the model using standard instrumental variable regression technique to correctly identify the demand parameters. The instruments used must be correlated with supply factors which affect the underwriter’s cost of supplying the service. I select the instruments carefully with this aim in mind as the two-year and the ten-year government bond interest rate daily volatilities of government bonds from in the

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\(^{28}\) Examples of unobservable underwriter characteristics are marketing campaigns, specific client relationships, business networks and any other ‘soft’ signals of underwriter characteristics that issuers assign a positive value to in their demand function.
bond’s domestic market for each year of the sample. Higher interest rate volatility is likely to increase the underwriter’s risk that some of the bonds will remain unsold due to adverse interest rate movements. Similarly, I include the investor relationships indicator and the global reputation variables that appear in the main demand model as also possibly correlated with the direct costs of placement. 29 Finally, I include indicator variables for pure investment banks as their cost structures may differ to universal banks and indicator variables for European and U.S. banks to represent different compensation structures for banking personnel across nationalities. The within-group market shares are also instrumented using the same orthogonal instruments. The first stage estimation results are not reported for reasons of brevity due to the larger number of parameter estimates. 30 The fee index regression has an adjusted $R^2$ is 0.521 with a statistically significant F-stat of 31.35. The within-group market shares regression has an equally high adjusted $R^2$ of 0.505 with a statistically significant F-statistic of 29.39. The results of a Basmann J-test for over identification restrictions are not statistically significant and therefore support the use of the outlined instruments.

5.1 Estimated demand parameters

Table IV presents the base regression results of the model estimates of equation (4) with the model fit of 44.6%. The second regression seeks to examine the difference in the importance of investor relationships across currency segments by adding interactive terms for each of the currency segments of the sample. The results show how the value of investor relationships varies across currency segments. The adjusted $R^2$ shows a good fit of the model at a relatively high value of 57.54%. A more detailed examination of the model variables are provided below.

5.1.1 Investor Relationships

Table IV shows that both indicators of investor relationships, derived from the underwriter’s parent’s domicile and through foreign subsidiaries, are valued by firms

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29 Excluding the investor relationship and global reputation variables has a no qualitative effect and only minor quantitative effects on the results.
30 These results are available on request.
choosing their underwriter. Though both are positive and statistically significant, the
domicile of the lead underwriting bank appears to be a more robust indicator of
investor relationships, possibly because banks generally conduct the majority of their
lending and underwriting business in their domestic markets relative to other foreign
capital markets. This may also indicate the importance of different kinds of investors.
Banks are more likely to have robust relationships with retail investors through
lending and commercial banking activities in their home markets. Their offshore
subsidiaries are more likely to cater to specialised corporate clients and some
institutional investors. The base results show that investor relationships of competing
underwriters specific to the target investor of the bond are important in the
competition for underwriting mandates.

The economic interpretation follows by comparing the estimated coefficients relative
to the coefficient of the underwriter fee index (e.g. Yasuda (2005)). The interpretation
is as follows. An increase of 100 basis points (bps) on the underwriter spread
decreases the demand for underwriter services by 1.468 (Table IV) units based on the
coefficient value on the fee index variable. The value of investor relationships derived
from the underwriter’s home market increase demand by 0.549. The trade-off implies
a 37 basis point (bps) value of investor relationships per transaction or $US 0.75
million for a $US 200 mil issue. The economic values of the coefficients are reported
in Table VIII.

The interactive terms of Table IV show how the importance of investor relationships
varies significantly across different investor groups (currency segments). Investor
relationships are most important in the smaller investor groups of the legacy
currencies, the commonwealth currencies and the yen. The Euro interaction term is
not significantly different from zero, indicating that investor relationships ceased to be
a significant source of differentiation for competing underwriters after the Euro. This
result highlights the importance of investor segmentation as impacting the value of
investor relationships for competing underwriters. The pre-Euro legacy markets held
segmented investors, where underwriters with relationships to these investor groups
derived a significant portion of their demand from investors in their local markets.
Ceteris Paribus, this equates to a hypothetical loss of US$1.27 million per deal of
possible fee revenue after the Euro owing to the removal of segmentations that
maintained the demand for the smaller (less reputable) European underwriters. This is also equivalent to a relative\textsuperscript{31} loss of US$207.94 million\textsuperscript{32} per year in fee revenue for European underwriters as a whole. It is also interesting to compare the magnitude of the geographic segmentation with the observed drop in fees after the Euro. Fees dropped from 186 bps to just 84 bps (Table I), which may suggest that greater competition due to the removal of the effect of investor segmentation may have played a significant part in increasing price competition.

Next I ask the question “How much of the total demand was driven by investor relationships in the smaller currency segments?” I obtain the difference in implied demand for an underwriter with and without investor relationships in the legacy and Euro currency segments by multiplying the statistically significant coefficients of the model with the mean values for the respective independent variables. Taking the exponential gives $\bar{d}_s = \frac{s_{smd}}{s_{0mt}}$ and $\bar{d}_s = \frac{s_{smd}}{s_{0mt}}$. Calculating $\frac{\bar{d}_s - \bar{d}_s}{\bar{d}_s}$ shows that underwriters with investor relationships in the legacy (Euro) currency segment obtained 62% (41.5%) more demand than those without investor relationships.

Tests of segments interactions are informative of the effect of the natural experiment, but not about what the economic drivers are behind the differences in the value of investor relationships across currency segments. To address this question, I test how the value of investor relationships varies with type of bonds (private vs. public) in the segment and the exclusivity of the investor relationship. Private placement may require greater access to investors and not rely on a public road-show to elicit interest from investors that the underwriter may not already have relationships with. Investor relationships should therefore be more valuable in segments with more private placements. The coefficient of the interactive term of ‘Investor relationships * private

\textsuperscript{31} This is a relative loss as underwriters received greater overall revenue due to increased volume of transactions and in spite of falling fees.

\textsuperscript{32} Calculated using the volume of new Euro denominated issues from 1999 to 2003 from Table 3 and the estimated value of 48 basis points per transaction. This figure is likely to underestimate the total economic effect as it is estimated using the sample of fixed-rate international bonds issued by non-financial firms. Including that larger universe of bonds (for example floating-rate, convertible equity-linked and asset-backed) and widening the issuer types to government and banks is likely to provide an even higher estimate of the value of investor relationships to European banks. I continue to use within-sample economic interpretations as a conservative measure of the value of investor relationships.
placements’ is positive but does not achieve statistical significance as reported in Table V.

One explanation for the decline of the importance of investor relationships was due to the lower cost of establishing these relationships for foreign underwriters. I test this hypothesis in the following section by interacting the investor relationships indicator with an indicator for the likely cost of establishing investor relationships in different currency segments. I use the number of foreign underwriters operating in the domestic market of the bond’s currency as an indicator for the cost of establishing an underwriting subsidiary and therefore investor relationships in that domestic market. Lower costs of establishing relationships imply less differentiation among competing underwriters. The interactive term of investor relationships and the number of foreign underwriters is termed investor accessibility. The negative coefficient is consistent with the notion that investor relationships are less important when the costs of establishing investor relationships are small. If the costs of establishing investor relationships are related to the degree of segmentation (either the number of segments or the strength of segmentation), then the removal of segmentation in the Eurozone acted to decrease the cost of establishing investor relationships, and therefore removed this source of differentiation among competing underwriters.

5.1.2 Global Reputation

The results of the base regression show that reputable is valued by issuing firms, consistent with the certification role of underwriters (Table IV). I further test if reputation is equally valued in different currency segments by interacting the reputation coefficient with currency indicators in Table VI. The results show that reputation is valued differently, and that it is most significant in the more liquid, and ‘global’ currencies of the Euro and the U.S. Dollar. The coefficient values show that value of reputation in the Euro segment is 0.09 units per rank (to a maximum of 20). The corresponding economic value of a give rank increase is 54 bps per transaction, or USD 1.2 million for a median U.S. Dollar denominated debt transaction.

33 I count those foreign underwriters in the top 25 league tables for equity, debt and hybrid instruments.
Interestingly, reputation is less valued in the smaller currency segments, for example the legacy currencies, where investor relationships are the most important. With attention to the natural experiment, this suggests the structure of competition for underwriting services shifted with the removal of segmentation among European investors from investor relationships in favour of global reputation. This is consistent with the observed market share shift toward the more reputable U.S. underwriters also.

As a final test of the economic significance of reputation, I calculate the average value implied by the model for a top (rank=20) underwriter and a mid-rank reputation (rank=10) and compare the marginal value of reputation for the higher ranked underwriter in the Euro segment.\(^{34}\) Using the methodology outlined in the previous section, I find that bulge bracket (top five) underwriters obtain 37% more demand for their services than other underwriters. This is particularly significant, and appears to lend strong support for the economic importance of reputation in more liquid underwriting markets. I detailed a more detail breakdown of the economic value of reputation in all of the currency segments in Table VIII.

Reputable underwriters should derive greater demand from firms that rely heavily on their certification capabilities. To test this, I use the interaction of reputation and the mean credit rating of all bonds in a segment. The coefficient estimate reported in Table VII shows that demand for reputation declines in higher credit rated segments, consistent with the certification role of reputation. As a second test of certification, I use the interaction of the proportion of ‘Not-Rated’ bonds and underwriter reputation, and find it positive but not statistically significant. This may be because issuers of ‘Not-Rated’ instruments are well known firms that substitute their reputation in place of a formal credit rating.

As a secondary effect, the introduction of the Euro increased the market size beyond the sum of its legacy parts through lower barriers of entry and greater liquidity. Greater liquidity and market size are likely to have different implications for both reputation and investor relationships. The interactive term of investor relationships

\(^{34}\) The top five to ten underwriters represent the most reputable banks (Fang (2005)).
shows that underwriters differentiate less based on their investor relationships in the larger liquid currency segments. This is consistent with the notion that the exclusivity of investor relationships declines in larger, and less segmented markets. The value of global reputation appears to increase with segment size. Firms tend to choose the more reputable firms when marketing securities to the larger pools of investors. This may be because reputation acts as a better signalling mechanism for issues distributed to a range of investors, or because the more liquid segments attract lower rated bonds (on average) and therefore the value of certification provided by reputation is greater.

5.1.3 Placement Risk and Insurance

The results of Table IV show that firms place a positive value on the balance sheet size of underwriting banks. The economic value is equivalent to 26 basis points of underwriter spread for each positive shift in standard deviation of balance sheet size. Table III reports the average underwriter size of $US 287,202 million with a standard deviation of $US 168,209. This suggests strong non-normality in the variable. A brief calculation shows that 72% of underwriters are within one standard deviation of the mean, suggesting that the majority of the benefit of size is conferred on very large underwriters relative to the average.

It is possible that underwriter size proxies a possibility of economies of scope in offering other financial services. Kanatas and Qi (2003) and Drucker and Puri (2005) argue that banks may (and do) tie lending and underwriting services together and that this effects their attractiveness as potential underwriters.35 If underwriter size indicates the willingness of banks to extend loans, then it does appear to provide value for firms using the international debt market.

5.1.4 Direct Costs of Placement

The fee index is negative and statistically significant at the 99% significance level. The coefficient value of −1.468 in Table IV is consistent with a downward sloping demand curve. The results show that issuers value the direct cost of capital and that

35 Though observing these loans is often empirically difficult. Though I am unable to observe loans tied to underwriting agreements I do control for the unobserved elements of the underwriter’s service.
underwriters compete on underwriting fees in the international debt market. These results are further supported by the large standard deviation of underwriting fees reported in the U.S. domestic markets (Livingston and Miller (2000), Livingston and Zhou (2002), Burch, Nanda and Warther (2004) and Yasuda (2005)) and international debt markets (Esho, Kollo and Sharpe (2006), Kollo and Sharpe (2006)).

The yield index (yield to maturity) $y_{jm}$ is negative and statistically significant at the 99% confidence interval, however the coefficient estimate of -0.263 is relatively small. It suggests that the loss of value derived from 100 basis points higher yield is only 0.26 or equivalent to an additional 18 basis points in underwriter fees. The low coefficient suggests that the actual yield to maturity obtained by underwriters is not a significant source of differentiation. This may be because the international debt instruments are high rated, transparent instruments that are easily priced by investors. In this case, the marginal effect of employing a high quality underwriter that is able to obtain a slightly better yield to maturity for its client may be small. It suggests that underwriters compete predominantly on their fees and only to a much smaller extent, on the yield to maturity they can offer issuers.

5.1.5 Nested Logit Correlation

The correlation ($\sigma$) in the nested logit structure is 0.61 and significant at the 99% significance level in the base model of Table IV. The coefficient estimate represents the degree of substitution within the bulge bracket (top five) underwriters in a given currency segment and year. Alternately, it represents the correlation in the within-group choices. A positive value shows the degree to which issuers restrict their choice set within groups. For example, if the estimation $\sigma$ is close to one, firms would effectively choose from a sub-set of high reputation underwriters, and if the fee of any of those underwriters rises, the firm would substitute it with another from the same reputable group.\(^{36}\)

5.2 Robustness Tests

\(^{36}\) I test an alternate nested logit structure by grouping underwriter in different reputation brackets. The results are qualitatively similar.
I report six robustness checks of the results by: (i) testing the significance of the prior experience of the underwriter, (ii) adding a U.S. nationality effect for underwriters, (iii) using an alternate correlation structure in upper nest, (iv) using an alternate derivation of the fee and yield, (v) using instruments for the yield to maturity and (vi) accounting for self-selection biases among firms and underwriters. The results are qualitatively consistent with the base model and reported in Tables IX and X. A brief discussion of these follows below.

5.2.1 Underwriter experience

As the league table rankings are often persistent in the underwriting industry, the use of league tables to indicate reputation may equally represent lagged market share. Though my measure of reputation is not the league table ranking, it may equally suffer from this bias. To address this, I include an indicator variable that is unity if the underwriter has underwritten any bond issued in that currency of denomination in the prior year. While the indicator is positive and significant, it does not significantly change the sign or the magnitude of the underwriter reputation. The positive coefficient shows support for the persistence of market shares of underwriters, even after controlling for reputation.

5.2.2 U.S. Underwriter Indicator

Both Figure 2 and Table III suggest that reputation favours the U.S. underwriters. It is possible that the indicator for reputation is indicating demand for U.S. underwriters. To test this, I include the U.S. indicator variable for U.S. underwriters, and report the results in Table IX. The indicator is significant and negative but does not change the sign or magnitude of underwriter reputation.

5.2.3 Correlation in upper nest

I test an alternate correlation structure in the upper nest using the investor relationships acquired through an underwriter’s nationality. The upper nest is therefore the choice between an underwriter of the same nationality as the currency’s home market and all other underwriters. I report the results of the alternate upper nest in Table IX and show that it does not change the statistical significance of the model
variables, but it does lower the model fit from the base model of 0.60 (Table IV) to 0.39.

5.2.4 Fee and Yield Fixed-effect aggregation

As a robustness test of the simple aggregation method used to calculate the fee and yield indices, I use an alternate fixed-effect aggregation method outlined in the Data Appendix. The fixed-effect coefficient estimates provide a noisier estimate of the marginal fee and yield charged by each underwriter. Despite this, the coefficients of the model and those of the fixed-effect fee and yield indices are consistent with the base model.

5.2.5 Endogenous Yield

While the yield is assumed to be exogenous in the model, it is possible that it is correlated with the unobservable underwriter characteristics $\xi_{jmt}$. Relaxing the assumption of exogeneity, I instrument the yield. The coefficient estimate is negative but does not achieve statistical significance. This result is supportive of the earlier conclusions that the yield does not appear to play a significant part in the competition for underwriting services in the international debt market.

5.2.6 Self-Selection among firms and underwriters

Fang (2005) and Fernando, Gatchev and Spindt (2005) argue that firms and underwriters select each other based on a matching between high quality firms and high quality underwriters. Fang (2005) adjusts her estimates of the underwriter’s yield and fee using a first stage Heckman self-selection equation, by estimating the probability of selecting a high quality (reputation) underwriter using the characteristics of the issuer and the bond. She notes that low-quality (sub-investment grade) firms select low quality underwriters, despite the potential for certification benefits of a higher quality underwriter. First, this study examines the demand for underwriting services conditional on continuous supply over the firms in the sample. As the potential denial of underwriting service is greatest for sub-investment grade firms, and this study has almost all investment grade firms, the potential bias arising
from sample selection is limited. As an additional test, I estimate the base regression of Table IV using a Heckman’s correction by estimating a first stage regression for the self-selection of reputable underwriters. The first stage estimates the probability of choosing a top ten ranked underwriter in a given year in any currency as a function of the mean issue size, maturity, rating, and issuer nationality characteristics. The independent variables are consistent with Fang (2005). The second stage results are reported in Table XI, and are statistically and economically consistent with the base regression results of Table IV.

6 Conclusions and Further research

This study examines the importance of investor relationships in the competition for and the provision of underwriting services in the international debt market. Using a unique database of international issues, I provide estimate a structural model for underwriter services to estimate the source of differentiation among competing underwriters. While prior research has focused exclusively on the relationship between the firm and the underwriter to characterize the competitive equilibrium, this is the first study to estimate the importance of investors in shaping underwriter competition. By exploiting the unique characteristics of the international debt market and the natural experiment of the Euro, I am able to estimate the economic value of investor relationships across different currency segments, and to study how this changes as segmentations in the investor pool are removed.

The study shows several novel and new results for the literature. First, it documents the importance of investor relationships in underwriting markets where investors are segmented. It shows that investor relationships are a significant source of differentiation among underwriters when the investor pool is segmented, and when establishing these relationships is costly. Reputation also plays a significant part in these markets, despite the relatively low information asymmetry and high credit rating of issuers. I show that reputation is important in more competitive segments, but declines and is dominated by investor relationships as the pool of investors shrinks. In other words, in large, competitive capital markets reputation is an important source of differentiation among the many competing underwriters. In smaller, more segmented
markets the investor relationships of the often local banks dominates the importance of reputation, even when it is the foreign banks (in this case, the U.S. banks) that hold the reputation capital. This is the first study to suggest limits to the value of reputation in the presence of segmentations in the investor pool. Finally, the study shows that bank asset size does matter in competing underwriting services, consistent with the notion of economies of scope argued by Fang (2005) and Drucker and Puri (2005).

This is the first study to incorporate information about the investor population into the notion of underwriting competition. Relaxing the assumption of equal access to the universe of investors for competing underwriters is likely to produce more valuable analyses of competition in bond and other securities markets. This is especially important as underwriters and banks increasingly acquire investment expertise and access to global clientele. Applications of a structural model in the estimation of market frictions leading to imperfect competition are also likely to produce richer analyses of competition in these markets.
Data Appendix

A1. Secondary market yields

I obtain daily secondary market yield information from Merrill Lynch Government Bond Database (MLGBD) through the Datastream portal. The MLGBD provides yields for a range of zero coupon government bonds for the currencies in the sample. I match the duration of each of the bonds to the equivalent zero-coupon government bond, using a straight-linear iteration for imperfectly matched durations. The difference between the yield to maturity of the bond and the matched government yield is the yield premium. The yield premium shows significant variance from a minimum value of −2.17% to a maximum of 6.87% in excess of the matched government bond yield. Though unusual, it is not impossible that the yield premium is negative on an international debt issue. Kim and Stulz (1988) argue that clientele effects in the international debt markets result in lower costs of borrowing than would otherwise be available domestically, a hypothesis supported by McBrady and Schill (2005). The international clientele may provide favourable terms for high quality corporate issuers that may result in lower yields than the government bonds. It may also be due to errors in variables problem in the data provider. Livingston and Zhou (2002) report some instances of outlier errors in their domestic bond databases provided also by Thomsons. Though the sample selection criteria are chosen carefully to obtain the most homogeneous sample of bond types and therefore yields, the errors in variables may remain. I adjust the yield premiums by censoring the distributions within each of the currency segments at the 5% and 95% percentile intervals. The resulting yield premiums are used henceforth.

A2. Merger Treatment

I treat mergers between underwriters carefully by assigning a new identifier for newly merged underwriters and treating these as distinct from the previous entities. As an example, UBS completed its merger with SBC Warburg in June 1998. The newly formed merged group of UBS Warburg is treated as a new entrant underwriter. Its market shares, quality and fees are recalculated to reflect possible changes in quality and/or pricing. I allow the newly merged entity to carry the highest reputation value of its two component underwriters. UBS Warburg in 1999 would carry the no smaller than the reputation value of either SBC Warburg or UBS recorded in 1998. There were no underwriters in the sample that merged across borders.

For example, a marched yield of U.K. Pound bond with a duration of 5.53 would be the equivalent mid-point between the yield on a 5 and the yield on a 6 year zero coupon U.K. government bond.
A3. The Fee and Yield Index

The value of underwriting services is estimated in aggregate of bond characteristics while the observable fees and yield vary for each bond issued. I propose two methods of aggregation of the underwriter fee (gross spread) and the yield premium to obtain a fee and a yield index: (i) the simple average method and (ii) the fixed-effect method. The simple average method follows Schroth (2006)\(^{38}\) and calculates a simple average of fees and yields charged for all issues lead by underwriter ‘j’ in market ‘m’ in year ‘t’. Calculating an even weighting or a volume weighted measure gives similar results to generate \(P_{jmt}\) and \(Y_{jmt}\) in the model. As bond characteristics may not be uniformly distributed across segments, I add additional controls of the average rating, maturity and size of bonds in the aggregate demand model.\(^{39}\)

The fixed-effect method estimates the fixed-effect differences in pricing and yield across all underwriter-segment groups. I estimate a simple linear multivariate regression with the underwriter gross spread as the dependent variable and bond characteristics \(B\) as independent variables motivated by prior literature. These include maturity, size, Moody’s rating, and controls for the year of the issue\(^{40}\) (Gande, Puri and Saunders (1999), Livingston and Miller (2000), Burch, Nanda and Warther (2004)), as well as fixed-effect dummy variables \(I_{jm}\) that take the value of unity if the bond was managed by underwriter ‘j’ in market ‘m’ and zero otherwise. The estimated multivariate equation is:

\[
P_{ijbm} = X’B + p_{jm}I_{jm} + \varepsilon_{ijbm} \quad (3)
\]

The coefficient estimates \(p_{jm}\) are the underwriter-market fee net of the bond characteristics.\(^{41}\) I follow a similar methodology to obtain the yield premium \(y_{jm}\). I employ the first method of the simple average of fees and yield as the base model and report robustness checks using the fixed-effect method.

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\(^{38}\) Schroth (2006) aggregates the underwriter fees of his sample of innovative securities by taking a simple average of the gross spreads charged by underwriter ‘j’ in a given year ‘t’.

\(^{39}\) For example, if the mean size of issues in the U.S. Dollar segment was US$205 in the year 1995, the mean issue size control would take this value for all underwriters that operated in the U.S. Dollar market in 1995. Issue size is adjusted by US CPI inflation index.

\(^{40}\) Using additional variables that identify the underwriter’s reputation and ‘local’ status do not impact the results.

\(^{41}\) A natural limitation of this approach is that I am unable to estimate the unobserved underwriter gross spreads and yields for the unsuccessful underwriter bidders. Yasuda (2005) applies a sample selection (EM) algorithm to attempt to obtain consistent measures of underwriter gross spreads in the presence of self-selection. Unfortunately, the use of selection bias methods like Heckman (1979) significantly reduces the underwriters in the sample due to insufficient number of issues per underwriter. The data limits the remedies that I am able to apply to this problem.
The adjusted $R^2$ for the underwriter gross spread and yield are expectedly high at 83% and 79.5% due to exhaustive permutations of underwriter-market fixed-effects. The estimated coefficient values for the underwriter-market fixed-effect dummies are the index of underwriter gross spreads $p_{jm}$. The average index value for the underwriter gross spread is 0.03 (or 3 basis points) and ranges from minus 89 basis points to positive 147 basis points. The values indicate the range of pricing by underwriters relative to each other across markets controlling for the bond characteristics. Similarly, the coefficients of the fixed-effects in the yield premium regression are used as the index of relative underwriter quality across markets $y_{jm}$. The estimates show greater range with an average of minus 17 basis points and a range from minus 250 to plus 332 basis points. The greater range is indicative of more pronounced heterogeneity in yield premiums offered by underwriters across markets.
## Appendix Table 1. Sample Selection
The table shows the evolution of the sample size from issue-by-issue data to the aggregate underwriter-currency-year form that is used to estimate the demand for underwriting services.

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Data Characteristics</th>
<th>N</th>
<th>Underwriters</th>
<th>Currency Segments</th>
<th>Years</th>
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<tbody>
<tr>
<td><strong>Thomsons Deals</strong></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Issue - by - Issue</td>
<td>Fixed Rate Bonds, Corporate Issuers, available Underwriter spread and yield to maturity</td>
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<td>143</td>
<td>26</td>
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<tr>
<td>Underwriter-segment-year</td>
<td>Lead for minimum two offers in currency</td>
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<td>102</td>
<td>9</td>
<td>1994-2004</td>
</tr>
<tr>
<td>Underwriter-segment-year</td>
<td>Available information on underwriter size</td>
<td>718</td>
<td>90</td>
<td>9</td>
<td>1994-2003</td>
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Table I. New issue volume and Underwriter Spreads.
The summary statistics are drawn from a sample of 2,535 fixed-rate international debt issues between 1994 and 2003. The volume of new issues and issue size are adjusted by the U.S. CPI Inflation index. The underwriter spread is the combined underwriter fee, selling concession and management fee and is expressed as a percentage of the issue size. The median values are shown in parentheses.

<table>
<thead>
<tr>
<th>Legacy Currencies</th>
<th>U.S. Dollar</th>
<th>Japanese Yen</th>
<th>Euro</th>
<th>Deutsche-mark</th>
<th>French Franc</th>
<th>Italian Lira</th>
<th>Total Legacy</th>
<th>Commonwealth Currencies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Volume of New Issues ($mil)</strong></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Period: 1994 – 1998</td>
<td>$93,197</td>
<td>$20,358</td>
<td>$26,255</td>
<td>$31,222</td>
<td>$4,432</td>
<td>$61,908</td>
<td>$37,438</td>
<td></td>
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<tr>
<td>Period: 1999 – 2003</td>
<td>$45,992</td>
<td>$16,220</td>
<td>$216,605</td>
<td></td>
<td></td>
<td></td>
<td>$50,925</td>
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<tr>
<td><strong>Average Issue Size ($mil)</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period: 1994 - 1998</td>
<td>240.21</td>
<td>36.10</td>
<td>197.40</td>
<td>213.85</td>
<td>110.80</td>
<td>194.07</td>
<td>193.98</td>
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<tr>
<td>(203.14)</td>
<td>(16.3)</td>
<td>(163.60)</td>
<td>(192.26)</td>
<td>(106.03)</td>
<td>(192.25)</td>
<td>(157.3)</td>
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</tr>
<tr>
<td>Period: 1999 - 2003</td>
<td>251.31</td>
<td>142.28</td>
<td>362.82</td>
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<td>(263.93)</td>
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<tr>
<td>Period: 1994 - 2003</td>
<td>243.81</td>
<td>58.98</td>
<td>362.82</td>
<td>197.40</td>
<td>213.85</td>
<td>110.80</td>
<td>194.07</td>
<td>198.87</td>
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<tr>
<td>(207.92)</td>
<td>(19.8)</td>
<td>(263.93)</td>
<td>(163.60)</td>
<td>(192.26)</td>
<td>(106.03)</td>
<td>(192.25)</td>
<td>(182.54)</td>
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<tr>
<td><strong>Average Underwriter Spread / Deal (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Period: 1994 - 1998</td>
<td>1.34</td>
<td>0.29</td>
<td>2.03</td>
<td>1.77</td>
<td>1.59</td>
<td>1.86</td>
<td>1.43</td>
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<tr>
<td>(1.38)</td>
<td>(0.10)</td>
<td>(2.00)</td>
<td>(1.88)</td>
<td>(1.75)</td>
<td>(1.88)</td>
<td>(1.88)</td>
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<tr>
<td>Period: 1999 - 2003</td>
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<td></td>
<td></td>
<td>0.80</td>
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<td>(1.36)</td>
<td>(0.25)</td>
<td>(0.40)</td>
<td></td>
<td></td>
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<tr>
<td>Period: 1994 - 2003</td>
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<td>0.28</td>
<td>0.84</td>
<td>2.03</td>
<td>1.77</td>
<td>1.59</td>
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<tr>
<td>(1.38)</td>
<td>(0.40)</td>
<td>(0.40)</td>
<td>(2.00)</td>
<td>(1.88)</td>
<td>(1.75)</td>
<td>(1.88)</td>
<td>(0.63)</td>
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Table II. Issuer Characteristics across Currency Segments

The issuer characteristics are identified for the final sample (N=718) for the currency segments of U.S. Dollar (94-03), Japanese Yen (94-03), Euro (99-03) and the legacy currencies of Deutschemark, French Franc and Italian Lira (94-98). The non-italic figures show the percentage of the currency segment by the number of issues while the figures in italics show the size weighted segment share. Infrequent issuers are defined as those that made only 1-2 issues in the sample period of 1994 to 2003 in any currency of denomination. Home currency issuers are those that issue in their home currencies.

<table>
<thead>
<tr>
<th>Legacy currencies</th>
<th>U.S. Dollar</th>
<th>Japanese Yen</th>
<th>Euro</th>
<th>Deutschemark</th>
<th>French Franc</th>
<th>Italian Lira</th>
<th>Total Legacy</th>
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<tbody>
<tr>
<td>Number of Issuers</td>
<td>247</td>
<td>148</td>
<td>292</td>
<td>82</td>
<td>35</td>
<td>18</td>
<td>122</td>
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<tr>
<td>Infrequent Issuers (%)</td>
<td>77.3</td>
<td>54.7</td>
<td>80.5</td>
<td>91.5</td>
<td>74.3</td>
<td>77.8</td>
<td>94.3</td>
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<tr>
<td>Home Currency Issuers (%)</td>
<td>32.8</td>
<td>27.2</td>
<td>40.9</td>
<td>62.8</td>
<td>46.5</td>
<td>38.7</td>
<td>54.7</td>
</tr>
<tr>
<td>Aaa - Aa3 Rated (%)</td>
<td>22.3</td>
<td>59.5</td>
<td>55.2</td>
<td>23.4</td>
<td>37.2</td>
<td>11.5</td>
<td>28.6</td>
</tr>
<tr>
<td>A1 - Baa3 Rated (%)</td>
<td>37.3</td>
<td>55.2</td>
<td>58.1</td>
<td>23.3</td>
<td>38.2</td>
<td>5.1</td>
<td>26.8</td>
</tr>
<tr>
<td>Sub-Investment Grade (%)</td>
<td>59.5</td>
<td>18.9</td>
<td>24.8</td>
<td>45.0</td>
<td>42.8</td>
<td>62.2</td>
<td>46.0</td>
</tr>
<tr>
<td>Not-Rated (%)</td>
<td>24.7</td>
<td>39.9</td>
<td>50.0</td>
<td>32.9</td>
<td>34.3</td>
<td>38.9</td>
<td>37.7</td>
</tr>
<tr>
<td>A1 - Baa3 Rated (%)</td>
<td>24.3</td>
<td>52.1</td>
<td>61.1</td>
<td>33.7</td>
<td>38.9</td>
<td>27.9</td>
<td>34.9</td>
</tr>
<tr>
<td>Sub-Investment Grade (%)</td>
<td>6.6</td>
<td>0.2</td>
<td>7.5</td>
<td>3.5</td>
<td>0.0</td>
<td>3.8</td>
<td>2.3</td>
</tr>
<tr>
<td>Not-Rated (%)</td>
<td>12.6</td>
<td>0.7</td>
<td>14.0</td>
<td>8.5</td>
<td>0.0</td>
<td>5.6</td>
<td>6.6</td>
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<tr>
<td>Aaa - Aa3 Rated (%)</td>
<td>6.6</td>
<td>0.2</td>
<td>7.5</td>
<td>3.5</td>
<td>0.0</td>
<td>3.8</td>
<td>2.3</td>
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<tr>
<td>A1 - Baa3 Rated (%)</td>
<td>31.6</td>
<td>40.5</td>
<td>17.8</td>
<td>32.9</td>
<td>28.6</td>
<td>16.7</td>
<td>22.1</td>
</tr>
<tr>
<td>Sub-Investment Grade (%)</td>
<td>9.7</td>
<td>28.9</td>
<td>6.5</td>
<td>17.9</td>
<td>18.3</td>
<td>6.2</td>
<td>16.8</td>
</tr>
</tbody>
</table>

Source: Thomsons Deals
Table III. Underwriter Characteristics in the international debt market

The statistics are drawn from the sample of 90 underwriters that acted as book-runner for international debt issues from 1994 to 2003. Investor relationship underwriters are those with home markets matching the currency of denomination of the debt issue. The reputation of underwriters is defined as the underwriter’s parent’s annual Euromoney ranking, (20 for the highest and decreasing). The underwriter size is the underwriter’s total assets in USD millions. Source: Thomson Deals, Compustat Global & Euromoney Institutional Investors.

<table>
<thead>
<tr>
<th></th>
<th>U.S. Dollar</th>
<th>Japanese Yen</th>
<th>Euro</th>
<th>Deutsche-mark</th>
<th>French Franc</th>
<th>Italian Lira</th>
<th>Total Legacy</th>
<th>Common wealth</th>
<th>Total Market</th>
</tr>
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<tbody>
<tr>
<td>All Underwriters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of unique underwriters</td>
<td>46</td>
<td>37</td>
<td>40</td>
<td>29</td>
<td>10</td>
<td>12</td>
<td>41</td>
<td>33</td>
<td>90</td>
</tr>
<tr>
<td>Average underwriter reputation</td>
<td>7.82</td>
<td>5.38</td>
<td>7.34</td>
<td>5.24</td>
<td>2.90</td>
<td>4.79</td>
<td>4.72</td>
<td>8.24</td>
<td>6.94</td>
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<tr>
<td>Average underwriter size</td>
<td>$382,563</td>
<td>$375,175</td>
<td>$505,825</td>
<td>$306,622</td>
<td>$257,019</td>
<td>$253,389</td>
<td>$287,202</td>
<td>$386,566</td>
<td>$387,828</td>
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<td>Underwriters local to currency (investor relationships)</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Number of underwriters</td>
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<td>21</td>
<td>25</td>
<td>9</td>
<td>7</td>
<td>3</td>
<td>19</td>
<td>10</td>
<td>76</td>
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<tr>
<td>Average underwriter reputation</td>
<td>12.95</td>
<td>0.27</td>
<td>3.19</td>
<td>1.61</td>
<td>0.90</td>
<td>0.00</td>
<td>1.10</td>
<td>3.89</td>
<td>4.28</td>
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<tr>
<td>Average underwriter size</td>
<td>$345,082</td>
<td>$326,384</td>
<td>$441,163</td>
<td>$316,568</td>
<td>$234,925</td>
<td>$102,709</td>
<td>$258,884</td>
<td>$323,812</td>
<td>$343,154</td>
</tr>
<tr>
<td>Underwriters without investor relationships</td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Eurozone</td>
<td>13</td>
<td>4</td>
<td>--</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>8</td>
<td>7</td>
<td>16</td>
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<tr>
<td>Ex-Eurozone European</td>
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<td>5</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>6</td>
<td>11</td>
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<td>U.S.</td>
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<td>10</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td>9</td>
<td>12</td>
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<tr>
<td>Japanese</td>
<td>12</td>
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<td>1</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Other</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Number of underwriters</td>
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<td>16</td>
<td>15</td>
<td>20</td>
<td>3</td>
<td>9</td>
<td>27</td>
<td>27</td>
<td>54</td>
</tr>
<tr>
<td>Average underwriter reputation</td>
<td>5.08</td>
<td>14.15</td>
<td>12.64</td>
<td>7.62</td>
<td>13.5</td>
<td>7.05</td>
<td>7.81</td>
<td>10.17</td>
<td>9.01</td>
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<tr>
<td>Average underwriter size</td>
<td>$402,554</td>
<td>$458,997</td>
<td>$588,326</td>
<td>$300,213</td>
<td>$373,014</td>
<td>$324,765</td>
<td>$311,355</td>
<td>$414,343</td>
<td>$422,732</td>
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</table>
Table IV. Investor relationships and the demand for bond underwriting services.

The value of underwriter services ($V_{jm}$) is the dependent variable. The investor relationships are (i) an indicator for when the underwriter and the currency’s home nations are the same and (ii) the underwriter’s market share in the currency’s domestic market. The underwriter’s global reputation is its *Euromoney* survey ranking (0 to 20), while the underwriter size is the log of total assets scaled by the mean bond size in the currency in that year. The aggregated fee (yield) variable is the mean (median) fee (yield) of bonds managed by that underwriter in that currency and time. The within-group correlation ($\sigma$) is the estimated level of correlation among top five ranked underwriters while the controls include the mean bond, time and currency fixed effects. Coefficients are estimated using two-stage instrumental variables technique for the fees and within-group correlation, and standard errors are reported in italics. The ***, ** and * denote significance at the 1%, 5% and 10% levels respectively.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Value of Underwriter Service ($V_{jm}$)</th>
<th>Value of Underwriter Service ($V_{jm}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investor Relationships - Underwriter’s local market (1/0)</td>
<td>0.549***</td>
<td>0.984***</td>
</tr>
<tr>
<td>* Legacy Currencies</td>
<td>0.106</td>
<td>0.179</td>
</tr>
<tr>
<td>* The Euro</td>
<td>0.058</td>
<td>0.145</td>
</tr>
<tr>
<td>* U.S.D.</td>
<td>1.041***</td>
<td>0.229</td>
</tr>
<tr>
<td>* Yen</td>
<td>0.629***</td>
<td>0.178</td>
</tr>
<tr>
<td>* Commonwealth Currencies</td>
<td>0.013**</td>
<td>0.008*</td>
</tr>
<tr>
<td>Investor Relationships – subsidiary’s market share (0-100)</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>Underwriter’s Global Reputation (0-20)</td>
<td>0.022***</td>
<td>0.033***</td>
</tr>
</tbody>
</table>

40
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balance Sheet of Underwriting Bank</strong></td>
<td>0.242***</td>
<td>0.207***</td>
</tr>
<tr>
<td></td>
<td>0.053</td>
<td>0.047</td>
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<tr>
<td><strong>Direct Costs of Placement</strong></td>
<td>-1.468***</td>
<td>-1.058**</td>
</tr>
<tr>
<td>Aggregated Fee</td>
<td>0.547</td>
<td>0.44</td>
</tr>
<tr>
<td></td>
<td>-0.263***</td>
<td>-0.193***</td>
</tr>
<tr>
<td>Aggregated Yield</td>
<td>0.071</td>
<td>0.132</td>
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<tr>
<td><strong>Nested Logit Correlation</strong></td>
<td>0.614***</td>
<td>0.518***</td>
</tr>
<tr>
<td>Correlation among top ranked underwriters ($\sigma$)</td>
<td>0.158</td>
<td>0.132</td>
</tr>
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<td><strong>Currency Segment Bond Characteristics</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Year Controls</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Currency Fixed Effects</strong></td>
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<td>Yes</td>
</tr>
<tr>
<td><strong>Diagnostics</strong></td>
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<td></td>
</tr>
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<td>F-statistic</td>
<td>53.79</td>
<td>62.13</td>
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<td>P-Value</td>
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<td>0.000</td>
</tr>
<tr>
<td>Adjusted R^2</td>
<td>0.446</td>
<td>0.5754</td>
</tr>
</tbody>
</table>
Table V. Investor relationships and the demand for bond underwriting services.
The value of underwriter services ($V_{jmt}$) is the dependent variable. The investor relationships are (i) an indicator for when the underwriter and the currency’s home nations are the same and (ii) the underwriter’s market share in the currency’s domestic market. Private Placements the proportion of private placement bonds in the currency segment while investor exclusivity is the number of foreign underwriters operating in the currency’s domestic capital underwriting market. The underwriter’s global reputation is its Euromoney survey ranking (0 to 20), while the underwriter size is the log of total assets scaled by the mean bond size in the currency in that year. The aggregated fee (yield) variable is the mean (median) fee (yield) of bonds managed by that underwriter in that currency and time. The within-group correlation ($\sigma$) is the estimated level of correlation among top five ranked underwriters while the controls include the mean bond, time and currency fixed effects. Coefficients are estimated using two-stage instrumental variables technique for the fees and within-group correlation, and standard errors are reported in italics. The ***, ** and * denote significance at the 1%, 5% and 10% levels respectively.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Value of Underwriter Service ($V_{jmt}$)</th>
<th>Value of Underwriter Service ($V_{jmt}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investor Relationships - underwriter’s domestic market (1/0)</td>
<td>0.483***</td>
<td>0.901***</td>
</tr>
<tr>
<td></td>
<td>0.108</td>
<td>0.188</td>
</tr>
<tr>
<td>* Private Placements</td>
<td>0.432</td>
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</tr>
<tr>
<td></td>
<td>0.322</td>
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</tr>
<tr>
<td>* Investor Accessibility</td>
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<td>-0.070***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.027</td>
</tr>
<tr>
<td>Investor Relationships - domestic capital market share (0-100)</td>
<td>0.012**</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>Underwriter’s Global Reputation (0-20)</td>
<td>0.024***</td>
<td>0.026**</td>
</tr>
<tr>
<td></td>
<td>0.006</td>
<td>0.012</td>
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<td>Balance Sheet of Underwriting Bank</td>
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<td>0.215***</td>
</tr>
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<td></td>
<td>0.052</td>
<td>0.045</td>
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<tr>
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<td>Layer 1</td>
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<td>---------------------------</td>
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<td>---------</td>
</tr>
<tr>
<td><strong>Direct Costs of Placement</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggregated Fee</td>
<td>-1.298**</td>
<td>-0.888**</td>
</tr>
<tr>
<td></td>
<td>0.509</td>
<td>0.416</td>
</tr>
<tr>
<td>Aggregated Yield</td>
<td>-0.252***</td>
<td>-0.213***</td>
</tr>
<tr>
<td></td>
<td>0.067</td>
<td>0.053</td>
</tr>
<tr>
<td><strong>Nested Logit Correlation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlation among top ranked underwriters (σ)</td>
<td>0.595***</td>
<td>0.507***</td>
</tr>
<tr>
<td></td>
<td>0.153</td>
<td>0.123</td>
</tr>
<tr>
<td>Bond Characteristics</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year Controls</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Currency Fixed Effects</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Regression Diagnostics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-statistic</td>
<td>56.05</td>
<td>66.65</td>
</tr>
<tr>
<td>P-Value</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.499</td>
<td>0.566</td>
</tr>
</tbody>
</table>
Table VI. The demand for underwriter reputation across currencies.
The value of underwriter services ($V_{jmt}$) is the dependent variable. The investor relationships are (i) an indicator for when the underwriter and the currency’s home nations are the same and (ii) the underwriter’s market share in the currency’s domestic market. The underwriter’s global reputation is its Euromoney survey ranking (0 to 20), while the underwriter size is the log of total assets scaled by the mean bond size in the currency in that year. The aggregated fee (yield) variable is the mean (median) fee (yield) of bonds managed by that underwriter in that currency and time. The within-group correlation ($\sigma$) is the estimated level of correlation among top five ranked underwriters while the controls include the mean bond, time and currency fixed effects. Coefficients are estimated using two-stage instrumental variables technique for the fees and within-group correlation, and standard errors are reported in italics. The ***, ** and * denote significance at the 1%, 5% and 10% levels respectively.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Value of Underwriter Service ($\bar{V}_{jmt}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investor Relationships - Underwriter’s local market (1/0)</td>
<td>0.448***</td>
</tr>
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<td></td>
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<tr>
<td></td>
<td>0.084</td>
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<tr>
<td>Investor Relationships - subsidiary’s market share (0-100)</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.004</td>
</tr>
<tr>
<td>Underwriter’s Global Reputation (0-20)</td>
<td></td>
</tr>
<tr>
<td>* Legacy Currencies</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>0.008</td>
</tr>
<tr>
<td>* The Euro</td>
<td>0.091***</td>
</tr>
<tr>
<td></td>
<td>0.010</td>
</tr>
<tr>
<td>* U.S.D.</td>
<td>0.054***</td>
</tr>
<tr>
<td></td>
<td>0.009</td>
</tr>
<tr>
<td>* Yen</td>
<td>0.015</td>
</tr>
<tr>
<td></td>
<td>0.014</td>
</tr>
</tbody>
</table>
| Commonwealth Currencies | -0.007  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.015</td>
</tr>
</tbody>
</table>
| Balance Sheet of Underwriting Bank | 0.182***  
| Direct Costs of Placement |  
| Aggregated Fee | -0.515*  
|                 | 0.305  |
| Aggregated Yield | -0.156***  
|                 | 0.116  |
| Nested Logit Correlation |  
| Correlation among top ranked underwriters (σ) | 0.460***  
|                                             | 0.116  |
| Currency Segment Bond Characteristics | Yes  
| Year Controls | Yes  
| Currency Fixed Effects | Yes  
| Regression Diagnostics |  
| F-statistic | 91.61  
| P-Value | 0.000  
| Adjusted R² | 0.686  |
Table VII. The demand for underwriter reputation in different characteristics of currency segments.

The value of underwriter services ($V^j_{\text{ jint}}$) is the dependent variable. The investor relationships are (i) an indicator for when the underwriter and the currency’s home nations are the same and (ii) the underwriter’s market share in the currency’s domestic market. The Liquidity is the volume of new issues in the currency in that year. The underwriter’s global reputation is its Euromoney survey ranking (0 to 20), while the underwriter size is the log of total assets scaled by the mean bond size in the currency in that year. The Credit Rating is the mean Moody’s credit rating of bonds in the currency in that year while External Certification is the proportion of bonds in the ‘Not Rated’ category. The aggregated fee (yield) variable is the mean (median) fee (yield) of bonds managed by that underwriter in that currency and time. The within-group correlation ($\sigma$) is the estimated level of correlation among top five ranked underwriters while the controls include the mean bond, time and currency fixed effects. Coefficients are estimated using two-stage instrumental variables technique for the fees and within-group correlation, and standard errors are reported in italics. The ***, ** and * denote significance at the 1%, 5% and 10% levels respectively.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Value of Underwriter Service ($V^j_{\text{ jint}}$)</th>
<th>Value of Underwriter Service ($V^j_{\text{ jint}}$)</th>
<th>Value of Underwriter Service ($V^j_{\text{ jint}}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investor Relationships - underwriter’s domestic market (1/0)</td>
<td>0.563***</td>
<td>0.542***</td>
<td>0.725***</td>
</tr>
<tr>
<td></td>
<td>0.106</td>
<td>0.107</td>
<td>0.139</td>
</tr>
<tr>
<td>* Liquidity / Segment Size</td>
<td></td>
<td></td>
<td>-0.819***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.166</td>
</tr>
<tr>
<td>Investor Relationships - domestic capital market share (0-100)</td>
<td>0.011*</td>
<td>0.012**</td>
<td>0.011*</td>
</tr>
<tr>
<td></td>
<td>0.006</td>
<td>0.005</td>
<td>0.006</td>
</tr>
<tr>
<td>Underwriter’s Global Reputation (0-20)</td>
<td>0.125**</td>
<td>0.017*</td>
<td>0.021**</td>
</tr>
<tr>
<td></td>
<td>0.053</td>
<td>0.009</td>
<td>0.009</td>
</tr>
<tr>
<td>* Credit Rating</td>
<td>-0.007**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* External certification</td>
<td></td>
<td>0.038</td>
<td>0.035</td>
</tr>
<tr>
<td>* Liquidity / Segment Size</td>
<td></td>
<td></td>
<td>0.044***</td>
</tr>
</tbody>
</table>
### Balance Sheet of Underwriting Bank

<table>
<thead>
<tr>
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<th>Underwriting Bank</th>
<th>Underwriting Bank</th>
<th>Underwriting Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balance Sheet of Underwriting Bank</strong></td>
<td>0.233***</td>
<td>0.238***</td>
<td>0.232***</td>
</tr>
<tr>
<td>* Liquidity / Segment Size</td>
<td>0.058</td>
<td>0.053</td>
<td>0.055</td>
</tr>
<tr>
<td>* Direct Costs of Placement</td>
<td>0.049</td>
<td>0.031</td>
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</table>

### Direct Costs of Placement

<table>
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<th>Underwriting Bank</th>
<th>Underwriting Bank</th>
<th>Underwriting Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aggregated Fee</strong></td>
<td>-1.650***</td>
<td>-1.437***</td>
<td>-1.642***</td>
</tr>
<tr>
<td><strong>Aggregated Yield</strong></td>
<td>-0.320***</td>
<td>-0.254***</td>
<td>-0.204***</td>
</tr>
</tbody>
</table>

### Nested Logit Correlation

<table>
<thead>
<tr>
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<th>Underwriting Bank</th>
<th>Underwriting Bank</th>
<th>Underwriting Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Correlation among top ranked underwriters (σ)</strong></td>
<td>0.533***</td>
<td>0.550***</td>
<td>0.507***</td>
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</tbody>
</table>

### Bond Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Underwriting Bank</th>
<th>Underwriting Bank</th>
<th>Underwriting Bank</th>
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</thead>
<tbody>
<tr>
<td><strong>Yes</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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### Year Controls

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</thead>
<tbody>
<tr>
<td><strong>Yes</strong></td>
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### Currency Fixed Effects

<table>
<thead>
<tr>
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<th>Underwriting Bank</th>
<th>Underwriting Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Yes</strong></td>
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<td>Yes</td>
<td>Yes</td>
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</table>

### Regression Diagnostics

<table>
<thead>
<tr>
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<th>Underwriting Bank</th>
<th>Underwriting Bank</th>
<th>Underwriting Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F-statistic</strong></td>
<td>50.91</td>
<td>51.68</td>
<td>54.36</td>
</tr>
<tr>
<td><strong>P-Value</strong></td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Adjusted R²</strong></td>
<td>0.397</td>
<td>0.464</td>
<td>0.423</td>
</tr>
</tbody>
</table>
Table VIII. Economic Estimates for the value of investor relationships, reputation and underwriter size.
The table shows the economic value of investor relationships, reputation and size in the different currency segments. The economic values are obtained using coefficient values for each of the underwriter characteristics obtained from Table IV and comparing these to the coefficient estimate of the underwriter fee index in the base regression. The average underwriter fee and total issue volume is obtained from Table I. Figures in italics are not statistically significant.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Underwriting Fee ($US mil)</td>
<td>1.980</td>
<td>3.720</td>
<td>1.680</td>
<td>2.600</td>
<td>0.560</td>
<td>2.200</td>
</tr>
<tr>
<td>Investor relationships [Home Parent]</td>
<td>0.748</td>
<td>1.341</td>
<td>0.144</td>
<td>0.080</td>
<td>1.418</td>
<td>0.857</td>
</tr>
<tr>
<td>Investor relationships [Subsidiaries Δ+10%]</td>
<td>0.178</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δ Reputation [ten ranks]</td>
<td>0.300</td>
<td>0.041</td>
<td>1.240</td>
<td>0.736</td>
<td>0.204</td>
<td>-0.095</td>
</tr>
<tr>
<td>Δ Underwriter Size [1 Std. dev]</td>
<td>0.330</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic value per year (U.S. Dollar mil)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Underwriting Fees ($US mil)</td>
<td>537.32</td>
<td>230.30</td>
<td>363.90</td>
<td>180.95</td>
<td>10.24</td>
<td>97.31</td>
</tr>
<tr>
<td>Investor relationships [Nationality]</td>
<td>202.99</td>
<td>83.02</td>
<td>31.19</td>
<td>5.57</td>
<td>25.93</td>
<td>37.91</td>
</tr>
<tr>
<td>Investor relationships [Subsidiaries Δ+10%]</td>
<td>48.30</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Δ Reputation [ten ranks]</td>
<td>81.41</td>
<td>2.54</td>
<td>268.59</td>
<td>51.22</td>
<td>3.73</td>
<td>-4.20</td>
</tr>
<tr>
<td>Δ Underwriter size [1 Std. dev]</td>
<td>89.55</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Table IX. The robustness tests of underwriter experience, nationality and the correlation structure of preferences.

The value of underwriter services \( (V_{jmt}) \) is the dependent variable. The investor relationships are (i) an indicator for when the underwriter and the currency’s home nations are the same and (ii) the underwriter’s market share in the currency’s domestic market. The Liquidity is the volume of new issues in the currency in that year. The underwriter reputation is the intermediary’s ranking (0 to 20) for underwriting services in the Euromoney survey, while the underwriter size is the log of total assets scaled by the mean issue size. The raw log(underwriter size) is tested in the third robustness equation. The underwriter fee (yield) variable is the mean (median) fee (yield) of each underwriter across markets and time. The fixed-effects estimator for the fee is tested in regression two and described in the Appendix. The within-group correlation (\( \sigma \)) is the estimated level of correlation among top ranked underwriters while the controls include the mean bond, time and currency fixed effects. The yield is also instrumented in the first robustness test. Coefficients are estimated using two-stage instrumental variables technique for the fees and within-group correlation, and standard errors are reported in italics. The ***, ** and * denote significance at the 1%, 5% and 10% levels respectively.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Value of Underwriter Service ( (V_{jmt}) )</th>
<th>Value of Underwriter Service ( (V_{jmt}) )</th>
<th>Value of Underwriter Service ( (V_{jmt}) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underwriter has experience in currency (1/0)</td>
<td>0.483***</td>
<td>0.089</td>
<td></td>
</tr>
<tr>
<td>U.S. Underwriter (1/0)</td>
<td></td>
<td>-0.253**</td>
<td>0.114</td>
</tr>
<tr>
<td>Investor Relationships - underwriter’s domestic market (1/0)</td>
<td>0.410***</td>
<td>0.541***</td>
<td>0.535***</td>
</tr>
<tr>
<td>Investor Relationships - domestic capital market share (0-100)</td>
<td>0.099</td>
<td>0.102</td>
<td>0.118</td>
</tr>
<tr>
<td>Investor Relationships - domestic capital market share (0-100)</td>
<td>0.011**</td>
<td>0.011**</td>
<td>0.013**</td>
</tr>
<tr>
<td>Underwriter’s Global Reputation (0-20)</td>
<td>0.005</td>
<td>0.005</td>
<td>0.006</td>
</tr>
<tr>
<td>Underwriter’s Global Reputation (0-20)</td>
<td>0.006</td>
<td>0.008</td>
<td>0.007</td>
</tr>
<tr>
<td>Balance Sheet of Underwriting Bank</td>
<td>0.216***</td>
<td>0.217***</td>
<td>0.261***</td>
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<tr>
<td>Balance Sheet of Underwriting Bank</td>
<td>0.049</td>
<td>0.054</td>
<td>0.055</td>
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Direct Costs of Placement
<table>
<thead>
<tr>
<th></th>
<th>Aggregated Fee</th>
<th>Aggregated Yield</th>
<th>Nested Logit Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-1.210**</td>
<td>-1.404***</td>
<td>0.555***</td>
</tr>
<tr>
<td></td>
<td>0.483</td>
<td>0.531</td>
<td>0.146</td>
</tr>
<tr>
<td></td>
<td>-1.529**</td>
<td>-0.231***</td>
<td>0.537***</td>
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<td>0.622</td>
<td>0.067</td>
<td>0.155</td>
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<td></td>
<td>-0.234***</td>
<td>-0.265***</td>
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<tr>
<td></td>
<td>0.063</td>
<td>0.076</td>
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</tr>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Correlation among top ranked</td>
<td>0.555***</td>
<td>0.537***</td>
<td></td>
</tr>
<tr>
<td>underwriters (σ)</td>
<td>0.146</td>
<td>0.155</td>
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<tr>
<td>Correlation among local</td>
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<td></td>
<td>0.761***</td>
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<tr>
<td>underwriters (σ)</td>
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<td>0.188</td>
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<td>Currency Segment Bond</td>
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<td>Yes</td>
<td>Yes</td>
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<td>Characteristics</td>
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<td>Yes</td>
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<td>Regression Diagnostics</td>
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<td>F-statistic</td>
<td>64.99</td>
<td>58.74</td>
<td>47.63</td>
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<td>P-Value</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
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<tr>
<td>Adjusted R²</td>
<td>0.5481</td>
<td>0.4776</td>
<td>0.3948</td>
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</table>
Table X. The robustness tests of un-scaled underwriter size, alternate aggregation of the fee (yield) and the instrumentation of the yield.

The value of underwriter services \( (\bar{V}_{jmt}) \) is the dependent variable. The investor relationships are (i) an indicator for when the underwriter and the currency’s home nations are the same and (ii) the underwriter’s market share in the currency’s domestic market. The underwriter’s global reputation is it’s Euromoney survey ranking (0 to 20), while the underwriter size is the log of total assets scaled by the mean bond size in the currency in that year. The un-scaled size is included as the first robustness test. The aggregated fee (yield) variable is the mean (median) fee (yield) of bonds managed by that underwriter in that currency and time. The fixed-effect aggregated fee (yield) are described in the Data Appendix. The within-group correlation (\( \sigma \)) is the estimated level of correlation among top five ranked underwriters while the controls include the mean bond, time and currency fixed effects. Coefficients are estimated using two-stage instrumental variables technique for the fees and within-group correlation, and standard errors are reported in italics. The third robustness test also instruments the aggregated yields. The ***, ** and * denote significance at the 1%, 5% and 10% levels respectively.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Value of Underwriter Service ( (\bar{V}_{jmt}) )</th>
<th>Value of Underwriter Service ( (\bar{V}_{jmt}) )</th>
<th>Value of Underwriter Service ( (\bar{V}_{jmt}) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investor Relationships - underwriter’s domestic market (1/0)</td>
<td>0.447***</td>
<td>0.425***</td>
<td>0.552***</td>
</tr>
<tr>
<td></td>
<td>0.088</td>
<td>0.091</td>
<td>0.105</td>
</tr>
<tr>
<td>Investor Relationships - domestic capital market share (0-100)</td>
<td>0.008*</td>
<td>0.013**</td>
<td>0.013**</td>
</tr>
<tr>
<td></td>
<td>0.005</td>
<td>0.006</td>
<td>0.006</td>
</tr>
<tr>
<td>Underwriter’s Global Reputation (0-20)</td>
<td>0.028***</td>
<td>0.023***</td>
<td>0.022***</td>
</tr>
<tr>
<td></td>
<td>0.005</td>
<td>0.007</td>
<td>0.007</td>
</tr>
<tr>
<td>Balance Sheet of Underwriting Bank (scaled)</td>
<td></td>
<td>0.220***</td>
<td>0.246***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.05</td>
<td>0.06</td>
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<tr>
<td>Underwriter Size (not scaled)</td>
<td>0.104*</td>
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<td>0.246***</td>
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<td></td>
<td>0.054</td>
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</tr>
</tbody>
</table>

Direct Costs of Placement

Aggregated Fee: -0.868** - 1.504**
<table>
<thead>
<tr>
<th>Regression Coefficient</th>
<th>Fixed-Effect Aggregated Fee</th>
<th>Aggregated Yield</th>
<th>Fixed-Effect Aggregated Yield</th>
<th>Aggregated Yield (instrumented)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.422</td>
<td>-1.353**</td>
<td>0.601</td>
<td>0.634</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.224***</td>
<td>0.055</td>
<td>-0.302***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nested Logit Correlation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Correlation among top ranked underwriters (σ)</td>
<td>0.425***</td>
<td>0.549***</td>
<td>0.624***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.131</td>
<td>0.162</td>
<td>0.166</td>
</tr>
<tr>
<td></td>
<td>Currency Segment Bond Characteristics</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Year Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Currency Fixed Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Regression Diagnostics</td>
<td>F-statistic</td>
<td>73.17</td>
<td>63.12</td>
<td>52.48</td>
</tr>
<tr>
<td></td>
<td>P-Value</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Adjusted R²</td>
<td>0.5861</td>
<td>0.5455</td>
<td>0.4332</td>
</tr>
</tbody>
</table>
Table XI. Self-selection among firms and underwriters in the international debt market.

The value of underwriter services ($V_{jmt}$) is the dependent variable. The investor relationships are (i) an indicator for when the underwriter and the currency’s home nations are the same and (ii) the underwriter’s market share in the currency’s domestic market. The underwriter’s global reputation is it’s Euromoney survey ranking (0 to 20), while the underwriter size is the log of total assets scaled by the mean bond size in the currency in that year. The Inverse Mills Ratio (Landa) is calculated from a first stage discrete regression of a choice of a prestigious (top 10) underwriter as in Fang (2005) described in Section 5.2.6. The aggregated fee (yield) variable is the mean (median) fee (yield) of bonds managed by that underwriter in that currency and time. The within-group correlation ($\sigma$) is the estimated level of correlation among top five ranked underwriters while the controls include the mean bond, time and currency fixed effects. Coefficients are estimated using two-stage instrumental variables technique for the fees and within-group correlation, and standard errors are reported in italics. The ***, ** and * denote significance at the 1%, 5% and 10% levels respectively.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Value of Underwriter Service ($V_{jmt}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investor Relationships - Underwriter’s local market (1/0)</td>
<td>0.534*** 0.107</td>
</tr>
<tr>
<td>Investor Relationships - domestic capital market share (0-100)</td>
<td>0.010** 0.005</td>
</tr>
<tr>
<td>Underwriter’s Global Reputation (0-20)</td>
<td>0.024*** 0.006</td>
</tr>
<tr>
<td>Balance Sheet of Underwriting Bank (scaled)</td>
<td>0.226*** 0.053</td>
</tr>
<tr>
<td>Inverse Mills Ratio (Lambda)</td>
<td>1.094** 0.522</td>
</tr>
<tr>
<td><strong>Direct Costs of Placement</strong></td>
<td></td>
</tr>
<tr>
<td>Aggregated Fee</td>
<td>-1.447** 0.588</td>
</tr>
<tr>
<td>Aggregated Yield</td>
<td>-0.243*** 0.068</td>
</tr>
<tr>
<td><strong>Nested Logit Correlation</strong></td>
<td></td>
</tr>
<tr>
<td>Correlation among top ranked underwriters ($\sigma$)</td>
<td>0.622*** 0.171</td>
</tr>
</tbody>
</table>

**Currency Segment Bond Characteristics**
- Yes
**Year Controls**
- Yes
**Currency Fixed Effects**
- Yes

**Diagnostics**
- F-statistic: 52.04
- Adjusted R2: 0.461
Figure 1: Panel A shows the market shares of Eurozone, U.S. and other nationality underwriters in the international debt market for the pre-Euro currencies (1994-1998) and the Euro currency segment (1999-2003). Panel B shows the market shares for the same underwriters for the underwriter fees over the same period and same markets. The market shares are calculated from 1185 non-equity linked fixed-rate international debt instruments issued by non-financial firms and denominated in the legacy currencies (pre 1999) and the Euro (post 1999). In the case of multiple lead underwriters, each lead underwriter is credited with equal share of the issue or fee amount. European Currency Unit (ECU) denominated bonds are excluded due to their ambiguous home nationality classification. Source: Thomsons Deals.
Figure 2: The bar graph shows the average reputation values of U.S. and European underwriters that were active in the pre-Euro (1994-1998) and Euro currency (1999-2003) segments. The dashed line shows the market shares of the top 10 reputation underwriting banks over the same period. The calculations are based on the study sample of fixed-rate international debt instruments issued by corporate firms. Source: Thomsons Deals.
Figure 3: The market shares are calculated for the 90 underwriters in the study sample that were active in the pre-Euro (1994-1998) and Euro (1999-2003) currency segments. The market shares are a proportion of the total issue volume underwritten based on the study sample. Underwriters were ranked in each year based on their balance sheet size. The market shares of the bottom 25%, 25-75% and top 25% percentile groups are reported. Source: Thomsons Deals.
Figure 4: The figure shows the nested logit structure of demand. The upper nest of the choice model is between the top tier (five) underwriters and all other mid to lower ranked underwriters. The second (lower) nest of the choice function is the firm’s choice of a specific underwriter ‘j’.