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Home bias and the need to build a bond market track record

Arthur Krebbers[a], Andrew Marshall[b], Patrick McColgan[c], Biwesh Neupane[d]

Abstract

This paper examines home bias in the primary distribution process of the European corporate bond market. Our approach allows us to study the initial holdings of corporate bonds at a uniquely liquid point in their life cycle. We find that home bias is prevalent across our sample, but is highest amongst bonds issued by firms from both the highest-debt market size economies and lower-debt market sizes economies, who both benefit from relatively large domestic bond markets compared to their funding needs. We argue that international diversification can occur in this market through a life cycle effect where issuers outgrow investor home bias and build a reputation amongst international investors through regular bond market issuance. Our results provide some initial support for this life cycle effect, with repeat issues, issues off an EMTN programme, and highly subscribed issues being associated with lower home bias.

JEL Classification: G23; G24.

Keywords: Tranche allocations; Home bias; Orderbook oversubscription.

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1. Introduction

Obstfeld and Rogoff (2001) state that home bias is one of the major puzzles in international macroeconomics. Home bias in the portfolio choices of investors is the phenomenon where investors overweight their portfolios with domestic equity or debt securities relative to that justified by portfolio theory. Therefore, theoretically, as domestic investors eschew foreign equity or debt, they limit their opportunity to improve their portfolios' risk and return characteristics. Most of the literature has focused on equity home bias and its presence and persistence across countries is largely accepted (Cooper et al., 2012). The existence of home bias in debt markets has also been supported (Campenhout and Vanpée, 2017; Fidora et al., 2007; Liu, 2016; Tesar and Werner, 1995).[1] However, despite its general acceptance and several different plausible explanations put forward the consensus in the literature is that none of these reasons can account for the full extent of home bias (Ardalan, 2019; Sercu and Vanpée, 2007). This encourages further research into home bias in different markets and asset classes, especially as the gains from international diversification can vary noticeably across markets (Rubbaniy et al., 2014).

In this paper, we examine home bias in the Western European investment-grade corporate bond market and consider allocation decisions by examining cross-country institutional differences between bond buyers. We are motivated to study this geographically diverse market as it defies typical explanations of the home bias effect. By offering senior, unsecured claims on well-established and low-credit risk issuers, this bond market should lend itself towards well-diversified

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[1] There is also evidence of the existence of a home bias in banks' lending reactions to adverse liquidity and capital shocks (Giannetti and Laeven, 2011; De Haas and Van Horen, 2013; Presbitero et al., 2014).

investor portfolios (Markowitz, 1991) with little structural home bias (Chan et al., 2005). This should particularly apply in the European Union, where the Prospectus Directive offers a harmonized regulatory framework for investments in EU-listed bond securities.[2] We investigate home bias in thirteen Western European countries with the aim of focusing on the most developed and integrated bond markets within the European market.[3] This investment-grade bond market is also the largest source of funding for corporates (source: Dealogic).

Data on investment-grade bond portfolio decisions is challenging to obtain given that bond investors are arms-length investors who, unlike equity investors, have no statutory duty to report their holdings and are rarely consulted outside of the primary syndication process. We resolve issues with data availability by focusing on primary syndication, a unique point in a bond's life cycle when a range of investors place orders and the bookrunners and issuer determine the initial distribution of bonds. This is increasingly relevant given the growing illiquidity of the secondary bond markets (International Capital Market Association, 2014). Primary syndication is often reported by bookrunners who provide data on the allocations across investor geographies and types (such as insurers, private banks, and fund managers). To the best of our knowledge, we are the first to empirically investigate the allocation drivers of the primary bond market.

Our results show that there is home bias in the Western European investment-grade bond primary market. Tranche allocations are on average 13.72 percentage points higher to domestic investors in comparison to an efficient allocation benchmark of investors pursuing a well-diversified portfolio, weighted by each issuer's country's relative debt market share. This

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[2] For more information, see https://ec.europa.eu/info/business-economy-euro/banking-and-finance/financial-markets/securities-markets/securities-prospectus_en
[3] In the debt market, Eastern European countries are still generally seen as distinct from the Western European and consequently, in practice, they are often grouped under "CEEMEA" (Central Eastern Europe, Middle East and Africa).

benchmark would entail that each investor places a similar proportionate order size (relative to the size of their overall portfolio) and that geographic allocations match the relative size of each country's bond market size. Further findings suggest this is predominantly driven by investor decisions, as transactions where issuers have greater allocation discretion tend to be associated with lower home bias. In an earlier study on equity holdings, Meade and Mann (2002) similarly found evidence of home bias by European investors.

The home bias in bond markets effect is particularly high for issuers from low-debt market size economies, such as Portugal and Greece, and those from in the higher (top)-debt market size economies, including France and Germany. Issuers from mid-debt market economies, including Spain, Belgium, and Ireland, have a lower home bias (2.82% on average). Our data also shows significant cross-country institutional differences between bond buyers. In the UK, we observe higher allocations to fund managers. Amongst French and Italian bond issuers, a larger proportion of bonds are placed with pension funds and insurers. For Germany, we observe a higher allocation with private banks and retails and our "Other" investors grouping, which likely reflects the country's distinctive system of savings banks. The consistency of investor home bias in the top and low-debt economies and the heterogeneity in investor type highlights the pervasiveness of the home bias effect in this bond market.

Although our results generally support home bias, we further investigate the insignificant home bias results of the mid-debt market economies. We suggest that there are limits to home bias as issuers can outgrow investor home bias by developing a bond market track record. This is conceptually similar to Diamond's (1991) life-cycle theory of debt sourcing where firms seek to amass a capital market reputation in order to access the bond markets. Our derivative of this theory focuses on a life cycle effect of issuers building up an international capital market reputation with

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non-domestic bond investors to achieve internationalisation of the investor base in this market. Our data show some support for this pattern, with repeat bond issuers and highly oversubscribed tranches exhibiting lower home bias and less geographically concentrated orderbooks.

Our findings contribute to various areas of research. Firstly, we add to the home bias literature, particularly in debt markets, by examining the European investment-grade bond markets that should not be subject to typical explanations for home bias, such as heterogeneous investor beliefs, additional costs, and barriers to international transactions and information asymmetries. We show that despite the theoretical "level playing field" in this bond market and the clear potential diversification benefits there is evidence of home bias as investors still skew their purchases towards domestic issuers. We argue that international diversification only occurs in this bond market through a life cycle effect of issuers building up an international capital market reputation, and find those higher reputation issues exhibit lower home bias and less geographically concentrated orderbooks. Secondly, our results have implications for the literature on corporate debt sourcing (Denis and Mihov, 2003). We suggest that the size of a firm's national debt market, as well as the size and nature of its domestic investor base, play an important role in shaping the demand for public debt instruments, which in turn is likely to affect the split between public and private debt instruments. Finally, we contribute to the literature that examines new bond issuance (Nikolova et al., 2020). Although a substantial body of literature examines the allocation practices in equity initial public offerings (Jenkinson et al., 2018), there is a lack of evidence on how bonds are allocated among potential domestic and non-domestic investors as well as how severe home bias in the debt market is. Given the growing illiquidity of secondary bond markets (Bao et al., 2011) and the issuers/bookrunners' discretion in bond allocation, initial bond offerings provide us with an opportunity to examine the existence and the extent of home bias in the bond market.

Our research on bond investor demand in the primary market has important implications for corporate treasurers. Understanding the determinants of primary market allocations is important to issuing firms since allocating to the right class of investors is likely to reduce an issuer's current and future bond yields, and enhance the ability to regularly access long term capital (Chaplinsky and Ramchand, 2000; Massa et al., 2013; Massa and Zalkodas, 2014).

The remainder of this paper is structured as follows. Section 2 describes the allocation process for corporate bond tranches. Section 3 describes the data collection process and presents a summary of sample statistics, including the home bias in allocations. In section 4, we explore cross-country differences in home bias and other investor allocation statistics. In section 5, we examine the impact on the home bias of the size of the domestic investor base. Section 6 tests the process by which issuers can outgrow home bias by developing a bond market track record. Section 7 concludes.

2. Allocation process

In this section, we describe the allocation process for corporate bond tranches in the euro-denominated investment-grade corporate bond market, from which our sample is extracted. For almost all issues, the distribution is carried out through an intraday bookbuilding process by a syndicate of investment banks, referred to as bookrunners. Throughout the bookbuilding process, the at-issue size and credit spread are refined to more accurately reflect investor demand in response to feedback during the process. This occurs through a series of intraday updates provided to investors by the salesforce of the bookrunners. Once the final at-issue size and credit spread have been determined, investors typically have 15 to 30 minutes to finalise their level of interest,

which practitioners refer to as "firming up" their orders. After this time, the orderbooks are closed and reconciled between the bookrunners.

The bookrunners then proceed to prepare their allocation recommendations, which can take around two to four hours, dependent on the size of the orderbook. The starting point is typically a pro-rata allocation, meaning that an investor's order is scaled back by the overall level of oversubscription.[4] The bookrunners look to deviate from this for investors who they believe merit over or under-allocation, taking into account any issuer stated preferences, the investor's supportiveness of a transaction[5] as well as their own prior experiences with the investor.[6]

Subsequently, bookrunners submit their proposed allocations to the issuer, who reviews and provides comments, if any. Once these have been implemented, the final signoff is obtained and the allocations are shared with the investors. Shortly afterward the underlying risk-free benchmark rate is set and used to finalise the bond pricing terms, during the so-called "pricing call" between bookrunners and the issuer.

The bookrunners typically discuss the final allocation statistics, being the split per investor geography and investor type, within a few hours after the bond has been priced. Further detail is not provided in consideration of investor confidentiality. Banks ensure that each member of the syndicate signs off on the statistics to avoid any discrepancy in external communication. They will be asked for these data points by financial data providers, such as Informa Global Markets (IGM), who are the main source for our sample.

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[4] By way of example, if we assume a EUR 500m transaction that attracted a EUR 2bn orderbook, i.e. oversubscription level of four times, a pro rata allocation for an investor with a EUR 100m order would be EUR 25m.

[5] Such supportiveness could be through attending the roadshow and providing early feedback around level of interest in the trade and views on pricing.

[6] The implementation of Markets in Financial Instruments Directive (MiFID) II as of the start of 2018 has made this process more formalised, requiring a written record of both an issuer's allocation preferences and the rationale behind the final allocation decisions. See: "Mifid II threatens to turn bond allocation into a minefield", Financial Times, 19th May 2017.

3. Sample

Prior literature on bond holdings is relatively sparse given limited data availability, with only a few studies directly considering the validity of home bias in order and allocation decisions (Cornelli and Goldreich, 2001; Ritter and Zhang, 2007).[7] Massa and Zaldokas (2014) examine investors' bond holdings using Thomson Reuters' eMAXX database, which reports bond holdings for a subset of institutional investors in the secondary market. They show that when international institutional investors hold a high proportion of a firm's existing bonds, issuers are more likely to issue subsequent bonds in the international bond markets and can achieve lower yield spreads when doing so. This paper differs as our sample is on the primary market and therefore is able to provide an overview of holdings across the entire bond investor base, as we are not reliant on a proprietary data set from an investment bank (Cornelli and Goldreich, 2001) or the public reporting of holdings from a specific class of investors (Massa and Zaldokas, 2014; Ritter and Zhang, 2007). The data set we use also has other attractive features for studying home bias as we can consider geographic influences for a relatively homogeneous security across a range of bond issuing countries. In addition, our focus on investment-grade tranches issued by large firms with strong access to credit markets ensures we only consider bond issuers who generally will have discretion in their tranche allocation decisions. Sub-investment grade rated firms are likely to have weaker bond market access, being more dependent on the strength of the market and a smaller bond investor base that is able to purchase them. They, therefore, have less flexibility in targeting their desired investor base.

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[7] Ritter and Zhang (2007) find that affiliated mutual funds receive more shares in hot initial public offerings (IPOs) during the bull market for technology stocks in 1999-2000. Cornelli and Goldreich (2001) find that investment banks award relatively higher equity allocations to domestic investors. This effect is stronger when orderbook demand is low.

Bookrunner reports are collated by IGM, whose Deal Navigator database we consult for the construction of our sample of 915 euro-denominated investment-grade bond issues between 2001 and 2020, allowing us to provide a comprehensive examination of the composition of bond investors. This is a unique database, to our knowledge that has not been used in prior corporate bond market studies. We construct a sample of euro-denominated senior unsecured bond tranches issued by Western European corporates between January 2001 and December 2020. Western Europe is identified to include Austria, Belgium, France, Germany, Greece, Italy, Ireland, Luxembourg, Netherlands, Portugal, Spain, Switzerland, and the UK. We merge data on the terms for each bond reported in Dealogic with bond allocation data from IGM. We outline filters at each stage of sample construction in Table 1.

[Insert Table 1 about here]

Initially, we search Dealogic for all euro-denominated corporate bonds using numerous filters. First, we exclude bonds issued by financial institutions given their unique risk profile. As we examine the factors that affect the primary distribution of bonds across the European markets, we exclude tranches with a more limited placement process. Second, we, therefore, remove tranches that are placed only domestically, tranches that are privately placed, single bookrunner-led, are smaller than EUR 200m, fungible, and with a maturity of less than 1 year.[8] Third, we subsequently remove high yield tranches due to the heightened secrecy associated with the distribution of these types of bonds, reflected in low allocation data availability.[9] Fourth, we also

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[8] Tranches with these types of characteristics are likely to have been sold to a small number of investors and are unlikely to be reflective of the typical pan-European distribution process we examine in this paper.
[9] IGM only had certain allocation statistics available for circa 10% of the universe of European high yield corporate bonds.

remove tranches that are distributed exclusively to retail investors and those sold through a retention system. These exclusion criteria produce a final Dealogic sample of 3,169 tranches.

We next match our Dealogic sample to the IGM Deal Navigator database that reports bond allocation data. An IGM search for euro-denominated corporate bond offerings over our sample period produces an initial sample of 2,284 tranches. Matching with Dealogic produces a joint sample of 1,230 bond tranches. We remove tranches where the sum of geographic or investor type allocations is less than 95% or greater than 105% of the amount issued.[10] Finally, we exclude tranches for which only the geographic or investor type allocation data is available. This produces our final matched IGM and Dealogic sample of 915 bond tranches, representing 28.9% of the universe of euro-denominated corporate bonds. Separate testing shows that the availability of allocation data is associated with companies with a lower credit rating, i.e. more often reported for BBB than AAA-rated tranches. It is also more frequently reported for tranches with a higher at-issue credit spread, higher oversubscription, and those issued off a Euro Medium Term Note ("EMTN") programme – as opposed to issues supported by standalone debt documentation. We do not consider this an impediment to our research as we have sufficient heterogeneity within these variables to assess their impact on allocation skews.

The IGM database typically records data on geographic allocations of bond tranches across regional groups based on geographic proximity, a common language, and cultural heritage. This reflects the tendency of bookrunners to report allocation data at this level. In cases where more granular national-level data is available, we aggregate it across these regional groups for consistency. Allocation statistics are recorded by the IGM database across seven distinct regions:

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[10] Our results are unaffected if we impose a ±1% filter.

Germany, Austria, and Switzerland (GAS); France; UK and Ireland (UK&I); Southern Europe comprising Greece, Italy, Portugal, and Spain (GIPS); the Benelux countries; Scandinavia; and allocations to Other geographies. We calculate the proportion of each tranche issued to domestic investors, based on this regional classification (%Domestic). In addition, we also examine a measure of the dispersion of tranche allocation across geographical regions using a normalized Herfindahl-Hirschman index of allocations across regions (HHI_Geo).

Table 2 presents a geographic breakdown of our sample by the country of an issuer's head office location, split into three panels based on the bond market size measured as the total value of debt outstanding by all issuers in the country in both domestic and international markets. The total debt figure is collected from Bank of International Settlement (BIS) Debt Statistics. France, Germany, the UK, Italy, and the Netherlands are identified as top-debt market economies; Spain, Belgium, and Ireland are classified as mid-debt market economies; and the remaining countries in our sample are classified in the lower-debt markets of Western European economies. 718 (85%) of our sample tranches are by issuers in the top-debt market economies, 71 (8%) tranches from mid-debt market economies and the remaining 64 (7%) tranches are issued by firms in lower-debt market economies. As the largest debt market size, issuers headquartered in these top-debt markets have access to a larger potential pool of investors and bookrunners managing the offer we would expect to have to exert less effort to fill the orderbook. Therefore, any home bias in bond allocations will be stronger in these top-debt market economies.

[Insert Table 2 about here]

In addition to issuer headquarter location, we examine the impact of tranche and firm characteristics on allocations, motivated by an extended version of the preferred habitat view where different investor groups have a preference for securities of varying maturity (Greenwood

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and Vayanos, 2010; Guibaud et al., 2013). We assume that the objectives of different investor types mean that tranche and firm characteristics also affect investor demand and tranche allocation decisions. The tranche characteristics include pricing date, credit rating, maturity (tenor), relative tranche size, credit spread, issue frequency, orderbook oversubscription, and dummy variables for multi-tranche, debut, and EMTN tranches. We control for firm characteristics including leverage, firm size, profitability, intangible assets, growth opportunities, and a dummy for whether the firm is majority government owned. The appendix provides a list of variable definitions and data sources used.

4. Presence of home bias

We begin our investigation of home bias in the bond market through the sample univariate analysis presented in Table 3 (Kang and Stulz, 1997). Panel A includes the summary statistics for geographic bond allocation data. Following the approach of Fidora et al. (2007), our proxy for home bias (%Excess Domestic) is calculated as %Domestic minus %Efficient Domestic (see Appendix for details).[11] %Domestic is the actual allocation to the investor base from the issuer's geographic region of incorporation. The %Efficient Domestic is a benchmark based on a market where all euro-denominated bond investors pursue a geographic diversification strategy, ensuring their relative holdings in debt from a particular country match that country's share of the Western European debt market. Each new primary offering should hence result in a marginal order that matches this relative debt market share, to avoid the investor becoming over or underexposed to a particular geography, and hence be unrelated to an investor's geography. The investor geographic

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[11] In examining %Domestic and %Excess Domestic, our use of region-based rather than national tranche allocation statistics will overestimate the proportion of tranche allocation to the same country, with the exception of French issuers, but it does allow for comparison of the relative magnitude of domestic interest.

allocation split of a new primary issue should hence purely reflect the relative size of each national bond investor base. The mean of %Efficient Domestic is 14.63%.

Our proxy for home bias, %Excess Domestic, is on average 13.72%. This shows domestic investors end up holding an average of 13.72% percentage points more of a bond issued by a local firm in the primary market than would be required for a well-diversified pan-European bond portfolio. This pattern is also evident from %Domestic, the proportion allocated to the issuer's domestic region, where the average of 28.36% is higher than the average debt market size of the largest economic block, the GAS region (26.98%) (average of 2001-2020).

The home bias effect does not appear to be caused by any skews in the geographic make-up of the bond investor base. The results on Panel A also highlight that the largest economic regions are home to the most sizeable bond investor bases, with average tranche allocations to GAS, UK&I, and France being 30.94%, 18.77%, and 25.63% respectively.

[Insert Table 3 about here]

Considering that our sample is exclusively focused on the primary market, it entails that home bias already occurs in the first distribution of a new bond offering, when both investors and issuers have a relatively high degree of agency in their decision making. Investors can determine whether to invest and at what order size, a decision that in the secondary market is constrained by the degree of bond market liquidity (International Capital Market Association, 2014). Issuers can review the orderbook and determine which investor the bonds are initially placed with before they are freely tradeable in the secondary market.

As we have argued the nature of the market, securities, investors, and issuers in our sample should theoretically not lend itself to home bias. The European euro-denominated corporate bond market is governed by centralized regulation and institutions, developed since the early 2000s

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(Harm, 2001), meaning that there are no differential transaction costs between buying a bond from a domestic or a non-domestic European issuer (Glassman and Riddick, 2001). Our sample also consists of covenant-light, unsecured instruments, which are hence straightforward for investors to compare and analyse. The investor base in this bond market is predominantly highly sophisticated and are able to diversify their investments internationally to maximise their investment parameters in terms of risk and return. Therefore, a lack of investment understanding does not appear to be a credible explanation of our findings (Kimball and Shumway, 2010). As shown in the summary statistics by investor type in Panel B, on average more than three-quarters of the bonds in our sample are sold to institutional investors. Fund managers have a mean allocation of 61.80% and Pension Funds and Insurers ("PF&I") 16.88%. Even the third-largest group, private banks and retail ("PB&R") are arguably relatively sophisticated. This grouping is expected to mostly place orders on behalf of high net worth individuals, given that most of the bonds in our sample have an institutional denomination of EUR 100,000+ and are not generally purchased by ordinary retail investors.

As is apparent from Panels C and D showing the tranche and firm characteristics, our sample of investment-grade firms tends to be large and active bond market participants. Mean (median) company assets are reported as EUR 78.07bn (39.64bn), the average credit rating is 7.64 (between A- and BBB+) and the average number of tranches in the sample for a single bond issuer is 18.57. This highlights that these are well-established, low-risk companies and that there should be no significant differences between prospective domestic and international investors in terms of their return expectations or information asymmetries (Lau et al., 2010).

5. Impact on the home bias of the size of the domestic investor base

Having identified potential home bias in our bond sample, we next consider its extent across different European countries. This will help us understand whether the size of an issuer's economy affects home bias. We expect the home bias to be more pronounced for bond issuers from larger economies because they benefit from a more sizeable domestic bond market. This relation should be conditional on the size of an issuer's funding needs and the ability of their domestic bond market to support these.

5.1. Geographic spread of home bias

Table 4 presents the univariate analysis segregating allocations by issuers headquartered in France, Germany, France, the UK, Italy, and Netherlands, mid-debt market and lower-debt market economies. In Panel A.1., we report the geographic concentration for the top-debt market economies. We find that % Excess Domestic is typically higher for the top-debt market economies such as France and Germany with % Excess Domestic of 19.31% and 22.11% respectively. We also find that % Excess Domestic is relatively lower for UK and Italy, and negative for the Netherlands even though their debt market size is large. This could be due to several potential reasons. First, the number of euro-denominated issues is smaller for these countries compared to France and Germany. Furthermore, UK firms issue large amounts of Sterling-denominated corporate bonds, hence, the domestic allocations for Euro-denominated bonds may be relatively low. Second, the size of the economy may also play a major role in the home bias. The size of the economy (measured using GDP) of Italy and the Netherlands is small compared to France and Germany.[12] Third, the international orientation of firms in these countries could also affect %

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[12] If we classify these countries based on their size of GDP, Italy and Netherlands falls in mid-GDP economies.

Excess Domestic. For instance, a small number of very large multinational companies in the Netherlands conduct their business activities outside the Netherlands, hence, they may attract a larger number of international investors, compared to domestic firms without this international presence.[13]

In Panel B.1., we report the geographic concentration for top-debt, mid-debt, and lower-debt market economies. We find that % Excess Domestic is lower for mid-debt market economies compared to top-debt and lower-debt market economies. The mean is 14.56%, 2.82%, and 15.66% for top-debt, mid-debt, and lower-debt market economies. This suggests that home bias has a non-linear pattern, being concentrated in issuance from lower- and top-debt market economies.[14] These results could be due to several potential reasons. First, a possible explanation of this is that issuers from top-debt and lower-debt economies are best able to support their domestic issuers' funding ambitions. Clearly, companies from top-debt market economies benefit from a sizeable volume of domestic investor liquidity and their home bias, and therefore have less need for international diversification of their investor base. Second, although they have a smaller investment base, companies from lower debt economies in our sample are also amongst the least frequent issuers, with each *country* associated with eleven or fewer observations overall, in comparison with the average *issuer* frequency of nineteen as highlighted in Table 3.[15] Therefore, they have less need for broader international debt-market access. Firms from mid-debt economies are more frequent issuers, totalling between 8 to 22 tranches per country in our sample. This would likely require

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[13] We address these issues in our multivariate settings by examining the impact of issuers' track record in the bond market such as number of previous issues, issue frequency, country fixed effects, and % foreign sales.

[14] Additionally, we allocate countries based on their GDP. All countries are allocated to the same tiers except the Netherlands and Switzerland move to mid-debt, and Ireland moves to the lower debt category. This allocation results in 714, 154 and 47 tranches in top, mid and lower debt economies respectively. The % Excess Domestic based on this method is very similar with means of 14,57%, 2.12% and 15.39% top, mid and lower debt economies respectively.

[15] Their tranche issues are also typically smaller than those of issuers from mid- and top-debt countries.

them to rely more on international investor support given the limited domestic investor base in these mid-tier debt market sizes.

5.2.Geographic spread of investor types

The inter-country analysis also allows us to examine possible alternative explanations for home bias based on bond investor type. We present the geographical spread based on investor types in Panel A.2 and Panel B.2 of Table 4. Although fund managers have the highest percentage in each country, the top-debt countries in our sample have marked differences in the type of investors that buy their issuers' bonds, reflecting the institutional nature of each country's investor base. Italian and UK firms tend to allocate a relatively higher portion to fund managers, with a subsample mean of 67.50% and 64.91% in comparison to 58.32% and 61.51% for Germany and France respectively. French firms are associated with more sizeable PF&I allocations, an average of 20.75%. This can potentially be explained as France is home to a relatively large insurance industry (Borisova et al., 2015). Finally, German firms allocate a relatively larger amount of their bond tranche to PB&R and Other investor type groupings, with these categories constituting on average 15.68% and 5.76% of their bond offerings. As Germany is within the GAS region, the PB&R allocations likely incorporates a high amount of Swiss private bank interest. In addition, the large "Other" group includes Germany's distinct regional public banks, the Landesbanken and the Sparkassen (Höwer, 2016).[16] Despite these differences in the investor types in these countries, the

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[16] Milosevic (2017) finds that the French venture capital market experiences significant political interference in its investment decisions. We expect this effect to hold true for larger institutional investors, such as pension funds and insurers that partly manage state assets (such as civil servant pension). France's insurance industry's investment portfolio as a proportion of the country's GDP was 102.3% for 2015. This is the second largest ratio in Europe and compares to a continent-wide average of 60% (source: Insurance Europe, 2014). Switzerland has the world's largest private banking / wealth management sector, managing USD 2 trillion assets as of year-end 2015 (source: Deloitte, 2015). In Germany, the distinct public banking sector of *Sparkassen* and *Landesbanken* account for 26% of the company's banking assets (source: European Banking Federation). See Baltzer et al. (2015) for further information on equity home/local bias among German investors.

results in Panel B of Table 4 show that there does not appear to be one investor type more amenable to home bias providing new evidence of home bias in the bond market.

For mid-tier debt market firms, where we do not observe home bias. Panel B.2 supports the view that they are able to source orders from fund managers from other European economies. For instance, the mean allocation of Spanish, Belgians, and Irish samples to fund managers is 63.45%, 69.63%, and 75.62% respectively, significantly higher than issuers from top-debt and lower-debt market economies.

[Insert Table 4 about here]

6. The process of outgrowing domestic bond market

Our results thus far indicate that home bias appears to be related to the size of the domestic investor base relative to that of the local corporate sector. In this section, we consider a potential explanation of the process by which a firm "outgrows" its domestic bond market. The theory we posit is conceptually similar to Diamond's (1991) life-cycle theory of debt sourcing where firms seek to amass a capital market reputation in order to access the bond markets. Cantillo and Wright (2000) and Hale and Santos (2008) find evidence in support of this theory in the debt market. Using a dataset of bond and bank loan issuance from 291 US companies between 1975 and 1992, Cantillo and Wright (2000) analyse the probability a company will issue a bond rather than a bank loan. Their regressions include an asymmetric threshold dummy which captures all repeat bond issuers. They find that this variable is positive, implying that established bond market issuers are more likely to be able to re-access the bond markets. This suggests that bond investors are more comfortable investing in existing as opposed to new bond issuers. Likewise, Hale and Santos (2008) investigate the timing of firms' issuance of the bond and find that firms that establish a

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reputation enter the public bond market earlier. We focus on the build-up of a reputation with non-domestic bond investors to achieve internationalisation of the investor base.

Thus, extending Diamond's (1991) life-cycle theory, we hypothesize that the new bond issuers will exaggerate the home bias as they would allocate their bond predominantly to domestic investors. We argue that this relationship could be driven by two forces. First, first-time bond issuers generate greater value from their existing banking relationships compared to seasoned issuers (Yasuda, 2005; Pour, 2017), and as a result, distribute bonds to domestic investors with whom they may already enjoy a track record as a counterparty through existing business relationships. Second, first-time bond issuers are considered to be informationally opaque compared to repeat issuers (Fenn, 2000), which could discourage non-domestic investors to participate in the bond issuance.

Moreover, non-domestic issuers also lack such a track record with the domestic investors and they will hence be more reluctant to invest in debut issues from foreign firms. Following the first issuance, the bond issuer can build up an international bond market track record through conducting the necessary payments and reporting obligations. This strengthening reputation helps overcome international investor's home bias, allowing the firm to more easily access such non-domestic investors over time. Subsequent bond issuances will be characterized by less geographically concentrated orderbooks, allowing them to allocate more bonds to non-domestic investors (Massa and Zaldokas, 2014).

This hypothesized life cycle effect has a number of implications for this paper. Firstly, it suggests that excess domestic investor allocations are greater for new issuers. Secondly, it implies that excess domestic investor allocations are negatively related to bond issuance frequency. Thirdly, it suggests a negative relation between orderbook oversubscription and excess domestic

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investor allocations. The subsequent subsections test these arguments through further multivariate analysis.

6.1. Bond market track record

We assess the validity of the first two implications of the life cycle effect on non-domestic bond investor allocations using the number of previous issues, issue frequency, and the EMTN programme dummy (Yasuda, 2005). The latter can be considered an alternative variable for whether the firm is a regular bond issuer due to the economies of scale associated with setting up this type of issuance programme.[17]

In Table 5, we present the results of an ordinary least squares regression on tranche allocations by investor geography. Models 1 to 4 present results for our two variables for orderbook geographic concentration, HHI_Geo and %Domestic, and Models 5 and 6 show the results for our proxy for home bias, %Excess Domestic. In Models 1, 3, and 5 we examine the number of previous issues and in Models 2, 4, and 6, we examine the issue frequency. In all models, we incorporate EMTN dummy. We also individually segregate each top-debt country and group low-debt countries together. These models compare such geographic groupings to mid-debt countries, where we do not observe home bias in our univariate analysis.[18] The other explanatory variables include all our issuer and tranche variables. We include sector dummies and cluster standard errors at the firm-level. All these variables are defined in the Appendix.

[Insert Tables 5 about here]

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[17] Practitioners inform us associated costs of establishing an EMTN programme are typically EUR 100,000 or more, rendering this only suitable for firms who issue at least twice a year.
[18] We also use country fixed effects and the results are qualitatively and quantitatively similar. For brevity, we do not report these results but are available from authors upon request.

The findings show some support for our arguments. Models 1-2 show that neither of our three main variables affects the HHI_Geo suggesting the track record of issuers in the bond market does not affect investors' concentration. In Model 3, we find a significant negative impact (weakly at 10% level) of the number of previous issues on % Domestic. Economically, a one-standard-deviation decrease in number of previous issues results in 1.32% points higher allocation to domestic investors. This suggests that new issuers allocate more bond tranches to domestic investors escalating the home bias. The results in Model 4 provide additional support to our argument. The issue frequency is also significantly negatively (at 5 % level) related to % Domestic allocation. Economically, a one-standard-deviation increase in issue frequency decreases domestic allocation by 2.16% points. These results suggest that as issuers built a track record and reputation as frequent issuers, they are able to attract non-domestic investors which ultimately overcomes the home bias. Similarly, in Model 5, we find a negative relation between the number of previous issues and % Excess Domestic (at 5% level), and in Model 6, we again find a negative relation between the issue frequency and % Excess Domestic (at 5% level). Economically, a one-standard-deviation decrease in number of previous issues results in excess allocation of 1.42% points to domestic investors, whereas a one-standard-deviation increase in issue frequency results in 2.02% points reduction in excess allocation to domestic investors. Combined, these results suggest that building a bond market track record help issuer overcome the home-bias and attract non-domestic investors to participate in their debt issuance.[19]

With regards to geographic explanatory variables, these corroborate our earlier findings that home bias is higher for top-debt market economies such as France, Germany, and the UK and

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[19] We also run this regression where we allocate countries based on their GDP as discussed in footnote 14. The results are quantitatively similar to Table 5 (available from the authors on request).

lower-debt market countries (at 1% level).[20] We also find that home bias and geographic concentration is higher for majority government-owned firms (positive at the 10% or 5% level in all models). This suggests that political pressure could help permeate home bias, with governments potentially encouraging bond investors to support their domestic economy by buying domestic bonds.

6.2. Issuer allocation flexibility

We now relate bond oversubscription levels to investor allocations to examine the third implication of the "life cycle" effect on non-domestic bond investor allocations, namely that home bias is negatively related to oversubscription. To examine this, we split our sample between issues with high and low levels of oversubscription based on the sample median of 3.80x. Inter-group differences in home bias and geographic concentrations are reported in Table 6. The results support our expectation that domestic allocations are lower when demand is high, and the differences are statistically and economically large. The mean (median) excess allocation to domestic investors is 11.60% (10.83%) for highly oversubscribed tranches and 14.99% (13.79%) for issues with low oversubscription levels. We observe a similar relation for %Domestic and HHI_Geo.

This suggests that home bias is not predominantly driven by issuers' innate preference towards domestic investors – i.e. through established relationships or a sense of loyalty. They actively seek to widen their following through building a bond market track record; having achieved broad-based international demand, i.e. an oversubscribed offering, they seek to allocate a sizeable portion of the bond away from their early domestic backers.

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[20] The UK variable is positively related to domestic allocation but not significantly related to excess allocation. This likely reflects the exclusion of sterling-denominated bond tranches. We re-examine our analysis excluding UK sample and find similar results. For brevity, we do not report the results but is available from authors upon request.

7. Conclusion

In this study, we examine the heterogeneity of investors in the primary corporate bond market to investigate the prevalence and drivers of home bias in this market. We study the factors that determine the geographical and investor type allocation for a sample of 915 euro-denominated investment-grade bond tranches issued by Western European firms between 2001 and 2020. We collect allocation data from IGM Deal Navigator.

Our results show evidence of home bias in this market with tranche allocations higher to investors from the domestic geographic region. We find that this phenomenon is non-linearly related to debt market size. The proportion of domestic allocations is higher for firms from top and lower-debt market economies than for mid-debt market economies. Therefore, having outgrown their bond investor base they are forced to actively target non-domestic investors.

We argue that international diversification can occur in this bond market when issuers overcome home bias through a life cycle effect whereby, they build up a reputation amongst international investors through regular bond market issuance. Following their new bond issuance, firms gradually build up a reputation with nondomestic bond investors through making the necessary repayments on their outstanding bonds. As they become more frequent issuers, they can attract more non-domestic investor demand, allowing them to allocate to a wider investor base. Our results are broadly consistent with this life cycle effect with issues frequent issues and highly oversubscribed issues all being characterised by lower home bias.

Finally, our results show how an issuing firm's home country influences the investor type composition of its bond allocations. French issuers place a higher proportion of their bond tranches

with PF&I investors, UK issuers with fund managers, and issuers from GAS rely more on PB&R investors.

Given the growing illiquidity of the secondary bond market, our paper sheds important light on the overall make-up of the bond investor base in the primary market. Post the recent global financial crisis this arm's length market is becoming an increasingly critical source of funding for corporate treasurers. Our findings highlight the structural fragmentation of the bond market and the need to diligently build a capital market reputation to outgrow one's domestic bond investor base.

Our findings also have important implications for corporate treasurers. They should take a long-term view of bond market issuance, seeking to become a recurring issuer and communicating their intention to do so to the market. This will help them build a reputation with more non-domestic investors and thereby enhance their debt-market access.

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Table 1

Sample construction

The table outlines sample construction for a sample of 915 euro-denominated public bond tranches during 2001-2020 made by 266 Western European firms where data is collected from Dealogic and IGM Deal Navigator.

Filter	Number of firms lost	Sample size
Dealogic sample		3,169
IGM Deal Navigator euro-denominated tranches		2,284
Less:		
Tranches not covered by Dealogic	1054	
Tranche allocation adds to < 95% or > 105% of amount issued	216	
Only investor type or geographic allocation of tranches available	99	
Matched Dealogic and IGM Deal Navigator Sample		915

Table 2
Breakdown of sample of 915 bond observations by issuer parent nation

The table reports the number of bond issues with available data on investor allocations by issuer's country of incorporation. Total Debt statistics are obtained from the BIS Debt Securities Statistics and quoted in USD million. We use the outstanding debt figure for all issuers in both domestic and international markets.

	No. Obs. (%)	Total Debt Market 2002 (% of total)	Total Debt Market 2020 (% of total)
Panel A: Top-Debt market economies			
France	297 (32.46)	5.37 (15.96)	20.57 (18.54)
Germany	253 (27.65)	8.22 (24.43)	15.77 (14.21)
United Kingdom	115 (12.57)	6.66 (19.79)	26.24 (23.64)
Italy	49 (5.36)	5.48 (16.28)	13.55 (12.21)
Netherlands	66 (7.21)	2.67 (7.94)	20.57 (18.54)
Panel B: Mid-Debt market economies			
Spain	38 (4.15)	1.47 (4.36)	8.58 (7.73)
Belgium	22 (2.40)	1.28 (3.82)	3.19 (2.88)
Ireland	11 (1.20)	NA	3.65 (3.29)
Panel C: Lower-Debt market economies			
Switzerland	28 (3.06)	0.58 (1.73)	2.2 (1.98)
Austria	20 (2.19)	0.91 (2.70)	2.22 (2)
Portugal	9 (0.98)	0.35 (1.03)	1.29 (1.16)
Luxembourg	4 (0.44)	0.27 (0.81)	3.91 (3.53)
Greece	3 (0.33)	0.39 (1.16)	0.44 (0.4)

Table 3

Summary statistics

The table presents summary statistics for bond, firm, bookrunner, and allocation statistics for a sample of 915 euro-denominated investment-grade bond tranches issued by 266 Western European firms over the period 2001-2020. The sample is constructed by matching bonds available in Dealogic with allocation statistics provided by IGM Deal Navigator. All variables are defined in the Appendix.

	Obs.	Mean	St. Dev	Low	Median	High
Panel A: Allocation by investor geography						
HHI_Geo	915	0.24	0.11	0.03	0.24	0.94
%Domestic	915	28.36	18.29	0.00	29.00	89.00
%Efficient Domestic	915	14.63	5.76	0.40	15.86	24.76
% Excess Domestic	915	13.72	16.91	-24.11	12.55	73.58
%Germany, Austria and Switzerland	915	30.94	13.57	0.00	29.00	97.00
%UK & Ireland	915	18.77	10.62	0.00	17.00	57.00
%France	915	25.63	14.47	0.00	23.00	89.00
%Benelux	915	8.45	5.81	0.00	8.00	41.00
%Scandinavia	915	0.88	2.30	0.00	0.00	24.00
%Southern Europe	915	6.20	6.92	0.00	5.00	53.00
%Other geographies	915	8.77	7.38	0.00	7.00	54.00
Panel B: Allocation by investor type						
HHI_Type	915	0.45	0.12	0.12	0.45	0.87
%Central banks	915	4.20	6.55	0.00	0.00	39.00
%Fund managers	915	61.80	14.19	0.00	64.00	92.00
%Pension funds and insurers	915	16.88	10.79	0.00	15.00	76.00
%Private banks and retail	915	11.82	9.99	0.00	9.00	75.00
%Corporate treasuries	915	0.46	1.75	0.00	0.00	23.00
%Hedge funds	915	0.57	4.82	0.00	0.00	74.00
%Other types	915	3.9	7.43	0.00	2.00	93.00
Panel C: Tranche characteristics						
# of previous issues	915	3.34	2.79	0.00	0.00	3.00
Frequency	915	18.57	16.40	1.00	14.00	74.00
EMTN	915	0.79	0.41	0.00	1.00	1.00
Credit rating	915	7.64	2.10	2.00	8.00	11.00
Maturity/Tenor	915	7.85	3.31	1.51	7.01	20.10
Tranche Size / Total assets	810	0.03	0.04	0.00	0.02	0.37
Multi-tranche	915	0.46	0.50	0.00	0.00	1.00
Credit spread	883	1.09	0.85	-0.10	0.82	6.00
Oversubscription	875	4.17	2.52	1.10	3.80	22.00
Panel D: Firm characteristics						
Leverage	810	0.31	0.15	0.00	0.29	0.84
Government owned	915	0.05	0.22	0.00	0.00	1.00
Size (Total assets)	810	78.07	126.84	1.13	39.64	2004.61
Profitability	801	0.11	0.05	-0.05	0.10	0.40
Intangible assets	801	0.70	0.21	0.04	0.71	1.00
Growth opportunities	798	1.87	0.78	0.81	1.68	6.56
% Foreign sales	810	54.28	35.53	0.00	64.06	171.02

Table 4

Tranche allocations by issuer home country

Univariate analysis of tranche allocations partitioned by headquarter location of the issuing firm for a sample of 915 euro-denominated public bond tranches made by 266 Western European firms during 2001-2020. All variables are defined in the Appendix. ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively for an Anova test of difference in mean allocations and a Kruskal-Wallis test of difference in median allocations across issuer location groups.

Panel A. Top Debt Market Economies

	France (297)		Germany (253)		UK (115)		Italy (49)		Netherlands (66)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
A.1. Geographic concentration										
HHI_Geo	0.24	0.24	0.28	0.26	0.22	0.23	0.13	0.10	0.21	0.23
%Domestic	36.43	35.00	37.74	36.00	24.20	23.00	15.68	13.00	4.48	0.00
%Excess Domestic	19.31	17.24	22.11	21.14	1.80	0.04	2.00	-0.93	-4.25	-8.49
A.2. Investor type										
HHI_Type	0.45	0.45	0.45	0.45	0.47	0.46	0.45	0.43	0.43	0.44
%Central banks	4.27	0.00	5.12	2.00	3.26	0.00	1.39	0.00	6.11	1.50
%Fund managers	61.51	63.00	58.32	61.00	64.91	67.00	67.50	67.00	60.27	61.00
%Pension funds and insurers	20.75	18.00	12.42	11.00	17.06	15.00	14.57	14.00	18.87	17.50
%Private banks and retail	9.76	8.00	15.68	12.00	9.17	7.60	12.45	13.00	10.42	8.00
%Corporate treasuries	0.27	0.00	0.77	0.00	0.42	0.00	0.00	0.00	0.68	0.00
%Hedge funds	0.27	0.00	1.38	0.00	0.06	0.00	0.73	0.00	0.29	0.00
%Other types	3.03	2.00	5.76	2.00	3.97	2.00	3.34	2.00	2.98	2.00

Table 4 (continued)

Panel B. Tier-wise Debt Markets

	Top-Debt Market Economies (780)		Mid-Debt Market Economies (71)		Lower-Debt Market Economies (64)			
	Mean	Median	Mean	Median	Mean	Median	Anova	Kruskal-Wallis
B.1. Geographic concentration								
HHI_Geo	0.24	0.24	0.20	0.21	0.24	0.24	8.05***	20.703***
%Domestic	31.05	31.00	8.69	0.00	17.36	8.00	44.72***	46.771***
%Excess Domestic	14.56	13.95	2.82	-2.64	15.66	6.02	39.78***	313.99***
B.2. Investor type								
HHI_Type	0.45	0.45	0.49	0.48	0.44	0.44	3.38**	2.99
%Central banks	4.37	0.00	3.07	0.00	3.33	0.00	0.38	2.20
%Fund managers	61.25	64.00	67.25	69.00	61.56	63.50	5.77***	5.87*
%Pension funds and insurers	16.96	15.00	16.33	15.00	16.34	13.50	0.64	1.44
%Private banks and retail	11.82	9.00	9.85	8.00	13.88	12.00	2.96*	9.48***
%Corporate treasuries	0.47	0.00	0.31	0.00	0.44	0.00	0.88	0.97
%Hedge funds	0.63	0.00	0.31	0.00	0.11	0.00	0.55	0.77
%Other types	4.07	2.00	2.60	2.00	4.19	3.00	2.45*	9.35***

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Table 5

OLS regressions of tranche allocations by investor geography

The table represents OLS regressions where the dependent variable is a measure of tranche allocation by investor geography for a sample of euro-denominated public bond tranches issued during 2001-2020. All variables are defined in the Appendix. *t*-statistics based on standard errors clustered at the firm level are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively.

	HHI_Geo		% Domestic		% Excess Domestic	
	(1)	(2)	(3)	(4)	(5)	(6)
# of Previous Issues	-0.001		-0.473*		-0.510**	
	(-0.921)		(-1.961)		(-2.101)	
Frequency		0.000		-0.132**		-0.123**
		(0.167)		(-2.463)		(-2.353)
EMTN	-0.012	-0.013	-0.433	0.053	0.165	0.606
	(-1.027)	(-1.069)	(-0.239)	(0.029)	(0.090)	(0.329)
Low Debt Countries	0.002	0.004	12.975***	12.425***	17.181***	16.748***
	(0.104)	(0.194)	(3.806)	(3.550)	(5.251)	(5.002)
France	0.017	0.018	26.864***	26.260***	15.643***	15.123***
	(1.196)	(1.214)	(10.874)	(10.504)	(6.746)	(6.434)
Germany	0.059***	0.060***	30.871***	31.656***	20.813***	21.574***
	(3.319)	(3.307)	(11.971)	(12.332)	(8.317)	(8.536)
United Kingdom	0.006	0.007	17.556***	16.706***	0.901	0.134
	(0.374)	(0.420)	(6.904)	(6.598)	(0.368)	(0.055)
Italy	-0.038**	-0.038**	5.174*	4.715	-2.251	-2.671
	(-2.556)	(-2.510)	(1.742)	(1.631)	(-0.800)	(-0.973)
Netherlands	-0.053***	-0.051**	-3.485	-4.195	-6.445**	-7.028***
	(-2.631)	(-2.469)	(-1.320)	(-1.601)	(-2.525)	(-2.795)
BBB rated	0.093***	0.093***	1.493	0.498	2.161	1.231
	(4.333)	(4.446)	(0.497)	(0.164)	(0.738)	(0.413)
AA rated	0.012	0.012	-3.393**	-4.015***	-3.327**	-3.936***
	(1.055)	(1.009)	(-2.297)	(-2.656)	(-2.267)	(-2.626)
3-4.9 years	-0.025**	-0.025**	0.786	0.841	0.254	0.311
	(-2.059)	(-2.067)	(0.495)	(0.523)	(0.150)	(0.181)
5-6.9 years	-0.004	-0.004	1.849	1.999*	1.670	1.834
	(-0.487)	(-0.437)	(1.541)	(1.657)	(1.411)	(1.544)
10 or more years	0.014*	0.013*	1.882*	1.750*	1.874*	1.739*
	(1.753)	(1.720)	(1.772)	(1.659)	(1.774)	(1.663)
Tranche size/Total assets	-0.001	0.030	28.136	28.555	32.065	33.871
	(-0.004)	(0.194)	(1.249)	(1.311)	(1.465)	(1.595)
Multi-tranche	-0.006	-0.007	-3.045**	-2.561*	-2.653**	-2.216
	(-0.758)	(-0.815)	(-2.303)	(-1.886)	(-1.990)	(-1.623)

Credit spread	-0.021***	-0.021***	0.365	0.532	0.319	0.478
	(-3.845)	(-3.899)	(0.453)	(0.692)	(0.409)	(0.638)
Leverage	0.029	0.025	1.593	0.490	1.256	0.030
	(0.859)	(0.746)	(0.252)	(0.094)	(0.215)	(0.006)
Government owned	0.084**	0.080**	7.362*	7.804**	7.642*	7.866**
	(2.560)	(2.390)	(1.828)	(1.996)	(1.912)	(2.002)
Size (Ln Total assets)	0.000	0.000	-0.006	-0.006	-0.005	-0.006
	(0.913)	(0.608)	(-1.196)	(-1.383)	(-0.928)	(-1.132)
Profitability	-0.367**	-0.358**	33.023**	32.257*	29.933*	29.622*
	(-2.569)	(-2.521)	(2.021)	(1.934)	(1.817)	(1.769)
Intangible assets	0.004	0.005	5.865*	6.901**	4.967	6.009*
	(0.180)	(0.238)	(1.718)	(2.180)	(1.462)	(1.888)
Growth opportunities	0.040***	0.040***	-4.256***	-4.378***	-3.995***	-4.131***
	(4.341)	(4.335)	(-3.819)	(-3.844)	(-3.542)	(-3.565)
% Foreign Sales	0.006	0.005	0.454	-0.067	0.153	-0.377
	(0.395)	(0.344)	(0.193)	(-0.031)	(0.066)	(-0.174)
Constant	0.180***	0.174***	9.265	10.664	3.929	4.997
	(4.609)	(4.295)	(1.362)	(1.579)	(0.582)	(0.747)
Likelihood ratio for country variables ($\chi2$)	76.82***	70.60***	350.21***	359.28***	264.88***	274.25***
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	761	761	761	761	761	761
Adjusted R-squared	0.352	0.352	0.470	0.474	0.406	0.408
F stat	14.807***	14.404***	25.671***	24.658***	17.106***	16.481***

Table 6

Tranche allocations by investor geography conditioned on orderbook oversubscription

The table represents a univariate comparison of geographic allocations conditional on oversubscription. Low Oversubscription tranches are identified as those with Oversubscription of less than or equal to the sample median of 3.80x. High Oversubscription tranches are identified as those with Oversubscription greater than the sample median of 3.80. All variables are defined in the Appendix. t-statistics (for mean) and z-statistics (for median) are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels respectively.

Variable	HHI_Geo			% Domestic			%Excess Domestic		
	High Oversubscription		Low Oversubscription	High Oversubscription		Low Oversubscription	High Oversubscription		Low Oversubscription
Mean	0.21	4.91***	0.26	24.37	2.97***	29.67	11.60	3.10***	14.99
Median	0.22	4.73***	0.25	22.00	2.94***	31.00	10.83	2.97***	13.79

Appendix

Variable definitions

The table presents variable definitions for allocation, tranche, firm, demand and bookrunner characteristics for a sample of 915 euro-denominated public bond tranches made by 266 Western European firms during 2001-2020.

Variable	Calculation	Source
Panel A: Allocation characteristics		
Geographic split	Allocation percentages to i) Germany, Austria and Switzerland, ii) UK & Ireland, iii) France, iv) Benelux, v) Scandinavia, vi) Southern Europe and vii) Other geographies.	IGM Deal Navigator
HHI_Geo	The normalized Herfindahl-Hirschman index of allocations by investor geography.	IGM Deal Navigator
%Domestic	Allocation percentage to geographic region encompassing issuer's country of incorporation.	IGM Deal Navigator
%Efficient Domestic	Bond issuer home geographic region (based on country of incorporation) outstanding debt securities issuance in domestic and international market divided in a year by total Western European outstanding debt securities issuance in domestic and international market in a year.	BIS
%Excess Domestic	%Domestic minus %Efficient Domestic	IGM Deal Navigator, BIS
Type split	Allocation percentages to i) Central banks, ii) Fund managers, iii) Pension funds and insurers, iv) Private banks and retail, v) Corporate treasuries, vi) Hedge funds and vii) Other types.	IGM Deal Navigator
HHI_Type	The normalized Herfindahl-Hirschman index of allocations by investor type.	IGM Deal Navigator
Panel B: Tranche characteristics		
# of previous years	The number of euro-denominated bond tranches issued in previous years by the issuer. The first euro-denominated bond tranche issued is set at 0 and bond tranches are grouped by year.	Dealogic
Frequency	Total number of tranches issued by the borrowing firm, as covered by Dealogic, during the sample period.	Dealogic
Euro Medium Term Note (EMTN)	Dummy variable equal to one if the bond is issued off a euro-median term note program, and zero otherwise.	Dealogic
Credit rating	The numeric value for the S&P rating assigned to the bond tranche on the issue date, ascending from 1 for AAA to 10 for BBB- and 11 for unrated tranches. In regression models, we dummy variables for the ratings.	S&P
Maturity (Tenor)	The tenor of the tranche in years.	Dealogic
Relative tranche size (Tranche size / Total assets)	The amount issued divided by book value of total assets for the issuing firm.	Dealogic
Credit spread	At-issue yield to maturity minus the benchmark euro midswap rate for the equivalent tenor.	Dealogic, Bond prospectus
Oversubscription	The aggregate orderbook size divided by the amount issued.	GlobalCapital, IFR
Multi-tranche	Dummy Variable equal to one if the issuer sells two or more tranches in the same currency on the same day, and zero otherwise.	
Panel C: Firm characteristics		
Leverage	Book value of total debt divided by total assets.	Datastream
Size (Total assets)	Book value of total assets in EUR billions.	Datastream
Profitability	Earnings before interest, taxes, depreciation and amortization (EBITDA) divided by book value of total assets.	Datastream

Intangible assets	One minus the ratio of net property, plant, and equipment divided by the book value of total assets.	Datastream
Growth opportunities	Book value of total assets plus market value of equity minus book value of equity, divided by the book value of total assets.	Datastream
Government owned	Dummy variable equal to one if 50% or more of the firm's shares are owned by government agencies, and zero otherwise.	Capital IQ
% Foreign Sales	Total foreign sales scaled by net sales	Datastream
Headquarter location (Economy size)	Dummy variables for issuers headquartered in top-debt economies (France, Germany, UK, Italy, and Netherlands), mid-debt economies (Spain, Belgium, Ireland) and lower-debt economies (Switzerland, Austria, Portugal, Luxembourg, and Greece) within Western Europe.	Dealogic, Company reports