Corporate Credit Conditions Around the World: Novel Facts Through Holistic Data*

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Abstract

We collect comprehensive granular data on various aspects of firms' access to credit markets. We document ten facts that show that inferring credit conditions for new debt from those for existing debt – and vice versa – leads to erroneous conclusions. Secondary market spreads are poor proxies of the cost of new debt. Investment grade issuance is driven by firms' own secondary market spreads, while high yield issuance responds to macroeconomic conditions. Bond issuances overstate changes in firm indebtedness. Emerging market bond and loan borrowing is complementary for firms with access to both markets, but borrowing of loan-only firms appears disconnected.

JEL codes: F23, F30, G12, G15, G30

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1 Introduction

The decade and a half since the global financial crisis (GFC) has seen a rapid increase in marketable debt securities around the globe.[1] This rise of the share of non-financial corporate firm financing provided by potentially flighty and less-regulated non-bank financial intermediaries through international debt markets creates financial vulnerabilities for borrowers in the countries receiving the debt financing. Country-level aggregate data may not accurately reflect such vulnerabilities engendered through debt market borrowing as individual firms' exposures may be hidden when the borrowers are concentrated in a particular part of the firm population or when firms use foreign subsidiaries to raise debt market financing. Moreover, exposed firms may differ in the levels of maturity, currency, and liquidity mismatch taken on through bond issuance.

With these considerations in mind, the academic literature has increasingly focused on using granular data for capturing credit market conditions over time and across countries. Yet measuring aggregate credit market conditions from granular data requires taking a stand on what is the "right" measure of average credit conditions in a country. In other words, in using micro data to learn about aggregate credit conditions, we have to consider which issuances characterize local credit conditions, which credit spreads better capture costs of new debt, and to what extent new debt issuances contribute to firm vulnerabilities. In this paper, we document ten novel facts on these three broad aspects of aggregate credit conditions.

We start by exploring which credit spreads – those measured from primary or secondary market prices – better capture costs of new debt. While the literature has mostly focused on understanding secondary market credit spreads, secondary market prices may not accurately capture the cost of debt from the perspective of the issuing firm. We show that

[1] For example, Aldasoro, Hardy, and Tarashev (2021) show that international debt securities of non-financial corporate issuers from advanced economies grew from 3.9% to 6.8% of GDP between 2009 and 2020, while the international debt securities of non-financial corporate issuers from emerging market economies grew from 1.2% to 2.2% of GDP over the same time period. See also the time series of issuance in Figure 1.

investment grade firms time issuance to take advantage of lower firm-level secondary market credit spreads, and their newly issued bonds earn an on-the-run premium. In contrast, high yield firms are charged higher spreads at issuance than prevailing secondary market rates, with issuance primarily driven by macroeconomic conditions. At the country-level, these differences in ability to time the market translate into substantial, cyclical deviations between primary and secondary spreads, explained by the selection bias in which issuances take place.

Second, we argue that, while issuance data measure firms' on-going access to credit markets, they might not be appropriate proxies for changes in overall firm indebtedness. High volumes of corporate bond issuance may not translate into increases in amounts outstanding as new issuances can be used to refinance existing debt. We document that measuring credit conditions based on the volume of bonds issuances overestimates the contribution of bond issuance to overall firm indebtedness. Furthermore, the pass-through of bond issuances into bond outstanding at a firm level is substantially lower for firms in emerging markets, suggesting that a large fraction of emerging market debt issuances is used to refinance existing debt rather than to increase overall debt levels. At the country level, the pass-through of bond issuances into bond amount outstanding is larger when global risk premia are higher, highlighting that the offsetting role of early bond refinancing is smaller when aggregate credit conditions are tight.

An issue that is common to both the question of whether secondary market prices are an informative proxy for primary market credit conditions and whether primary market issuances are a useful summary of changes in firm indebtedness is which issuances better characterize local credit conditions. We tackle this issue by focusing on whether issuances by foreign subsidiaries of domestic multinational companies should be used to measure credit conditions in the subsidiary's country of domicile or in the parent's domicile country. We document that, within a country, subsidiaries face different credit conditions depending on whether their parent is foreign or domestic. In contrast, foreign subsidiaries of domestic

parents face similar pricing conditions as the parent itself or domestic subsidiaries of the same parent. Thus, issuances by foreign subsidiaries should be "repatriated" to the ultimate parent country. We further show that including issuances by foreign subsidiaries has a substantial impact on measures of aggregate credit conditions and that those gaps are particularly large in emerging markets.

A substantial contribution of this paper is to put together a comprehensive dataset covering a number of aspects of international corporate debt market data. We combine data on primary and secondary corporate bond market activity with data on corporate debt outstanding, firm balance sheets, and firm default probabilities across a number of countries. While different strands of the literature have studied different aspects of international credit markets, a comprehensive picture of corporate debt in a global context has so far been missing in the literature. This paper remedies this gap, serving as a guide in putting together a comprehensive database covering these different aspects of international credit market access and pricing. Our granular dataset of firms' access to credit markets and its determinants opens the door to answering a wide set of questions related to corporate debt markets and their impact on real outcomes, even beyond the facts documented in this paper.

In fact, we use the dataset constructed in a number of related papers. Elias (2021) tracks firms' debt instruments over the instruments' lifetime to study the real effects of exposure to rollover risk during episodes of international capital flows reversals. In Boyarchenko and Elias (2024d), we use the granular data on bond pricing to construct instruments for the effect of borrowing costs on the composition of lenders to the non-financial corporate sector across a range of economies. In Boyarchenko and Elias (2024e), we use the broad cross-country panel of secondary market credit spreads, bond returns, and ultimate parent financial characteristics to document the existence of a global credit cycle. In Boyarchenko and Elias (2024b), we study the determinants of active debt management, how it affects overall debt structure, and how global credit conditions affect firms' ability to manage their debt structure. In Boyarchenko and Elias (2024a,c), we explore the differences between bond

and loan financing.

This paper is related to several other strands of the literature. First, it relates to the literature that studies global liquidity provision through debt markets and the uses of those proceeds. Bruno and Shin (2017) document that non-financial corporates around the world engage in carry trades by issuing USD-denominated bonds and using the proceeds to hold local currency instruments. De Gregorio and Jara (2023) argue instead that increasing cash holdings can also be consistent with a "save to invest" motive for issuing lower-cost debt. Calomiris, Larrain, Schmukler, and Williams (2019) show that firms increase the size of their issuances to enjoy a size-related yield discount (since qualifying for inclusion in a bond index on average reduces offering yields by 100 bps), and invest the excess proceeds in cash. Similarly to Bruno and Shin (2017), Calomiris et al. (2019) also find evidence that suggests that non-financial corporates engage in carry trades. Bruno and Shin (2020) further show that balance sheet vulnerabilities to currency depreciations are in part explained by such carry trade activity by non-financial corporate issuers: it is not the issuance of non-local currency debt per se but rather the use of the proceeds of that debt to invest in local currency assets that exposes firms' valuations to currency depreciations.

In the U. S. context, Acharya and Steffen (2020) and Darmouni and Siani (2022) study the use of bond offering proceeds in 2020 for firms that were able to issue after the introduction of the Corporate Credit Facilities, and argue that the proceeds of new issuances were used to repay bank credit lines (drawn down at the start of the COVID-19 pandemic) and to build cash reserves. Boyarchenko, Kovner, and Shachar (2022) show that investment grade firms issued opportunistically to refinance existing debt after the Corporate Credit Facilities were introduced.

A second related strand of literature considers what type of firms are able to access international debt markets. Didier, Levine, and Schmukler (2014) explore the characteristics of firms issuing bonds in international capital markets, and find that the majority of financing through marketable debt goes to the largest public companies, with the median bond issuing

firm more than 36 times larger than the median non-issuing firm. The ability to access international debt markets leads these largest firms to have higher asset, sales, and employment growth rates. Exploring how access to bond markets in Europe has changed since the global financial crisis, Darmouni and Papoutsi (2022) document that borrower composition shifted to smaller, riskier firms, which used the proceeds raised in public debt markets to increase investment. These trends are in-line with the rapid decrease since 1990s in issuance costs for Eurobonds, as shown in Peristiani and Santos (2010).

Third, this paper is related to the literature on using secondary market spreads to measure credit conditions at the country level. Gilchrist, Yankov, and Zakrajšek (2009), Gilchrist and Zakrajšek (2012), López-Salido, Stein, and Zakrajšek (2017), Krishnamurthy and Muir (2017), and subsequent literature show that corporate bond credit spreads predict future real activity in the U. S. Corporate bond credit spreads have also been shown to predict real activity across a number of other, primarily advanced, economies (Okimoto and Takaoka, 2017; Gilchrist and Mojon, 2018; Leboeuf and Hyun, 2018; Carabarín Aguirre and Peláez Gómez, 2021).

Fourth, this paper contributes to the literature studying the composition of firms' debt outstanding and the relationship between primary market issuances and debt outstanding. Focusing on issuers in the U. S., Rauh and Sufi (2010) show that there is substantial cross-firm heterogeneity in the complexity of debt structure, with lower-credit-quality firms more likely to have subordinated marketable debt. In a larger cross-section of firms in the U. S., Colla, Ippolito, and Li (2013) further argue that debt specialization of U. S. firms has also increased over time, with more than three quarters of firms borrowing using only one type of debt instrument.[2] In the international context, John, Kaviani, Kryzanowski, and Maleki (2021) link the degree of debt specialization to country-level creditor protection, with firms in countries with stronger creditor protection having more concentrated debt structures.

Focusing on the composition of debt for firms with more than one instrument outstanding,

[2]See also a summary of the debt structure literature in Colla, Ippolito, and Li (2020).

Choi, Hackbarth, and Zechner (2018) document that U. S. issuers avoid "maturity towers" of existing debt when choosing at which maturity to issue new debt. Moreover, Xu (2018) shows that lower-credit-quality firms are more likely to use the call provisions in corporate bonds to actively manage the maturity structure of their debt, leading to a procyclical maturity structure for those types of firms. Similarly, using instrument-level amount outstanding to accurately measure the currency composition of debt outstanding, Adams and Verdelhan (2022) argue that firms' exposure to currency risk through their liabilities passes-through to their profits and creates a strong correlation of their equity prices with exchange rates.

The data exercise in this paper is complementary to the mapping of international capital flows undertaken in Coppola, Maggiori, Neiman, and Schreger (2021) and subsequent papers.[3] In the context of mapping securities to the country of their issuers' ultimate corporate parent, Coppola et al. (2021) provide a method for assigning an ultimate parent to each security issuer (see Section A.III.B of their Online Appendix). The security-ultimate parent mapping we construct in this paper is similar in spirit to the exercise described in their paper but relies on different data sources for the point-in-time ultimate parent information.

The rest of the paper is organized as follows. We describe the broad outlines of the data used in the paper and the matching procedure across different datasets in Section 2. Section 3 then explores how credit conditions measured at the country level change across alternative consolidation choices. We delve into the differences between primary and secondary market pricing data in Section 4, and document the distinction between issuance quantities and amounts outstanding in Section 5. Section 6 concludes. The Online Appendix serves as a comprehensive guide to the data and the matching endeavor undertaken to construct the full dataset.

[3]See also the Global Capital Allocation Project, https://www.globalcapitalallocation.com

2 Data Overview

A crucial contribution of this paper is the comprehensive dataset on various aspects of international corporate debt that we put together. We go beyond using different datasets in isolation and instead merge information on primary market issuances with secondary market and outstanding debt information at the firm level. The most challenging part of the exercise conducted in this paper is the matching procedure itself. The main obstacles are the complexity of firm- and bond-level identifiers, and changes in firm-level identifiers over time due to restructuring and merger and acquisition activity. In this paper, we build a comprehensive point-in-time mapping between operating firms (that is, firms at the top level of the organization structure) and their subsidiaries and the associated security-level identifiers. This allows us to put information in different datasets on an equal footing, and to accurately ascribe debt borrowing to the ultimate parent nation.

In this section, we describe the different datasets we use and provide some summary statistics. The Online Appendix provides a more detailed description, serving as a guide in putting together a comprehensive database covering these different aspects of international credit market access and pricing.

2.1 Data sources

Issuance Data. We use SDC Platinum New Issues database (SDC) to capture primary market activity for issuers outside of the United States. SDC reports bond and issuer characteristics as of the time of a new bond issuance – or the reopening of an existing bond issuance – such as issuer and parent domicile, issuer industry, currency of issuance, offering amounts, coupon type, rate, and payment frequency, bond seniority, and call and put provisions. SDC coverage starts in 1980 and our sample runs through the end of 2022. We supplement the primary market pricing and bond characteristics data on international corporate bonds from SDC with primary market pricing and bond characteristics data for U. S.

corporate bonds from Mergent FISD (Mergent). Mergent provides comprehensive coverage for publicly offered U. S. debt securities. Mergent tracks issuer and bond characteristics over the lifetime of the bond, including issuer and parent domicile, issuer industry, currency of issuance, offering amounts, coupon type, rate, and payment frequency, bond seniority, and call and put provisions. We identify re-openings in Mergent using the amount outstanding history table, selecting amount outstanding changes identified as reopenings by Mergent.[4] Mergent coverage begins in 1950, though there are only 2,873 unique non-financial corporate bonds with maturity greater than a year in the pre-1980 sample, and reliable data on changes in amount outstanding begins in 1995. As with SDC, we end our Mergent sample at the end of 2022.

We create a consolidated dataset of global primary market data by combining the information captured in SDC with that captured in Mergent. Since the same bond may appear in both datasets, we merge the two together using bond-level identifiers and offering characteristics. A detailed discussion of the consolidation procedure as well as summary statistics of the consolidated dataset can be found in Appendix A.

Figure 1 plots the time series of the annual total offering amount (in USD equivalents) of non-financial corporate, fixed-coupon bonds across advanced and emerging market economies. While issuance by firms domiciled in the U. S. continues to be outsized relative to issuance in the rest of the world, non-financial corporate debt issuance has been steadily increasing globally over the last two decades and, especially, since the global financial crisis.

Secondary Market Data. We use secondary bond market quotes from ICE Global Bond Indices. As noted in Kelly, Palhares, and Pruitt (2023), ICE data is considered the "gold standard" for corporate bond data because of the breadth of coverage relative to data on transactions-based prices and the analytics provided as part of the ICE dataset. Our main dataset starts in December 1996 and ends in December 2022, covering both periods of stress

[4]Note that there is a small number of increases in amount outstanding that are not identified by Mergent to be reopenings.

such as the global financial crisis and the COVID-19 pandemic, as well as more "normal" periods.

We define our universe of corporate bonds to be the underlying constituents at a monthly frequency from the ICE Global Corporate Index (G0BC) and ICE Global High Yield Corporate Index (HW00). The underlying constituents data includes effective option-adjusted spread and duration for each bond-day, as well as bond and issuer characteristics, such as issuer domicile, issuer industry, currency of issuance, coupon type and rate, bond seniority, and call and put provisions. We use observations as of the last day of every month to ensure that the pricing is not affected by month-end index rebalancing activity. A detailed discussion of the procedure for consolidation with primary market data as well as summary statistics of the consolidated dataset can be found in Appendix B.

Figure 2 plots the time series of weighted-average non-financial corporate bond duration-matched, currency-adjusted spreads for the 10 largest (by number of non-financial corporate bond issues) advanced and emerging market economies. Starting with the advanced economies in Figure 2a, we see a large degree of commonality in the evolution of corporate bond spreads. While weighted-average credit spreads for emerging market economies (Figure 2b) also share some common time series variation, we also see evidence of distinct local cycles in credit spreads for this set of countries as well.

Balance Sheet Data. We use standard financial statement information from a consolidated Worldscope-Compustat Global-Compustat North America dataset. We obtain standard firm characteristics (e.g. industry, domicile) as well as standard firm metrics, including log size (total assets in USD terms), leverage, profitability (EBITDA over lagged total assets), cash holdings (cash + short-term investments) over lagged total assets, and operating income over lagged total assets. A detailed discussion of the consolidation procedure as well as summary statistics of the consolidated dataset can be found in Appendix D. We augment firm-level characteristics with data from Moody's KMV CreditEdge to obtain measures of

expected default frequency (EDF).

Outstanding Instruments on Firms' Balance Sheets Data. We use *instrument*-level debt securities outstanding data from the Capital IQ Debt Capital Structure dataset, which allows us to track the lifecycle of debt securities at the instrument level. For each instrument captured in the Capital IQ Debt Capital Structure dataset, we observe a number of security characteristics including maturity, currency, security type, interest rate, and amount outstanding.

In addition to tracking the same instrument over its lifetime, we also use the detailed debt structure information to construct firm-level measures that capture key aspects of a firms' debt structure. In particular, measuring remaining time to maturity as the difference between the reported maturity date and the fiscal period end date, we construct measures of amount outstanding by maturity bucket. Notice that, while firm-level balance sheet data from Compustat and Worldscope provides information on long-term debt coming due in the following 12 months,[5] our firm-level measure of amount outstanding by maturity bucket allows us to have a more comprehensive view of the term structure of debt outstanding. Moreover, the granularity of the instrument-level dataset enables us to build the term structure of debt outstanding by security type and currency. That is, we can measure, for example, the amount outstanding of corporate bonds denominated in USD that each firm has due in 5 years. A detailed discussion of the matching procedure to other datasets as well as summary statistics of the consolidated dataset can be found in Appendix C.

2.2 Coverage

Given our interest in using granular data to measure aggregate credit conditions, a natural concern is the coverage of overall credit conditions in our firm- (and bond-) level datasets. We focus here on the comparison of measures of debt outstanding from Capital IQ Debt

[5]Compustat North America includes also measures of long-term debt coming due in each following year up to 5 years.

Structure Data and total assets from the consolidated Compustat/Worldscope balance sheet information with their counterparts in national financial accounts, and delegate the detailed summary statistics for each dataset as well as the merged dataset to the Appendix.

In particular, where available, we collect national financial accounts data on total assets (both financial and produced non-financial), debt securities outstanding, and loans outstanding of non-financial firms in the economy, together with data on non-financial credit outstanding from BIS debt securities statistics. Table 1 reports the summary statistics on the fraction of non-financial credit outstanding captured in Capital IQ Debt Structure Data at the country level. The average coverage ranges from 15% to more than 70%, suggesting that a substantial fraction of credit reported at the country level is reflected in the granular data we use.

Focusing on nine of the countries for which we have national accounts data on debt securities and loans outstanding separately, Figure 3 plots the time series of coverage of total assets, credit outstanding, and debt securities and loans outstanding. Across the board, coverage of credit outstanding is at least as high as coverage of total assets, suggesting that micro data on debt liabilities is at least as comprehensive as micro data on assets. Finally, coverage of debt securities is especially high. This is not surprising as small and medium enterprises borrow extensively through bank loans but may not appear in the datasets used in our paper.

3 Which issuances characterize bond market conditions?

How do you measure average credit conditions in a country? In order to answer this question, we have to consider whose credit conditions we are measuring (which issuances better characterize local credit conditions), whether to focus on prices or quantities, and whether to measure conditions for new or existing debt. In this section, we tackle the first question while Section 4 considers prices of new and existing debt (which credit spreads better capture

costs of new debt) and Section 5 explores the quantity of new and existing debt (to what extent debt issuances contribute to firm vulnerabilities).

We focus here on measuring credit conditions through the lens of primary market bond issuances. As is common in the literature, we measure credit conditions at the country-level using issuances from non-financial corporates in a given country. However, the presence of multinational and multi-industry corporations makes defining the set of instruments to consider a non-trivial task. In other words, the decision on which bonds to use boils down to a decision on how to assign nationality and financial/non-financial status.

Multinational firms have subsidiaries in multiple countries. Should issuances by subsidiaries in foreign countries be used to measure conditions in the subsidiary's country of domicile or the parent's domicile country? On the one hand, multinational firms may be using cross-border issuances to optimize their overall costs of debt, so that the credit conditions faced by the parent company are a conglomeration of the credit conditions faced by its individual subsidiaries around the world and issuances by foreign subsidiaries should be "repatriated" back to the parent's country of domicile. On the other hand, if debt issued by foreign subsidiaries is exclusively used to finance real activity in the country of issuance (and the parent's internal capital markets have sufficient frictions that prevent the parent from financing that activity through other channels), then issuances by foreign subsidiaries should be used to measure conditions in the subsidiary's country of domicile.

Likewise, multi-industry firms may themselves be either financial or non-financial and have financial and non-financial subsidiaries. The definition of what a "non-financial" issuance is then takes a stand on whether issuances by all types of subsidiaries of non-financial parents should be included and whether issuances by non-financial subsidiaries of financial firms should be included. In other words, if, for example, a pharmaceutical company sets-up a financial subsidiary that it then uses to issue corporate bonds, are those bonds considered to be issued by a non-financial firm?

In this section, we show that subsidiaries of different types of parents do indeed face

different credit conditions – even within the same issuer country – while different types of subsidiaries of the same parent tend to have much more similar issuances.

We begin by testing how the nationality status of the parent (foreign or domestic) affects issuance characteristics of a given firm. For a given bond i issued by firm f in country c and year t, we estimate:

$$\mathcal{C}_i = \alpha_c + \alpha_t + \alpha_{c,t} + \alpha_{SIC} + \beta \text{Org level}_{f,t} + \epsilon_i, \tag{1}$$

where $\mathcal{C}_i$ is a bond characteristic, and α_c, α_t, and $\alpha_{c,t}$ are country, year and country-year fixed effects. We are interested in β, the coefficient on the categorical variable Org level$_{f,t}$, which measures whether the issuer is its own parent (the omitted category), the issuer is a subsidiary of an ultimate parent firm in the same country ("domestic parent"), or the issuer is a subsidiary of an ultimate parent firm in a different country ("foreign parent").

We focus on a set of key bond-level characteristics as proxies for credit conditions. More specifically, we study duration-matched offering spreads (both on a currency adjusted and unadjusted basis), maturity, and dummies for foreign currency, callability, fixed-coupon, and seniority. We compute duration matched spreads relative to the sovereign discount curve of the currency of denomination of the bond. We then adjust for currency differentials following Liao (2020), bringing the duration matched spreads to "USD spread equivalents".

Table 2 reports the results of estimating Equation 1. The results in both panels show that for subsidiaries in both advanced (top panel) and emerging economies (bottom panel), having a foreign parent substantially impacts the conditions faced by a firm. That is, relative to firms that are their own parent (omitted category), domestic subsidiaries with domestic parents have statistically indistinguishable characteristics (first row). On the other hand, firms with foreign parents issue bonds with characteristics that are significantly different. Issuances of firms with foreign parents exhibit lower spreads and shorter maturities.

Just as Table 2 shows that subsidiaries with foreign parents face substantially different

credit conditions than domestic parents or subsidiaries of domestic parents, Table 3 shows that non-financial subsidiaries of financial firms face substantially different conditions than those of non-financial firms, paying significantly higher credit spreads and issuing at shorter maturities than either non-financial parents or non-financial subsidiaries of non-financial parents. Overall, this suggests that the best way to capture credit conditions faced by non-financial firms in a country is to consolidate issuances at the parent level and use the domicile and industry of said parent. This is how we proceed in the rest of the paper. To summarize: **Fact 1: Domestic subsidiaries of foreign parents face different credit conditions than domestic firms and subsidiaries of domestic firms.**

While Fact 1 explores how the nationality of a parent affects issuer level characteristics, we now turn to understanding differences in issuances by subsidiaries of the same parent. For this, we restrict our sample to parents with subsidiaries in more than one country and estimate Equation 1 from the perspective of the multinational parent. In this case, Org level$_{f,t}$ is a categorical variable that measures whether the issuance is done at the parent level (omitted category), in a subsidiary in the same country, in a subsidiary in a foreign advanced economy, or in a subsidiary in a foreign emerging economy. Importantly, to capture differences across subsidiaries of the same parent, we include parent fixed effects.

Table 4 reports the estimated coefficients of these regressions. Starting with the results for advanced economies, Table 4a shows that issuances by foreign subsidiaries have shorter maturities (especially those by foreign subsidiaries in emerging markets), higher shares of foreign currency issuances, and lower shares of callable bonds. Importantly, issuances by foreign subsidiaries in emerging markets have a higher spread.

Turning to parents in emerging markets, Table 4b shows that firms in less developed markets can issue at longer maturities when issuing through foreign subsidiaries (both in advanced and emerging markets). Moreover, issuing abroad allows emerging market parents to issue a higher share of callable bonds and a higher share of foreign currency issuances (especially for issuances through subsidiaries in advanced economies). However, we do not

find that issuing through foreign affiliates allows them to obtain lower spreads. Thus:

Fact 2: Multinational parents in emerging markets use their foreign subsidiaries to issue at better terms while multinational parents in advanced economies are willing to pay higher spreads to access foreign markets.

Facts 1 and 2 show that the credit conditions faced by firms depend on whether the issuer and the parent of the issuer are in the same country. We now show that repatriating issuances by foreign subsidiaries has substantial impact on measures of aggregate credit conditions.

In particular, we construct country-level measures of aggregate credit conditions as weighted averages $\overline{\mathcal{C}}_{c,t}^{(\cdot)}$ of credit conditions at the bond level, and compare weighted averages for domestic issuers only, $\overline{\mathcal{C}}_{c,t}^{(Dom)}$, with those of bonds that also include issuances through foreign subsidiaries, $\overline{\mathcal{C}}_{c,t}^{(Dom+Fgn)}$. The gap between these two weighted averages, $\Delta\overline{\mathcal{C}}_{c,t}$, measures the directional impact of consolidation choices on aggregate credit conditions. We also consider the absolute value of the gap, $|\Delta\overline{\mathcal{C}}_{c,t}|$, as our dependent variable of interest to capture the overall magnitude of the impact of including foreign subsidiaries regardless of the sign. We estimate:

$$\Delta\overline{\mathcal{C}}_{c,t} = \beta_{EM} EM_c + \beta_Y Year_t + \beta_{Fgn} \text{Frac Fgn}_{c,t} + \beta_V VIX_t + \epsilon_{c,t} \tag{2}$$

to capture how these measures of the gap change across emerging markets and advanced economies, over time, and as a function of the ratio between foreign and domestic issuances. The ratio between foreign and domestic issuances captures the overall impact of consolidation choices as including issuances from foreign subsidiaries becomes more consequential when such subsidiaries are responsible for a substantial share of overall issuances.

Table 5 reports the estimated coefficients of Equation 2. Starting with the results in Table 5a where the variable of interest is $|\Delta\overline{\mathcal{C}}_{c,t}|$, the last four rows show the average absolute gap, the average measures of credit conditions (of the corresponding column) for each type of firm, and the fraction of foreign issuances (the ratio of issuances by foreign subsidiaries to

issuances by domestic firms). For instance, focusing on column 1, we observe that the average duration matched spread of domestic firms is 2.68, the average duration matched spread of foreign subsidiaries (of domestic parents) is 2.78, and the average absolute gap between the measure that includes foreign subsidiaries and the measure that does not include foreign subsidiaries is 0.36. Turning to the estimated coefficients, the third row shows that the fraction of foreign issuances is positively associated with the absolute gap. This is intuitive as the larger the fraction of issuances by foreign subsidiaries the smaller the weight of domestic issuances in aggregate conditions, and hence the larger the gap between the measure that includes only domestic firms and the measure that includes foreign subsidiaries.

More importantly, Table 5a shows that the absolute gap in spreads is larger for firms in emerging economies. That is, "repatriating" foreign issuances has a particularly large effect on the level of average spreads in emerging markets relative to the gap in advanced economies. This gap is economically significant, as on average the absolute gap in advanced economies is 23 basis points (bps) while the average absolute gap in emerging markets is 57 bps. Figure 4 illustrates this difference between advanced and emerging countries by plotting the underlying series of average spreads (both including and excluding foreign subsidiaries) for the cases of one advanced and one emerging economy (U. S. and India). As the figure shows, in the case of the U. S., including foreign subsidiaries does not materially impact average spreads (small absolute gap) while, for the case of India, "repatriating" foreign issuances does substantially affect this measure of credit conditions. Furthermore, the magnitude of the gap fluctuates over time, suggesting that not only does including foreign issuances have level effects, but it also adds time series variation. Directionally, the results in Table 5b suggest that parents in emerging markets are able to issue at lower spreads (and with longer maturities) when they issue through foreign subsidiaries.

Likewise, column 5 shows that firms in emerging markets exhibit a larger absolute gap in callability. This suggests greater dispersion between domestic and foreign subsidiaries of emerging market parents in whether or not they issue callable bonds. On the other hand,

the absolute gap in the share of foreign currency issuances is smaller in emerging markets. This is consistent with parents in advanced economies being more likely to use their foreign subsidiaries to issue in a currency different from the one used by domestic subsidiaries.

Finally, Table 5a shows signs of convergence over time in spreads and seniority: a negative coefficient on the year variable means the absolute gap is getting smaller over time. Moreover, there are no signs of cyclicality in the gap, as suggested by the statistically insignificant coefficients on the VIX. Putting the results of Table 5 and Figure 4 together, we have:

Fact 3: Country-level measures of credit conditions are greatly affected by the set of bonds used in their construction. Correctly capturing issuances that characterize overall credit conditions is particularly important for emerging economies.

Overall, these results show that how we consolidate issuances (i.e. *whose* issuances we consider) has significant implications for measures of aggregate credit conditions and demonstrate the importance of consolidating based on the nationality of the parent. First, Fact 3 shows that consolidation choices lead to differences in measures of aggregate credit conditions and that those gaps are particularly large in emerging markets. More importantly, Facts 1 and 2 show that in choosing which consolidation method to use, there is a "correct" one. As the results in Table 2 and 4 show, subsidiaries of foreign parents face substantially different conditions than those of domestic parents, and hence, including them in computations of local credit conditions would bias results away from the true conditions faced by local firms.

4 Credit spreads and the cost of new debt

We now turn to exploring price-based measures of credit conditions, focusing on how to measure the cost of accessing credit markets and what determines whether firms issue new credit. While we can measure credit spreads from both the primary (issuance) and secondary markets, conditions in these two markets can diverge[6] due to both selection in which firms

[6]The debate on the differences between primary and secondary market yields, as well as the cyclical properties of this gap, goes back to Brimmer (1960).

issue and selection in which bonds trade in the secondary market.

4.1 Primary-secondary market disconnect at the firm level

We begin by testing whether the pricing information in secondary markets differs from the information in primary markets for the same issuer or for the same bond. There are a number of reasons why we may expect primary and secondary market prices to diverge from each other. First, because only a subset of bonds issued are ever traded in secondary market, there is a potential selection bias in secondary market prices. In the case of the bonds in our sample, that selection bias is potentially further confounded by the currency and minimum size restrictions for inclusion in the ICE Global Indices. In Table 6, we investigate the differences in (primary market) characteristics of bonds that are eventually included in the ICE Global Indices relative to bonds of firms with bonds in the ICE Global Indices that are never included in the ICE Global Indices themselves, and bonds issued by firms with no bonds in the ICE Global Indices (the omitted category). Firms with bonds in the ICE Global Indices are able to issue with lower average spreads and, for firms in emerging markets, at longer maturities. Bonds that themselves are included in the ICE Global Indices are larger, more likely to be issued callable, and, for issuers in emerging markets, have longer maturities (almost 2 years longer than average) and are issued in foreign currency.[7]

Overall, the results in Table 6 suggest that both bonds in ICE Global Indices and firms with bonds in ICE Global Indices are "special" relative to the rest of the bonds issued, highlighting the selection bias in secondary market prices. At the same time, there is also a selection bias in primary market spreads, with issuances of firms who can access the bond market at a given point in time and are willing to issue at the prevailing market rates appearing in the issuance data.

To capture the potential selection bias in primary market observations, we compute

[7]This is expected given index inclusion rules. Tables A.7–A.9 in the Online Appendix report further summary statistics on the differences between bonds included in the ICE Global Indices and the rest of our primary market issuance sample.

the difference between the primary market spreads at an individual bond level and three alternative measures of matched secondary market spread. The first measures secondary market spreads as the firm-level average spread the month before the issuance. Since primary market issuances are priced using secondary market spreads as reference information, this first measure reflects the primary-secondary market spread that is observable at the time of the issuance. The second measure of secondary market spread uses the bond-level spread as of the first month that the bond appears in the ICE Global Indices. That is, this second definition measures by how much the price of the bond itself changes between its price in the primary market and its first recorded secondary market price and is closely related to the "issuance premium" in Siani (2022). Finally, the third definition measures secondary market spreads as the firm-level average in the same month that the bond first appears in the ICE Global Indices, excluding the newly appearing bond itself. This third definition thus captures the ex-post primary-secondary market spread, uncontaminated by any potential issuance premia for the newly issued bonds. In all cases, we compute both the primary spread and the secondary market spread on a duration-matched, currency adjusted basis.

Table 7 reports the average primary-secondary market spread for these three definitions of matched secondary market spreads for investment grade (Table 7a) and high yield bonds (Table 7b). Starting with the average spreads for investment grade bonds, we see that the average primary market spread to the firm-level average secondary market spread the month before the issuance is negative (column 1). That is, investment grade bonds are issued on average with primary market spread 5 bps lower than existing bonds of the same firm trade at. However, the average issuance premium (column 2) is positive, so that the spread at which new investment grade bonds are issued at is on average 4 bps higher than the spread at which they are quoted when they first enter the corresponding index. Column 3 confirms that this issuance premium is specific to the bond itself and does not reflect overall changes in firm-level spreads. In particular, when we compare the primary market spread to the firm-level average in the same month that the bond first appears in the ICE Global Indices,

we find that the primary market spread is 7 bps lower than the firm-level average spread. In other words, investment grade bonds are priced at lower spreads in the primary market when compared to existing bonds of the same firm on either an ex-ante or an ex-post basis, but at a higher spread when compared to the bond's own first quote in the ICE Global Indices.

Table 7b shows that the pattern of primary-secondary spreads is substantially different for high yield bonds. The spread between primary and secondary market pricing is positive for all three definitions of matched secondary market spread. That is, high yield bonds are priced at *higher* spreads in the primary market when compared to existing bonds of the same firm on either an ex-ante or an ex-post basis and at a higher spread when compared to the bond's own first quote in the index. Furthermore, the average issuance premium is 22 bps for high yield bonds, which is substantially larger than the investment grade issuance premium, but is lower than either the ex-ante or the ex-post primary-secondary spread in columns 1 and 3.

We test more formally the difference between the bond-level spread at which a bond is quoted when it first enters the corresponding index and the firm-level average spread for existing bonds in Table 8. Similarly to the primary-secondary market spread calculation, we compute the spread to lagged firm-level average spreads (the month before the bond first appears in the corresponding index) in columns 1 and 3, and the spread to contemporaneous firm-level average spreads excluding bonds newly entering the index in column 2 and 4. Starting with the results for investment grade bonds in the first two columns, we see that bonds that newly enter the index are quoted at lower spreads than the rest of the bonds for the same firm, consistent with a small (but statistically significant) on-the-run premium for investment grade bonds. In contrast, columns 3 and 4 show that high yield bonds that newly enter the index are quoted at higher spreads than the rest of the bonds for the same firm. Overall, the results in Tables 7 and 8 can be summarized as:

Fact 4: Investment grade bonds earn an on-the-run premium while newly issued high yield bonds are discounted relative to previous issuances of the same firm.

What can explain the differential patterns in primary-secondary market spreads for investment grade and high yield bonds? First, the market for high yield bonds is substantially different from the market for investment grade bonds, with, for example, insurance companies mostly precluded from holding high yield bonds. The more limited set of potential investors may decrease the amount of bargaining power that high yield issuers have with their underwriters, increasing the average issuance premium. Second, underwriters of high yield bonds may demand a bigger risk premium to underwrite these riskier products, insuring themselves against the risk of an issuance with lower subscription levels. Finally, high yield firms may be less able to take advantage of changes in the overall level of interest rates, so that, rather than issuing to reduce interest costs, they issue to refinance and extend maturities.[8] This is consistent with the results in Table 8, that show that new high yield bond issuances are quoted at a higher spread in secondary markets relative to the average secondary market spread of the rest of the bonds of the same firm.

We now examine whether investment grade and high yield firms have a differential ability to benefit from declines in the overall level of interest rates, focusing on how the issuance premium depends on aggregate conditions. For a bond i issued by firm f in country c on date t, we estimate:

$$\text{Iss premium}_i = \alpha + \alpha_c + \alpha_f + \beta_A \text{Agg. conditions}_t + \beta_F \Delta\text{Firm-level spread}_{f,t} + \epsilon_i, \quad (3)$$

where α_c and α_f are country and firm fixed effects. Crucially, we control for the change in weighted-average firm-level secondary market spreads ΔFirm-level spread$_{f,t}$ between the last secondary market observation before the issuance and the secondary market observation of the date the bond first appears in the secondary market data (both of these spreads are firm-level spreads that are computed excluding the bond in question). Controlling for the changes in credit spreads for bonds of the same firm addresses a potential concern with our

[8] Xu (2018) uses data on called bonds in the U. S. to argue that high yield firms prepay bonds early for maturity management motives. We investigate the interaction between interest cost and maturity lengthening incentives in Boyarchenko and Elias (2024b).

measure of the issuance premium: if aggregate or firm-level conditions change between the time of issuance and the date at which we capture the secondary market spread in a manner that affects credit spreads for all of the firm's bonds, our measure of the issuance premium may reflect these changes rather than the true issuance premium.

Table 9 reports the estimated coefficients from specification (3) for three different measures of aggregate conditions: the yield on the 2-year U. S. Treasury, the U. S. term spread, and the VIX. Starting with the results for investment grade bonds in Table 9a, we see that the constant stays significant even when we control for changes in the firm-level secondary market spread, suggesting that the issuance premium we measure is not driven by other developments that affect bond spreads. Turning to the sensitivity with respect to aggregate conditions, the issuance premium is higher when the VIX or the U. S. term premium is higher, or when the U. S. 2-year yield is lower. The results for high yield bonds in Table 9b are broadly similar, with the only difference being that the U. S. term premium does not seem to affect the issuance premium of high yield bonds.

We examine the cyclicality of the issuance premium in Figure 5, which plots the time series of spreads for investment grade and high yield bonds. On a duration-matched spread basis (Figure 5a), we observe that the premium is particularly high during stress periods (towards the end of the global financial crisis and during the COVID-19 pandemic). Furthermore, the premium for high yield bonds seems to exhibit more volatility. The differences between the issuance premium for investment grade and high yield bonds are even starker on a default-adjusted basis. Figure 5b shows that premium for investment grade bonds is negative while the premium for high yield bonds is positive. This is consistent with underwriters in the high yield market charging a higher risk premium for underwriting riskier securities.

4.2 Secondary market spreads and credit demand

The discussion so far has focused on the differences between pricing in primary and secondary markets; that is, the cost of debt financing. We now explore the relationship between credit

spreads and the probability of issuance and the quantities being issued.

Table 10 estimates the linear probability model of a firm issuing in a given month as a function of its secondary market spreads in the previous month and aggregate conditions

$$\mathbb{1}_{\text{Issuance},f,t} = \alpha_f + \alpha_c + \beta_A \text{Agg. conditions}_t + \beta_F \text{Firm-level spread}_{f,t-1} + \epsilon_{f,t}, \tag{4}$$

where $\mathbb{1}_{\text{Issuance},f,t}$ is an indicator equal to 1 if firm f in country c issues in month t. Starting with the results for investment grade bonds, Table 10a shows that higher spreads are associated with a lower probability of issuance once we include month fixed effects (column 2). Moreover, columns 3 – 5 suggest a muted role for macroeconomic conditions in driving the probability of investment grade bond issuance.

On the other hand, Table 10b shows a very different pattern of issuance for high yield firms. First, the sensitivity of the probability of issuance to firm-level spreads is significantly smaller than that of investment grade firms. This suggests that high yield firms are much less able to time their issuances to declines in their own credit spreads and is consistent with the positive primary-secondary market spread for high yield bonds we observed in Table 7b. Instead, the probability of issuance by high yield firms is significantly sensitive to aggregate conditions (columns 2 – 5). This suggests that high yield firms primarily issue when aggregate conditions allow it, while investment grade firms issue when their own spreads are favorable.

Turning to the intensive margin, Table 11 explores how the quantities issued depend on firm-level spreads. In particular, Table 11 reports the estimated coefficients from the regression

$$\text{Issuance volume}_i = \alpha_f + \alpha_c + \beta_{PM} \text{PM spread}_i + \beta_{SM} \text{SM spread}_{f,t-1} + \epsilon_i. \tag{5}$$

Starting with the investment grade bonds (columns 1 – 2) we see that neither the primary nor the secondary market spread explains the size of the bond issuance. However, column 3 shows that the reason why the coefficient on the overall spread is not significant is that

the effect of the predicted credit spread off-sets that of the unexplained (default-adjusted credit spread, EBP) component. More specifically, the higher the predicted part of the primary market spread, the higher issued amount (consistent with larger bonds commanding a size premium), while the higher the unexplained component, the lower the issued amount (suggesting that firms issue smaller bonds when facing a higher risk premium). In contrast, in columns 4 – 5, we see that the overall primary and secondary market spreads explain the size of the issuance for high yield bonds, with the size of the offering rising when secondary market spreads are lower and when offering spreads are higher. For both the primary and the secondary market credit spread, this relationship between offering amount and credit spread is due to the predicted component of the spread (column 6).

Fact 5: Investment grade firms are better able to time issuance to declines in their own secondary market credit spreads, translating into lower issuance relative to secondary market spreads. In contrast, high yield firms' access to credit is primarily determined by aggregate conditions.

4.3 Primary-secondary spread and macroeconomic conditions

The results discussed above suggest that, at the firm level, primary and secondary market spreads capture different aspects of firms' access to credit markets. In this subsection, we study how these firm-level results aggregate to the country level. In particular, we compute country-level spreads at a quarterly frequency by first computing size-weighted averages of bond-level spreads at the firm level and then computing equal-weighted average across firms.

For country c in quarter t, we estimate

$$\text{PM-SM spread}_{c,t} = \alpha + \beta_M \text{Agg. conditions}_{c,t} + \epsilon_{c,t}, \tag{6}$$

where $\text{PM-SM spread}_{c,t}$ is the difference between average primary market credit spreads and secondary market credit spreads in the same country-quarter. The primary-secondary market

spread at the country level captures the difference between the overall level of spreads at which firms access credit markets and the overall level of spreads at which market participants value previously issued debt. Divergence between primary and secondary market spreads at the country level captures selection biases in which firms issue in a given quarter relative to which bonds are valued in the secondary market. The constant α is our main object of interest as it captures the average PM-SM spread, while β_M captures the cyclical behavior of said spread.

Table 12 estimates regression (6) separately for advanced and emerging economics, investigating the relationship between primary-secondary spreads and local and global macroeconomic conditions. Starting with the results for advanced economies, in Table 12a, we see that, on average, the primary-secondary spread is negative, so that the average primary market issuance has a credit spread 22 bps lower than the secondary market spread in the same country-quarter. Turning to the effect of local conditions, column 2 shows that years with higher real GDP growth correspond to less negative (smaller in absolute terms) primary-secondary market spreads. This is consistent with a smaller selection bias in which firms issue when local macroeconomic conditions are benign, so that realized primary market spreads are more closely aligned with observed secondary market spreads.

Similarly, deteriorations in global conditions increase the divergence between primary and secondary market spreads. The primary-secondary market spread in advanced economies is higher when the U. S. 2 year yield is lower (column 4), when the U. S. term spread (column 5) and VIX (column 6) are higher, and when the global financial cycle is tighter (column 9). In other words, primary market spreads are lower than secondary market spreads particularly when either local or global conditions lead to greater selection in which firms are able to access primary credit markets.

Table 12b shows that the primary-secondary market spread is larger (more negative) for emerging economies, suggesting that the selection bias in primary market spreads is even higher in emerging markets. Similarly to the results for advanced economies, the primary-

secondary market spread is higher when the U. S. term spread (column 5) and VIX (column 6) are higher, and when the global financial cycle is tighter (column 9), with the sensitivity to the global cycle variables higher for emerging markets. That is, not only is the selection bias potentially larger in emerging markets than in advanced economies, but that selection bias is more sensitive to global credit conditions.

Figure 6 illustrates the differences between the primary and secondary market spreads for two countries in our sample: the U. S. and Mexico. The figure shows that, for both countries, the secondary market spread is much more cyclical than the primary market spread is, highlighting that the transmission of increases in secondary market spreads into primary market spreads is muted when firms can choose to not issue at the higher spreads reflected in secondary markets. To summarize:

Fact 6: Country-level primary market spreads are on average lower than secondary market spreads, reflecting the selection bias in firms' access to primary markets. The selection bias is higher in emerging markets and when global or local macroeconomic conditions deteriorate.

The results in Table 13 further confirm the intuition of a selection bias in which firms issue driving the primary-secondary market spread. In particular, Table 13 estimates regression (5) but at the country level. Columns 1 and 2 show that, for advanced economies, total issuance is lower when primary market spreads are higher. Column 2 further shows that, once we restrict the sample to country-quarters for which we can decompose the overall spread into the predicted and the unexplained components, the secondary market spread has a counterintuitive positive coefficient, which would suggest that firms are able to issue a greater quantity of debt in aggregate when secondary market spreads are higher and, indeed, when secondary market credit risk premia are higher (column 3). These results suggest that, for advanced economies, primary market spreads are a better indicator of the quantity of issuance than secondary market spreads are.

In contrast, in columns 4 and 5, we see that the volume of issuance in emerging markets is

primarily explained by the secondary market spreads, with higher secondary market spreads corresponding to a lower overall issuance amount. Decomposing primary and secondary market spreads into their predicted and unexplained components, column 6 shows that emerging market issuance volumes are low when the primary market credit risk premium is high and when the predicted component of secondary market spreads is high. Thus, even when the overall effect of elevated primary and secondary market spreads goes in the same direction, the channel through which primary market spreads affect the quantity of issuance is different from the channel through which secondary market spreads affect issuance volumes. Putting the overall results in this section together, we have:

Fact 7: Overall volume of issuance in advanced economies is determined by primary market spreads while issuance in emerging markets responds to secondary market spreads. These country-level differences are driven by the differential ability of investment grade and high yield firms to time issuances to declines in their own secondary market credit spreads.

5 Debt issuance and firm vulnerabilities

The previous section explored the divergence between the informational content of *prices* of new and existing debt as measures of credit conditions. We now examine whether the *quantities* of new and existing debt are likewise disconnected. While issuance data measure firms' on-going access to credit markets, new issuances may not fully pass-through into increases in firm debt – as new issuances can be used to refinance existing debt – and hence, might not be appropriate proxies for overall firm indebtedness. For example, Figure 7 shows that a substantial fraction of bonds and loans outstanding on firms' balance sheets do not survive until their contractual maturity, with a third of five year bonds prepaid at least a year before the bond matures. In this section, we explore how bond issuances "pass-through" – how they translate into increases in debt – both at the firm and the country level, the cyclical

properties of this pass-through, and how it depends on firm and instrument type.

5.1 Firm-Level Pass-through of Bond Issuances

We estimate how issuances pass-through into changes in debt outstanding at the firm-level:

$$\begin{aligned}\Delta\text{Amt. out}_{f,t} = \alpha_c + \alpha_f + \beta_{PT}\text{Offering amt}_{f,t} + \beta_{\chi}\text{Firm char}_{f,t-1} \\ + \beta_{PT,\chi}\text{Offering amt}_{f,t} \times \text{Firm char}_{f,t-1} + \epsilon_{f,t},\end{aligned} \tag{7}$$

where ΔAmt. out$_{f,t}$ is the year-over-year change in amount outstanding of a given instrument type at the firm level, Offering amt$_{f,t}$ is the total bond issuance by firm f in year t, and Firm char$_{f,t-1}$ are firm characteristics as of the end of the previous year.[9] β_{PT} measures the overall pass-through rate of issuances into outstanding, with values below 1 indicating a less than perfect pass-through. $\beta_{PT,\chi}$ then captures whether that pass-through is different for different types of firms; for example, whether the pass-through decreases with firm riskiness.

We begin by measuring the pass-through rate of bond issuances into changes in bond amount outstanding at the firm level. Table 14 reports the estimated coefficients from regression (7) with changes in bond amount outstanding as the dependent variable. Starting with the results in Column 1, we see that, in advanced economies, the pass-through is 60% (52% in Column 2 where we restrict the sample to firms for which we have balance sheet data). That is, on average, for every dollar of bond issuances, firms see their debt increase by 60 cents. Pass-through is substantially smaller in emerging markets, at 38%. This suggests that, in emerging markets, a larger fraction of debt issuances is used to refinance existing debts, as opposed than to lever up.

Columns 3 – 9 include different firm characteristics – and their interaction with amounts issued – as controls to test how pass-through varies across a number of dimensions. For both advanced and emerging economies firms, pass-through is higher for safer firms – as

[9] Offering amounts are measured using primary bond issuances (Mergent FISD and SDC Platinum) and debt outstanding using firms' balance sheet (from Capital IQ Debt Capital Structure).

measured by their EDF and the current portion of their long-term debt – as evidenced by the negative coefficient on the interaction term in Columns 3 and 4. It is worth noting that while pass-through depends on share of long-term debt coming due (Column 4), it does not depend on the current portion of total debt – which includes short-term debt (Column 5). This suggests that short-debt is financed – or refinanced – differently than long-term debt, and hence does not affect the pass-through of bond issuances to bond debt outstanding.

Finally, pass-through is higher for more profitable firms – positive coefficient on the interaction term in Column 8 – with firms in emerging markets having twice as much sensitivity to profitability than firms in advanced economies. Together, these results suggest that safer and more profitable firms – firms that can "afford" to expand debt – use a larger share of their bond issuances to expand their debt.

Fact 8: Firm-level pass-through of bond issuances into debt outstanding is low, especially for riskier firms and firms in emerging markets.

While the results discussed above explain how bond issuances affect overall bond amount outstanding, they do not say anything about overall firm debt. To explore that question, we now turn to examining whether bond issuance not only translate into changes in bond outstanding at the firm level but also into changes in loans outstanding.[10] Table 15 reports the estimated coefficients from regression (7) with changes in loan amounts outstanding as the dependent variable. Overall, the results suggest that bond issuances do not explain changes in loan amounts outstanding at the firm level. That is, we find no evidence that firms expand their loan debt at the same time they are expanding their bond debt.

However, there is some evidence consistent with bond-loan substitution for highly levered firms. This is evidenced by the negative coefficient in the interaction between bond issuances and leverage in Column 7. That is, the higher the level of firm leverage, the bigger the *reduction* of loan amount outstanding for a given amount of bonds being issued.

Together, the results in Table 14 and Table 15 suggest that bond issuances increase bond

[10]We include bank and term loans, the drawn amount of revolving credit facilities, and (commercial) mortgages in our definition of loans outstanding.

amount outstanding but have no effect on loan amount outstanding. This suggests that bond issuances tilt firms' debt structure towards bonds and away from loans. In order to formally test for this, Table 16 reports results for bonds, loans, and the share of intermediated credit – which is equal to loans outstanding as a ratio of bonds and loans outstanding. Column 3 in Table 16a and Table 16b confirm that issuances reduce firms share of intermediated credit. Moreover, comparing the results for advanced and emerging economies, the results suggest that the share of intermediated credit in firms in emerging markets is more sensitive to bond issuances than in firms in advanced economies. As we discuss in Boyarchenko and Elias (2024a), changes in the share of intermediated credit affect firms' vulnerability to changes in credit conditions. Firms with a lower share of intermediated credit are less reliant on credit from the banking sector but more sensitive to changing conditions in capital markets.

5.2 Country-level pass-through of bond issuances

Do the firm-level results discussed above aggregate to the country-level? We test how bond issuances pass-through into changes in debt outstanding at the country-level by estimating:

$$\begin{aligned}\Delta\text{Amt. out}_{c,t} = \alpha_c + \beta_{PT}\text{Offering amt}_{c,t} + \beta_{\chi}\text{Agg Cond}_{c,t} \\ + \beta_{PT,\chi}\text{Offering amt}_{c,t} \times \text{Agg Cond}_{c,t} + \epsilon_{c,t},\end{aligned} \tag{8}$$

where $\Delta\text{Amt. out}_{c,t}$ is the year-over-year change in amount outstanding of a given instrument type at the country-level, $\text{Offering amt}_{c,t}$ is the total bond issuance by all firms in country c in year t, and $\text{Agg Cond}_{c,t}$ are proxies for aggregate conditions either at the country or global level. Our measures of conditions include year-on-year growth in GDP, the policy rate, the 2-year U. S. Treasury yield, the U. S. term spread, the VIX, the trade-weighted dollar index, the year-on-year change in the dollar index, and the global financial cycle as constructed in Miranda-Agrippino and Rey (2015) and updated in Miranda-Agrippino, Nenova, and Rey (2020). β_{PT} measures the overall pass-through rate of issuances into outstanding, with

values below 1 indicating a less than perfect pass-through. $\beta_{PT,\chi}$ then captures whether that pass-through is different depending on the state of the local and global economy.

Table 17 reports the estimated coefficients of regression (8). Starting with Column 1, we observe that for emerging markets, country-level pass-through is very similar to the estimated firm-level pass-through reported in Table 14 (34% vs. 38%). However, country-level pass-through in advanced economies is significantly lower than at the firm-level (34% vs. 60%). This suggests that, in advanced economies, smaller firms – which get a lower-weight when we aggregate to the country-level – have a higher pass-through than larger firms.

While pass-through in both advanced and emerging economies shows signs of having a cyclical component, the proxy for aggregate conditions that best captures this cyclicality is different across types of countries. For instance, while in advanced economies tighter monetary policy either locally or in the U. S. corresponds to lower pass-through (negative coefficient on the interaction term in Columns 3 and 4), in emerging markets pass-through is higher during GDP expansions (positive coefficient on the interaction in Column 2). Moreover, both sets of countries seem to react differently to global credit conditions as captured by the global financial cycle factor. Tighter global conditions – a more negative value – are associated with higher pass-through in advanced economies while they are associated with lower pass-through in emerging markets.

Table 18 reports results on country-level pass-through of bond issuances to loan amounts outstanding. Similar to what we observed in the context of firm-level pass-through, bond issuances do not translate into higher loan amounts outstanding. That is, as firms issue more bonds and lever up, they do not seem to be also increasing their indebtedness in loans.

However, for emerging markets, there is some cyclicality of the pass-through to loans. Loan amounts outstanding increase with bond issuance when domestic monetary policy is tighter, the U. S. term premium is higher, the VIX is lower, and when the trade-weighted dollar index is lower (significant coefficients on the interaction in Columns 3, 5, 6, and 7). On the other hand, there seems to be no cyclicality in pass-through in advanced economies,

suggesting that the loan and bond cycles are somewhat detached in developed economies.

Fact 9: Low firm-level pass-through aggregates into low pass-through at the country level. That is, aggregate issuance is a poor indicator of changes in aggregate corporate indebtedness.

5.3 Country-level pass-through: the role of firm heterogeneity

The observed differences in pass-through to bond and loan amounts outstanding – both at the firm and country level – explored in the previous subsections suggest that expansions in bond issuance do not capture very well expansions in firm indebtedness through loans. This "detachment" could be explained by firms that have access to both bond and loan markets using the two instruments as substitutes. It could, however, also be explained by market segmentation: while some firms only finance themselves through bonds, others only finance themselves through loans. If these two different types of firms are exposed to different credit cycles, we could potentially observe them issuing at different points of the cycle, explaining the "detachment" discussed above.

In order to explore these hypotheses, Table 19 reports results of computing country-level pass-through for the different types of firms. That is, for each type of firm – firms that issue only bonds, firms that issue only loans, and firms that issue both bonds and loans – we aggregate the respective amounts outstanding to the country level. Columns 1 and 2 report the results discussed in previous subsections: bond issuances co-move with bond amounts outstanding (column 1) but not with loan amounts outstanding (column 2).

Turning to the decomposition of pass-through to loans by type of firm, columns 3 and 4 report results of pass-through to loans outstanding only for firms that also issue bonds (column 3) and for firms than only issue loans (column 4). For advanced economies, both coefficients are insignificant, suggesting that the overall results in column 2 are driven by both types of firms. However, for emerging markets, column 3 shows that there is significant comovement between bond issuances and loans outstanding for firms that issue both bonds

and loans. That is, when firms that have access to both markets issue bonds, they also seem to be increasing their loan amounts outstanding. On the other hand, column 4 suggests that country-years with more bond issuances are not associated with more loan issuance by firms that only borrow through loans. This is consistent with the view that these markets are segmented and do not always move in tandem, as we discuss in Boyarchenko and Elias (2024a,c,d),

Consistent with the results described above, in advanced economies, bond issuances translate into a decrease in the share of intermediated credit of firms that have access to both bond and loan markets. This is explained by the fact that when firms issue bonds, they seem to be expanding bond amounts outstanding but not loan amounts outstanding, and hence, mechanically, the share of intermediated credit decreases and firms become more reliant on capital markets. On the other hand, the share of intermediated credit does not comove with bond issuances in emerging markets. This is consistent with the result described above: firms seem to be expanding both bond and loan amounts outstanding when they issue bonds.

Finally, column 7 shows that for firms in both advanced and emerging markets, bond issuances are associated with lower revolving credit utilization. This is consistent with revolving credit being a substitute for bond issuances that firms utilize less in periods when they are better able to issue bonds.

Fact 10: Country-level average rates of pass-through from bond issuances to loan amounts outstanding mask substantial heterogeneity across firm types. In emerging markets, bond issuance is complementary to loan borrowing for firms with access to both markets, but credit conditions for loan-only firms appear largely unrelated to bond market conditions.

Overall, the results in this section show that measuring credit conditions using data on bond issuances does not fully capture bond issuances' contributions to overall firm indebtedness and that there are important aggregate and granular differences in the pass-through of bond issuances to firm debt.

6 Conclusion

We put together comprehensive granular data on firms' credit, linking data on access to primary debt markets with those on secondary market quotes, debt outstanding, and firm financials. Linking these datasets at a firm-security level is challenging due to the complex nature of the relationships between securities, firms, and firms' organizational structure. A substantial contribution of this paper is in providing a detailed guide to the contents and characteristics of these data, as well as how to navigate the data merging process.

More importantly, we use these data to document ten facts that show that inferring credit conditions of new debt from those of existing debt – and vice versa – leads to erroneous conclusions. In other words, secondary market spreads are poor proxies for the costs of new debt and, in the case of high yield firms, do not even predict whether a firm will issue in a given month. Likewise, bond issuances are poor proxies of changes in amount outstanding – both at the firm and the country-level. Moreover, in emerging markets, bond and loan borrowing is complementary for firms with access to both types of credit, but the credit cycle for loan-only firms appears largely disconnected.

These results highlight that credit conditions are multifaceted and, hence, the importance of taking a holistic approach to data on debt markets. As corporate bond markets become an increasingly important source of funding for firms around the globe, being able to appropriately capture firm vulnerabilities due to their access to bond markets is of crucial importance to academics and policy makers alike. This paper provides evidence that we cannot rely on measures of a single dimension of credit conditions to infer how conditions are evolving along other dimensions. We further explore these issues in a sequence of subsequent papers.

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Table 1: Coverage of BIS credit to non-financial corporations in Capital IQ Debt Capital Structure Data. This table reports the distribution of the percent of BIS credit to non-financial corporations covered in Capital IQ Debt Capital Structure Dataset at a country-year level. Country-level debt outstanding from Capital IQ Debt Structure Dataset constructed by adding up all debt securities outstanding for each firm – at the ultimate parent level – in a given country. We exclude firms that are reported to be financial, or have one digit SIC code equal to 1 or 9. Sample period: 2002 – 2020.

(a) Advanced economies

	Mean	Min	Max	N. years
CA	15	10	20	18
CH	37	30	43	18
DE	24	19	32	18
DK	15	7	22	18
ES	15	11	18	18
FI	18	11	25	18
FR	19	17	25	18
GB	32	20	47	18
GR	23	15	31	18
HK	21	16	32	18
IE	24	18	30	18
IL	19	11	27	18
JP	27	21	32	18
KR	30	25	37	18
LU	44	23	67	18
NZ	15	12	19	18
PT	15	11	19	18
SG	28	15	53	18
US	26	20	37	18

(b) Emerging economies

	Mean	Min	Max	N. years
AR	18	9	35	18
BR	33	24	43	18
CL	18	14	23	18
CN	21	6	39	14
ID	19	13	27	18
IN	21	16	28	13
MX	74	53	89	18
MY	27	20	36	14
RU	16	10	29	18
SA	29	4	44	18
TH	23	19	29	18
ZA	40	37	47	12

Table 2: Issuance characteristics and organization structure. This table reports the estimated coefficients from the regression of bond-level issuance characteristics on a categorical variable for the organizational structure of the firm, which measures whether the issuer is its own parent (the omitted category), whether the issuer is a subsidiary of an ultimate parent firm in the same country ("domestic parent"), or whether the issuer is a subsidiary of an ultimate parent firm in a different country ("foreign parent"). Offering yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020). Only bond issuances of non-financial ultimate parents are included in the sample. Sub-samples of advanced economies and emerging economies based on the issuer country. All regressions include (issuer) country, issuance year, country-year, and (issuer) industry fixed effects. Standard errors clustered at the issuer level reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(a) Advanced economies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dur. matched spread	Dur. matched, curr adj. spread	TTM	Fgn currency	Callable	Fixed	Senior
Dom parent	-0.05	-0.05	0.28	0.02	-0.06	-0.00	0.01
	(0.08)	(0.08)	(0.19)	(0.01)*	(0.02)***	(0.00)*	(0.01)
Fgn parent	-0.30	-0.31	-1.41	0.08	-0.12	-0.00	0.02
	(0.10)***	(0.09)***	(0.24)***	(0.03)***	(0.02)***	(0.00)	(0.01)**
Constant	1.80	1.88	7.22	0.14	0.40	1.00	0.96
	(0.04)***	(0.04)***	(0.12)***	(0.01)***	(0.01)***	(0.00)***	(0.00)***
Adj. R-sqr	0.31	0.25	0.31	0.43	0.35	0.01	0.12
W/in adj. R-sqr.	0.00	0.00	0.01	0.00	0.01	0.00	0.00
N. of obs	119,611	119,601	133,322	133,322	133,322	132,810	133,322
N. of clusters	22,280	22,278	24,453	24,453	24,453	24,390	24,453

(b) Emerging economies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dur. matched spread	Dur. matched, curr adj. spread	TTM	Fgn currency	Callable	Fixed	Senior
Dom parent	-0.47	-0.48	-0.09	0.02	0.03	-0.00	-0.00
	(0.16)***	(0.16)***	(0.13)	(0.01)***	(0.01)***	(0.00)	(0.00)
Fgn parent	-1.08	-1.08	-0.80	-0.03	-0.01	-0.00	-0.00
	(0.25)***	(0.24)***	(0.24)***	(0.01)**	(0.01)	(0.00)	(0.00)
Constant	3.36	3.33	4.76	0.12	0.08	1.00	1.00
	(0.13)***	(0.13)***	(0.08)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***
Adj. R-sqr	0.27	0.28	0.32	0.64	0.29	0.12	0.09
W/in adj. R-sqr.	0.01	0.01	0.00	0.00	0.00	0.00	0.00
N. of obs	6,590	6,586	31,114	31,096	31,114	30,888	31,114
N. of clusters	2,169	2,168	6,633	6,628	6,633	6,608	6,633

Table 3: Issuance characteristics and financial firms. This table reports the estimated coefficients from the regression of bond-level issuance characteristics on a categorical variable for the industry of the firm, which measures whether the issuer is its own parent (the omitted category), whether the issuer is a subsidiary of a non-financial ultimate parent firm ("Non-fin parent"), or whether the issuer is a subsidiary of a financial ultimate parent firm ("Fin parent"). Financial firms identified as one digit SIC code equal to 6. Offering yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020). All regressions include (issuer) country, issuance year, and country-year fixed effects. Standard errors clustered at the issuer level reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dur. matched spread	Dur. matched, curr adj. spread	TTM	Fgn currency	Callable	Fixed	Senior
Non-fin parent	-0.17	-0.18	0.06	0.02	-0.04	-0.00	0.01
	(0.06)***	(0.05)***	(0.10)	(0.01)***	(0.01)***	(0.00)	(0.01)*
Fin parent	0.89	0.88	-0.37	-0.00	-0.03	-0.00	-0.02
	(0.18)***	(0.17)***	(0.15)**	(0.01)	(0.03)	(0.00)***	(0.01)***
Constant	2.05	2.13	6.78	0.14	0.34	1.00	0.96
	(0.03)***	(0.03)***	(0.05)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***
Adj. R-sqr	0.34	0.27	0.36	0.50	0.41	0.02	0.14
W/in adj. R-sqr.	0.01	0.01	0.00	0.00	0.00	0.00	0.00
N. of obs	106,445	106,434	144,923	144,896	144,923	144,313	144,923
N. of clusters	23,225	23,223	29,948	29,941	29,948	29,865	29,948

Table 4: Within firm issuance characteristics. This table reports the estimated coefficients from the regression of bond-level issuance characteristics on a categorical variable for the organizational structure of the firm, which measures whether the parent is the issuer (the omitted category), whether the issuer is a domestic subsidiary of the parent ("domestic subsidiary"), whether the issuer is a foreign subsidiary in an advanced economy ("foreign subsidiary – AE"), or whether the issuer is a foreign subsidiary in an advanced economy ("foreign subsidiary – EM"). Offering yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020). Only bond issuances of non-financial ultimate parents issuing in more than one country are included in the sample. Sub-samples of advanced economies and emerging economies based on the parent country. All regressions include (parent) country, issuance year, country-year, (parent) industry, and parent fixed effects. Standard errors clustered at the parent level reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.*** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(a) Advanced economies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dur. matched spread	Dur. matched, curr adj. spread	TTM	Fgn currency	Callable	Fixed	Senior
Dom sub	-0.03	-0.00	-0.86	0.07	-0.07	-0.00	-0.01
	(0.08)	(0.07)	(0.39)**	(0.06)	(0.02)***	(0.00)	(0.01)
Fgn sub in AE	0.05	0.04	-1.51	0.18	-0.11	-0.00	0.00
	(0.08)	(0.07)	(0.29)***	(0.03)***	(0.04)***	(0.00)	(0.00)
Fgn sub in EM	0.58	0.50	-2.52	0.16	-0.20	-0.00	-0.01
	(0.15)***	(0.16)***	(0.45)***	(0.09)*	(0.04)***	(0.00)	(0.01)
Constant	1.20	1.24	8.06	0.17	0.37	1.00	0.98
	(0.04)***	(0.04)***	(0.20)***	(0.02)***	(0.01)***	(0.00)***	(0.00)***
Adj. R-sqr	0.43	0.40	0.30	0.39	0.42	0.16	0.34
W/in adj. R-sqr.	0.00	0.00	0.01	0.02	0.01	0.00	0.00
N. of obs	48,508	48,506	51,419	51,189	51,419	51,120	51,419
N. of clusters	1,063	1,063	1,095	1,064	1,095	1,091	1,095

(b) Emerging economies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dur. matched spread	Dur. matched, curr adj. spread	TTM	Fgn currency	Callable	Fixed	Senior
Dom sub	-0.19	-0.19	-0.73	0.05	0.03	0.00	-0.00
	(0.43)	(0.43)	(0.22)***	(0.02)*	(0.02)	(0.00)	(0.00)
Fgn sub in AE	-0.08	-0.10	0.76	0.48	0.16	-0.00	-0.00
	(0.39)	(0.38)	(0.36)**	(0.06)***	(0.04)***	(0.00)	(0.00)
Fgn sub in EM	-0.35	-0.39	0.80	0.19	0.17	0.00	0.00
	(0.47)	(0.46)	(0.35)**	(0.10)*	(0.06)***	(0.00)	(0.00)
Constant	3.15	3.20	5.55	0.17	0.11	1.00	1.00
	(0.28)***	(0.28)***	(0.12)***	(0.01)***	(0.01)***	(0.00)***	(0.00)***
Adj. R-sqr	0.24	0.24	0.40	0.59	0.45	0.18	0.21
W/in adj. R-sqr.	-0.00	-0.00	0.02	0.17	0.03	0.00	-0.00
N. of obs	2,317	2,317	6,600	6,461	6,600	6,536	6,600
N. of clusters	229	229	297	294	297	296	297

Table 5: Impact of including foreign issuances on country-level average characteristics. This table reports the estimated coefficients from the regressions of the absolute gap (Table 5a) and the actual gap (Table 5b) between country-average characteristics including and excluding issuances through foreign subsidiaries of domestic parents, on country type (AE vs EM), a time trend, the ratio between foreign and domestic issuances, and the VIX . Offering yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020). Bond-level characteristics averaged to country level using offering amounts (in USD equivalents). Annual sample starts in 2005 for all countries. Heteroskedasticity-robust standard errors reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(a) Absolute Gap

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dur. matched spread	Dur. matched, curr adj. spread	TTM	Fgn currency	Callable	Fixed	Senior
EM	0.36	0.34	0.11	-0.04	0.02	-0.00	-0.00
	(0.05)***	(0.05)***	(0.08)	(0.01)***	(0.01)**	(0.00)	(0.00)
Year	-0.01	-0.01	-0.00	0.00	0.00	-0.00	-0.00
	(0.00)*	(0.00)*	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)***
Frac. fgn	0.33	0.33	0.43	0.08	0.07	0.00	0.00
	(0.02)***	(0.02)***	(0.04)***	(0.00)***	(0.00)***	(0.00)	(0.00)
VIX	0.01	0.01	0.00	-0.00	0.00	-0.00	-0.00
	(0.00)*	(0.00)*	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	-0.02	-0.02	0.20	0.05	0.01	0.00	0.01
	(0.09)	(0.08)	(0.15)	(0.02)***	(0.02)	(0.00)*	(0.00)***
Adj. R-sqr	0.29	0.31	0.17	0.34	0.26	-0.00	0.02
N. of obs	582	582	599	599	599	599	599
Avg. absolute gap	0.36	0.35	0.52	0.09	0.08	0.00	0.00
Avg. dom level	2.68	2.73	7.81	0.46	0.41	1.00	1.00
Avg. fgn sub level	2.78	2.81	7.54	0.82	0.46	1.00	0.99
Avg. frac fgn	0.62	0.62	0.62	0.62	0.62	0.62	0.62

(b) Gap

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dur. matched spread	Dur. matched, curr adj. spread	TTM	Fgn currency	Callable	Fixed	Senior
EM	-0.25	-0.22	0.34	-0.02	-0.04	0.00	0.00
	(0.06)***	(0.06)***	(0.10)***	(0.01)	(0.01)**	(0.00)	(0.00)
Year	-0.01	-0.01	0.02	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)**
Frac. fgn	-0.15	-0.15	-0.05	0.03	0.02	-0.00	-0.00
	(0.03)***	(0.03)***	(0.05)	(0.01)***	(0.01)**	(0.00)	(0.00)
VIX	-0.00	-0.00	0.01	-0.00	-0.00	0.00	0.00
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	0.23	0.22	-0.42	0.06	0.02	-0.00	-0.00
	(0.11)**	(0.11)**	(0.18)**	(0.02)***	(0.03)	(0.00)	(0.00)**
Adj. R-sqr	0.06	0.06	0.02	0.04	0.01	-0.00	0.01
N. of obs	582	582	599	599	599	599	599
Avg. gap	-0.05	-0.05	-0.02	0.07	0.02	-0.00	-0.00
Avg. dom level	2.68	2.73	7.81	0.46	0.41	1.00	1.00
Avg. fgn sub level	2.78	2.81	7.54	0.82	0.46	1.00	0.99
Avg. frac fgn	0.62	0.62	0.62	0.62	0.62	0.62	0.62

Table 6: Issuance characteristics and index inclusion. This table reports the estimated coefficient from the regressions of bond-level issuance characteristics on a categorical variable measuring whether the bond itself is eventually included in either the ICE Global Corporate Index or the ICE Global High Yield Corporate Index, or if the bond is issued by a firm that has bonds included in the ICE Global Indices but the bond itself is not, or the bond is issued by a firm that has no bonds included in the ICE Global Indices (omitted category). Offering yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020). Subsamples of advanced economies and emerging economies based on the parent country. All regressions include country, year, and country-year fixed effects. Standard errors clustered at the country and year level reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(a) Advanced economies

	(1) Dur. matched spread	(2) Off. amount	(3) TTM	(4) Fgn currency	(5) Callable
Bond in ICE	-0.21	431.10	-0.36	0.09	0.33
	(0.14)	(24.35)***	(0.52)	(0.04)**	(0.07)***
Firm w/bonds in ICE	-0.82	27.31	-0.26	0.15	0.01
	(0.14)***	(9.81)**	(0.65)	(0.05)***	(0.06)
Adj. R-sqr	0.37	0.36	0.18	0.37	0.38
W/in adj. R-sqr.	0.04	0.21	0.00	0.03	0.10
N. of obs	67,178	73,921	73,924	73,924	73,924
N. clust	23	23	23	23	23

(b) Emerging economies

	(1) Dur. matched spread	(2) Off. amount	(3) TTM	(4) Fgn currency	(5) Callable
Bond in ICE	-0.35	452.71	1.91	0.76	0.42
	(0.42)	(22.35)***	(0.20)***	(0.09)***	(0.05)***
Firm w/bonds in ICE	-0.73	161.85	1.11	0.10	0.03
	(0.23)***	(30.80)***	(0.31)***	(0.02)***	(0.01)**
Adj. R-sqr	0.40	0.28	0.32	0.68	0.38
W/in adj. R-sqr.	0.01	0.11	0.02	0.38	0.13
N. of obs	4,876	19,954	19,954	19,954	19,954
N. clust	23	23	23	23	23

Table 7: Bond-level offering spread to alternative measures of secondary market spreads. This table reports the estimated average from the regression of primary-secondary spread at the bond level for alternative definitions of secondary market spread. "Lagged FL" measures the secondary market spread as the weighted-average secondary market spread at the firm level as of the month before the bond issuance. "First SM" measures the secondary market spread as the first observation of the secondary market spread for the bond itself, restricting to bonds that enter the ICE Global Indices within a year of issuance. "FL at first SM" measures the secondary market spread as the weighted-average secondary market spread at the firm level as of the month of the first observation of the secondary market spread for the bond itself, excluding the bond considered. Both offering and secondary market yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020). All regressions include firm and country fixed effects. Standard errors clustered at the firm level reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(a) Investment grade

	(1) Lagged FL	(2) First SM	(3) FL at first SM
Constant	-0.05 (0.00)***	0.04 (0.00)***	-0.07 (0.00)***
Adj. R-sqr	0.11	0.09	0.18
W/in adj. R-sqr.	0.00	0.00	0.00
N. of obs	11,484	12,192	10,984
N. clust	887	1,125	914

(b) High yield

	(1) Lagged FL	(2) First SM	(3) FL at first SM
Constant	0.36 (0.00)***	0.22 (0.00)***	0.49 (0.00)***
Adj. R-sqr	0.22	0.14	0.24
W/in adj. R-sqr.	0.00	0.00	0.00
N. of obs	2,960	3,182	2,329
N. clust	552	698	457

Table 8: Bond-level spread to firm average at first secondary market observation. This table reports the estimated coefficients from the regressions of the bond-level spread as of the first observation of the secondary market spread for the bond relative to two definitions of firm-level spreads. "Lagged" measures the firm-level spreads as the weighted-average secondary market spread at the firm level as of the month before the first secondary market observation for the bond. "Contemp" measures the firm-level spread as the weighted-average secondary market spread at the firm level as of the month of the first observation of the secondary market spread for the bond itself, excluding the bond considered. Secondary market yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020). All regressions include firm and country fixed effects. Standard errors clustered at the firm level reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

	IG		HY	
	(1) Lagged	(2) Contemp	(3) Lagged	(4) Contemp
Constant	-0.04 (0.00)***	-0.01 (0.00)***	0.24 (0.00)***	0.20 (0.00)***
Adj. R-sqr	0.11	0.10	0.16	0.25
W/in adj. R-sqr.	0.00	0.00	0.00	0.00
N. of obs	15,557	14,698	4,519	3,452
N. clust	1,085	1,047	737	561

Table 9: Bond-level issuance premium cyclicality. This table reports the estimated coefficients from the regression of the primary-secondary spread at the bond level on changes in firm-level credit spreads and aggregate conditions, with the secondary market spread measured as the first observation of the secondary market spread for the bond itself, restricting to bonds that enter the ICE Global Indices within a year of issuance. Changes in firm-level credit spreads measured as the difference between firm-level credit spreads as of the month prior to issuance and firm-level weighted average credit spreads as of the month of the first observation of the secondary market spread. "U. S. term spread" measured as the difference between the yields on 10 year and 2 year Treasuries. Both offering and secondary market yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020). All regressions include firm and country fixed effects. Standard errors clustered at the firm level reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(a) Investment grade

	(1) Baseline	(2) U.S. 2Y	(3) U.S. term spread	(4) VIX
Agg. cond.		-0.01	0.02	0.00
		(0.00)*	(0.01)***	(0.00)**
Δ FL spread	0.24	0.24	0.24	0.24
	(0.02)***	(0.02)***	(0.02)***	(0.02)***
Constant	0.04	0.05	0.02	-0.01
	(0.00)***	(0.01)***	(0.01)**	(0.02)
Adj. R-sqr	0.15	0.16	0.16	0.16
W/in adj. R-sqr.	0.08	0.08	0.08	0.09
N. of obs	10,591	10,591	10,591	10,591
N. clust	862	862	862	862

(b) High yield

	(1) Baseline	(2) U.S. 2Y	(3) U.S. term spread	(4) VIX
Agg. cond.		-0.02	-0.02	0.01
		(0.01)*	(0.02)	(0.00)**
Δ FL spread	0.17	0.17	0.17	0.17
	(0.03)***	(0.03)***	(0.03)***	(0.03)***
Constant	0.17	0.20	0.21	0.05
	(0.00)***	(0.02)***	(0.02)***	(0.06)
Adj. R-sqr	0.20	0.20	0.20	0.20
W/in adj. R-sqr.	0.11	0.11	0.11	0.12
N. of obs	2,229	2,229	2,229	2,229
N. clust	434	434	434	434

Table 10: Firm-level probability of issuance. This table reports the estimated coefficients from the linear probability regression of a firm issuing in a given month as a function of lagged secondary-market spreads and aggregate conditions. Secondary market spreads measured as the weighted-average secondary market spread at the firm level. Secondary market yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020). All regressions include firm and country fixed effects. Standard errors clustered at the firm level reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(a) Investment grade

	(1) Baseline	(2) Month FE	(3) U.S. 2Y	(4) U.S. term spread	(5) VIX
SM spread	-0.15	-0.87	-0.10	-0.47	-0.02
	(0.12)	(0.17)***	(0.16)	(0.20)**	(0.23)
Agg. cond			-0.05	-0.13	0.06
			(0.13)	(0.20)	(0.02)***
SM spread × Agg. cond			-0.06	0.17	-0.01
			(0.07)	(0.11)	(0.01)*
Constant	10.24	11.48	10.47	10.54	9.28
	(0.20)***	(0.30)***	(0.36)***	(0.32)***	(0.46)***
Adj. R-sqr	0.31	0.31	0.31	0.31	0.31
W/in adj. R-sqr.	0.00	0.00	0.00	0.00	0.00
N. of obs	181,454	181,454	181,454	181,454	181,454
N. clust	1,683	1,683	1,683	1,683	1,683

(b) High yield

	(1) Baseline	(2) Month FE	(3) U.S. 2Y	(4) U.S. term spread	(5) VIX
SM spread	-0.20	-0.24	-0.24	-0.28	-0.19
	(0.02)***	(0.02)***	(0.03)***	(0.03)***	(0.03)***
Agg. cond			-0.53	0.61	-0.08
			(0.12)***	(0.16)***	(0.02)***
SM spread × Agg. cond			-0.01	0.03	0.00
			(0.02)	(0.02)	(0.00)
Constant	6.06	6.27	7.20	5.45	7.27
	(0.09)***	(0.12)***	(0.25)***	(0.22)***	(0.30)***
Adj. R-sqr	0.16	0.16	0.16	0.16	0.16
W/in adj. R-sqr.	0.00	0.00	0.00	0.00	0.00
N. of obs	101,787	101,787	101,787	101,787	101,787
N. clust	1,445	1,445	1,445	1,445	1,445

Table 11: Bond-level offering amount and credit spreads. This table reports the estimated coefficients from the regression of the offering amount (in USD equivalents) on measures of primary and secondary market credit spreads. Secondary market spreads measured as the weighted-average secondary market spread at the firm level as of the month before the issuance. Columns (2) and (5) restrict the sample of observations to those for which default-adjusted spreads ("EBP") are available. Both offering and secondary market yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020). Default-adjusted spreads calculated as in Gilchrist and Zakrajšek (2012); default-adjusted and predicted spreads add up to the overall spread at the bond level. All regressions include firm and country fixed effects. Standard errors clustered at the firm level reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

	IG			HY		
	(1)	(2)	(3)	(4)	(5)	(6)
PM spread	0.01	0.01		0.00	0.02	
	(0.01)	(0.01)		(0.01)	(0.01)*	
SM spread	0.01	0.01		-0.01	-0.01	
	(0.01)	(0.01)		(0.00)**	(0.01)**	
PM EBP			-0.03			0.00
			(0.01)***			(0.01)
SM EBP			0.02			-0.00
			(0.02)			(0.01)
Predicted PM spread			0.13			0.07
			(0.02)***			(0.01)***
Predicted SM spread			-0.18			-0.06
			(0.05)***			(0.01)***
Adj. R-sqr	0.37	0.37	0.40	0.41	0.45	0.47
W/in adj. R-sqr.	0.00	0.00	0.05	0.00	0.00	0.03
N. of obs	25,525	19,080	19,080	5,025	3,199	3,199
N. clust	1,023	559	559	670	352	352

Table 12: Country-level cyclicality of primary-secondary market spread. This table reports the estimated coefficients from the regression of the country-level primary-secondary market spreads on aggregate conditions. Country-level spreads measured as the weighted-average spread at the country-quarter level; primary-secondary market spread measured as the contemporaneous difference between offering spreads and secondary market spreads. "U. S. term spread" measured as the difference between the yields on 10 year and 2 year Treasuries. "GFC" is the global financial cycle factor of Miranda-Agrippino et al. (2020); lower levels of GFC correspond to tighter credit conditions. Both offering and secondary market yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020). All regressions include country fixed effects. Heteroskedasticity-robust standard errors reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(a) Advanced economies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Baseline	YoY real GDP growth	Policy rate	U.S. 2Y	U.S. term spread	VIX	USD TWI	Δ USD TWI	GFC
Agg. cond		0.06	0.00	0.09	-0.18	-0.05	0.00	-0.04	0.34
		(0.01)***	(0.02)	(0.02)***	(0.04)***	(0.01)***	(0.00)	(0.01)***	(0.04)***
Constant	-0.22	-0.32	-0.22	-0.43	-0.00	0.78	-0.34	-0.15	-0.32
	(0.04)***	(0.04)***	(0.05)***	(0.05)***	(0.05)	(0.13)***	(0.40)	(0.03)***	(0.04)***
Adj. R-sqr	0.10	0.11	0.10	0.11	0.11	0.13	0.10	0.12	0.12
W/in adj. R-sqr.	0.00	0.01	-0.00	0.01	0.01	0.04	-0.00	0.03	0.04
N. of obs	2,011	1,973	1,951	2,011	2,011	2,011	1,973	1,973	1,898

(b) Emerging economies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Baseline	YoY real GDP growth	Policy rate	U.S. 2Y	U.S. term spread	VIX	USD TWI	Δ USD TWI	GFC
Agg. cond		-0.02	-0.03	0.04	-0.49	-0.17	-0.01	-0.09	0.75
		(0.03)	(0.02)	(0.06)	(0.12)***	(0.02)***	(0.01)	(0.02)***	(0.13)***
Constant	-0.81	-0.63	-0.43	-0.88	-0.17	2.33	0.27	-0.67	-1.08
	(0.09)***	(0.11)***	(0.20)**	(0.14)***	(0.15)	(0.36)***	(1.00)	(0.09)***	(0.12)***
Adj. R-sqr	0.16	0.15	0.14	0.16	0.18	0.26	0.16	0.19	0.22
W/in adj. R-sqr.	0.00	-0.00	0.00	-0.00	0.02	0.12	-0.00	0.04	0.06
N. of obs	805	529	670	805	805	805	785	785	745

Table 13: Country-level issuance amount and credit spreads. This table reports the estimated coefficients from the regression of the country-quarter total offering amount (in USD equivalents) on measures of primary and secondary market credit spreads. Country-level spreads measured as the weighted-average spread at the country-quarter level; primary-secondary market spread measured as the contemporaneous difference between offering spreads and secondary market spreads. Columns (2) and (5) restrict the sample of observations to those for which default-adjusted spreads ("EBP") are available. Both offering and secondary market yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020). Default-adjusted spreads calculated as in Gilchrist and Zakrajšek (2012); default-adjusted and predicted spreads add up to the overall spread at the bond level. All regressions include quarter and country fixed effects. Heteroskedasticity-robust standard errors reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

	AE			EM		
	(1)	(2)	(3)	(4)	(5)	(6)
PM spread	-0.30	-0.86		-0.23	-0.36	
	(0.10)***	(0.38)**		(0.13)*	(0.54)	
SM spread	0.12	3.95		-0.41	-0.86	
	(0.17)	(1.17)***		(0.11)***	(0.29)***	
PM EBP			-0.45			-1.51
			(0.62)			(0.66)**
SM EBP			2.64			-0.59
			(1.31)**			(0.47)
Predicted PM spread			0.25			-0.08
			(0.60)			(0.58)
Predicted SM spread			-0.73			-2.08
			(1.06)			(0.66)***
Adj. R-sqr	0.82	0.82	0.82	0.68	0.78	0.78
W/in adj. R-sqr.	0.00	0.02	0.00	0.02	0.02	0.04
N. of obs	2,011	835	835	805	345	345

Table 14: Relationship between bond issuances and firm-level changes in bond amount outstanding. This table reports the estimated coefficients from the regression of firm-level changes in bond amount outstanding on firm-level total bond offering amount for the same firm-year. Amount outstanding measured from Capital IQ Debt Structure Dataset. "Matched to BS" restricts the sample to firms which are matched to balance sheets from the consolidated Compustat/Worldscope database. "Log EDF" is the (log) 1 year expected default frequency from Moody's KMV Credit Edge, measured as of the month before the fiscal period end date. "Current portion LTD" measured as the percent of long-term debt due in one year. "Current portion TD" measured as the sum of short-term debt and long term debt due in one year as a percent of total debt. Profitability measured as EBITDA relative to lagged total assets. Cash holdings measured as the sum of cash and short term investments. All regressions include firm and country fixed effects. Standard errors clustered at the firm level reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(a) Advanced economies

	(1) All	(2) Matched to BS	(3) Log EDF	(4) Current portion LTD	(5) Current portion TD	(6) Share LTD	(7) TD/TA	(8) Profitability	(9) Cash hold/TA
Offering amt	0.60	0.52	0.42	0.57	0.51	0.41	0.43	0.31	0.52
	(0.09)***	(0.06)***	(0.04)***	(0.05)***	(0.07)***	(0.08)***	(0.14)***	(0.09)***	(0.09)***
L.Firm char			-1.53	-12.15	-33.49	82.36	-904.68	-340.13	-44.24
			(18.65)	(110.30)	(53.34)	(73.66)	(257.86)***	(316.80)	(199.03)
Offering amt × L.Firm char			-0.04	-0.49	-0.07	0.07	0.22	1.42	-0.29
			(0.02)**	(0.27)*	(0.06)	(0.07)	(0.26)	(0.48)***	(0.35)
Adj. R-sqr	0.16	0.23	0.26	0.40	0.27	0.33	0.26	0.24	0.22
W/in adj. R-sqr.	0.03	0.22	0.24	0.35	0.23	0.26	0.23	0.23	0.22
N. of obs	12,993	9,300	7,477	6,830	8,781	8,543	9,053	7,936	8,634
N. of clusters	2,361	1,902	1,467	1,520	1,840	1,833	1,864	1,741	1,801

(b) Emerging economies

	(1) All	(2) Matched to BS	(3) Log EDF	(4) Current portion LTD	(5) Current portion TD	(6) Share LTD	(7) TD/TA	(8) Profitability	(9) Cash hold/TA
Offering amt	0.38	0.24	0.23	0.37	0.38	0.03	0.40	-0.02	0.19
	(0.10)***	(0.07)***	(0.06)***	(0.10)***	(0.09)***	(0.14)	(0.17)**	(0.05)	(0.06)***
L.Firm char			9.77	73.33	100.46	-152.16	-111.19	-384.57	127.74
			(10.55)	(55.13)	(72.85)	(67.96)**	(167.80)	(141.73)***	(122.01)
Offering amt × L.Firm char			-0.06	-0.62	-0.18	0.35	-0.39	2.61	-0.11
			(0.02)***	(0.18)***	(0.21)	(0.20)*	(0.44)	(0.44)***	(0.55)
Adj. R-sqr	-0.18	0.13	0.17	0.28	0.19	0.15	0.13	0.17	0.08
W/in adj. R-sqr.	0.01	0.10	0.15	0.13	0.14	0.11	0.11	0.16	0.06
N. of obs	6,943	2,888	2,451	1,767	2,761	2,797	2,839	2,707	2,732
N. of clusters	1,907	766	649	505	747	751	756	731	740

Table 15: Relationship between bond issuances and firm-level changes in loan amount outstanding. This table reports the estimated coefficients from the regression of firm-level changes in loan amount outstanding on firm-level total bond offering amount for the same firm-year. Amount outstanding measured from Capital IQ Debt Structure Dataset. "Loans" defined to included bank loans, term loans, the drawn portion of revolving credit, and commercial mortgages. "Matched to BS" restricts the sample to firms which are matched to balance sheets from the consolidated Compustat/Worldscope database. "Log EDF" is the (log) 1 year expected default frequency from Moody's KMV Credit Edge, measured as of the month before the fiscal period end date. "Current portion LTD" measured as the percent of long-term debt due in one year. "Current portion TD" measured as the sum of short-term debt and long term debt due in one year as a percent of total debt. Profitability measured as EBITDA relative to lagged total assets. Cash holdings measured as the sum of cash and short term investments. All regressions include firm and country fixed effects. Standard errors clustered at the firm level reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(a) Advanced economies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All	Matched to BS	Log EDF	Current portion LTD	Current portion TD	Share LTD	TD/TA	Profitability	Cash hold/TA
Offering amt	-0.02	-0.04	-0.09	0.06	-0.01	-0.09	0.04	-0.06	-0.08
	(0.03)	(0.03)	(0.04)**	(0.03)**	(0.02)	(0.05)**	(0.03)	(0.03)**	(0.04)**
L.Firm char			-68.76	127.04	104.66	-4.81	-871.63	603.51	287.45
			(15.09)***	(114.28)	(65.33)	(69.02)	(202.78)***	(193.13)***	(172.38)*
Offering amt × L.Firm char			-0.02	-0.36	-0.02	0.13	-0.25	0.19	0.30
			(0.01)	(0.28)	(0.03)	(0.06)**	(0.11)**	(0.16)	(0.21)
Adj. R-sqr	-0.04	-0.13	-0.10	0.04	-0.12	-0.02	-0.12	-0.14	-0.13
W/in adj. R-sqr.	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.01
N. of obs	12,993	9,300	7,477	6,830	8,781	8,543	9,053	7,936	8,634
N. of clusters	2,361	1,902	1,467	1,520	1,840	1,833	1,864	1,741	1,801

(b) Emerging economies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All	Matched to BS	Log EDF	Current portion LTD	Current portion TD	Share LTD	TD/TA	Profitability	Cash hold/TA
Offering amt	-0.61	-0.02	-0.03	-0.04	0.17	-0.20	0.45	-0.27	-0.02
	(0.38)	(0.13)	(0.09)	(0.15)	(0.19)	(0.16)	(0.31)	(0.09)***	(0.22)
L.Firm char			-13.05	55.87	24.83	-55.45	-879.71	91.28	351.42
			(21.44)	(84.96)	(96.80)	(96.45)	(245.21)***	(223.95)	(190.20)*
Offering amt × L.Firm char			-0.15	0.06	-0.18	0.31	-1.13	1.95	0.33
			(0.07)**	(0.28)	(0.20)	(0.26)	(0.60)*	(0.70)***	(0.83)
Adj. R-sqr	-0.28	-0.08	-0.00	-0.07	-0.05	-0.04	-0.03	-0.01	-0.08
W/in adj. R-sqr.	0.02	-0.00	0.07	-0.00	0.01	0.00	0.05	0.03	0.00
N. of obs	6,943	2,888	2,451	1,767	2,761	2,797	2,839	2,707	2,732
N. of clusters	1,907	766	649	505	747	751	756	731	740

Table 16: Relationship between bond issuances and firm-level changes in share of intermediated credit. This table reports the estimated coefficients from the regression of firm-level changes in loan amount outstanding on firm-level total bond offering amount for the same firm-year. Amount outstanding measured from Capital IQ Debt Structure Dataset. "Loans" defined to included bank loans, term loans, the drawn portion of revolving credit, and commercial mortgages. "Share of intermediated credit" defined as the ratio between loans and the sum of bonds and loans outstanding; changes in share of intermediated credit measured in basis points. All regressions include firm and country fixed effects. Standard errors clustered at the firm level reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(a) Advanced economies

	(1) Bonds	(2) Loans	(3) Δ Share int. credit
Offering amt	0.60	0.00	-0.04
	(0.09)***	(0.03)	(0.01)***
Adj. R-sqr	0.16	0.20	0.07
W/in adj. R-sqr.	0.03	-0.00	0.00
N. of obs	12,993	10,125	12,662
N. of clusters	2,361	1,994	2,304

(b) Emerging economies

	(1) Bonds	(2) Loans	(3) Δ Share int. credit
Offering amt	0.38	-0.60	-0.09
	(0.10)***	(0.40)	(0.03)***
Adj. R-sqr	-0.18	-0.28	0.02
W/in adj. R-sqr.	0.01	0.02	0.00
N. of obs	6,943	6,736	6,899
N. of clusters	1,907	1,861	1,898

Table 17: Bond issuances and changes in bond amount outstanding at the country level. This table reports the estimated coefficients from the regression of country-level changes in bond amount outstanding on country-level total bond offering amount for the same country-year. Amount outstanding measured from Capital IQ Debt Structure Dataset. "U. S. term spread" measured as the difference between the yields on 10 year and 2 year Treasuries. "GFC" is the global financial cycle factor of Miranda-Agrippino et al. (2020); lower levels of GFC correspond to tighter credit conditions. All regressions include country fixed effects. Heteroskedasticity-robust standard errors reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(a) Advanced economies

	(1) Baseline	(2) YoY real GDP growth	(3) Policy rate	(4) U.S. 2Y	(5) U.S. term spread	(6) VIX	(7) USD TWI	(8) Δ USD TWI	(9) GFC
Offering amt	0.34	0.28	0.36	0.36	0.29	0.23	0.37	0.30	0.37
	(0.11)***	(0.11)***	(0.10)***	(0.10)***	(0.10)***	(0.10)**	(0.31)	(0.09)***	(0.10)***
Agg. cond		-3.76	6.19	7.39	-10.22	-1.84	-0.11	-0.83	8.01
		(4.23)	(3.53)*	(4.10)*	(7.09)	(1.53)	(0.47)	(0.79)	(4.29)*
Offering amt × Agg. cond		0.03	-0.03	-0.05	0.06	0.01	-0.00	0.01	-0.05
		(0.02)	(0.02)*	(0.02)*	(0.04)	(0.01)	(0.00)	(0.00)***	(0.03)**
Adj. R-sqr	0.12	0.13	0.12	0.13	0.12	0.13	0.11	0.12	0.12
W/in adj. R-sqr.	0.03	0.04	0.03	0.04	0.04	0.04	0.02	0.04	0.04
N. of obs	405	388	387	405	405	405	388	388	365

(b) Emerging economies

	(1) Baseline	(2) YoY real GDP growth	(3) Policy rate	(4) U.S. 2Y	(5) U.S. term spread	(6) VIX	(7) USD TWI	(8) Δ USD TWI	(9) GFC
Offering amt	0.34	0.39	-0.35	0.47	0.25	0.35	3.44	0.30	0.42
	(0.07)***	(0.14)***	(0.52)	(0.14)***	(0.15)	(0.43)	(1.49)**	(0.09)***	(0.10)***
Agg. cond		0.03	-0.34	-0.93	0.67	-0.07	0.04	0.01	-0.98
		(0.11)	(0.24)	(0.93)	(1.08)	(0.23)	(0.11)	(0.17)	(0.83)
Offering amt × Agg. cond		0.06	0.16	-0.10	0.12	-0.00	-0.03	0.01	0.19
		(0.02)***	(0.11)	(0.08)	(0.11)	(0.03)	(0.01)**	(0.01)	(0.12)*
Adj. R-sqr	0.68	0.24	0.71	0.70	0.70	0.67	0.77	0.68	0.65
W/in adj. R-sqr.	0.45	0.21	0.50	0.49	0.48	0.44	0.60	0.46	0.44
N. of obs	267	206	256	267	267	267	267	267	251

Table 18: Bond issuances and changes in loan amount outstanding at the country level. This table reports the estimated coefficients from the regression of country-level changes in loan amount outstanding on country-level total bond offering amount for the same country-year. Amount outstanding measured from Capital IQ Debt Structure Dataset. "Loans" defined to included bank loans, term loans, the drawn portion of revolving credit, and commercial mortgages. "U. S. term spread" measured as the difference between the yields on 10 year and 2 year Treasuries. "GFC" is the global financial cycle factor of Miranda-Agrippino et al. (2020); lower levels of GFC correspond to tighter credit conditions. All regressions include country fixed effects. Heteroskedasticity-robust standard errors reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(a) Advanced economies

	(1) Baseline	(2) YoY real GDP growth	(3) Policy rate	(4) U.S. 2Y	(5) U.S. term spread	(6) VIX	(7) USD TWI	(8) Δ USD TWI	(9) GFC
Offering amt	0.06	0.07	0.09	0.09	0.09	0.09	-0.19	0.02	0.05
	(0.09)	(0.11)	(0.10)	(0.10)	(0.11)	(0.12)	(0.28)	(0.08)	(0.09)
Agg. cond		-0.45	2.51	2.41	-1.62	0.32	-0.14	-0.60	0.56
		(0.64)	(1.34)*	(1.62)	(2.33)	(0.35)	(0.14)	(0.29)**	(2.06)
Offering amt × Agg. cond		-0.01	0.01	0.02	-0.03	-0.00	0.00	0.01	-0.04
		(0.01)	(0.02)	(0.02)	(0.03)	(0.01)	(0.00)	(0.00)***	(0.03)
Adj. R-sqr	0.01	0.01	0.02	0.03	0.02	0.01	0.01	0.06	0.03
W/in adj. R-sqr.	0.00	0.00	0.01	0.02	0.02	0.00	0.00	0.06	0.02
N. of obs	405	388	387	405	405	405	388	388	365

(b) Emerging economies

	(1) Baseline	(2) YoY real GDP growth	(3) Policy rate	(4) U.S. 2Y	(5) U.S. term spread	(6) VIX	(7) USD TWI	(8) Δ USD TWI	(9) GFC
Offering amt	0.21	-0.35	-3.39	0.58	-0.34	2.11	11.96	0.22	0.88
	(0.31)	(0.21)*	(1.59)**	(0.40)	(0.44)	(0.91)**	(4.15)***	(0.48)	(0.33)***
Agg. cond		-0.01	-1.33	-3.85	-1.68	1.07	0.46	0.50	-4.63
		(0.20)	(0.81)	(3.14)	(3.68)	(0.54)*	(0.33)	(0.57)	(2.77)*
Offering amt × Agg. cond		-0.02	0.84	-0.28	0.69	-0.13	-0.10	-0.00	0.60
		(0.05)	(0.34)**	(0.35)	(0.33)**	(0.06)**	(0.04)***	(0.05)	(0.42)
Adj. R-sqr	0.46	0.12	0.58	0.49	0.57	0.50	0.64	0.45	0.66
W/in adj. R-sqr.	0.02	0.05	0.25	0.08	0.22	0.10	0.36	0.02	0.27
N. of obs	267	206	256	267	267	267	267	267	251

Table 19: Bond issuances and the composition of loan outstanding at the country level. This table reports the estimated coefficients from the regression of country-level changes in amount outstanding on country-level total bond offering amount for the same country-year. Amount outstanding measured from Capital IQ Debt Structure Dataset. "Loans" defined to included bank loans, term loans, the drawn portion of revolving credit, and commercial mortgages. "Share of intermediated credit" defined as the ratio between loans and the sum of bonds and loans outstanding; changes in share of intermediated credit measured in basis points. "Revolver util" defined as the percent of revolving credit drawn down. "CP util" defined as the percent of available commercial paper facilities drawn down. Column (3) restricts the sample of firms used for the calculation of loan amount outstanding to those that issue both bonds and loans. Column (4) restricts the sample of firms used for the calculation of loan amount outstanding to those that only have loans outstanding. Column (6) restricts the sample of firms used for the calculation of share of intermediated credit to those that issue both bonds and loans. All regressions include country fixed effects. Heteroskedasticity-robust standard errors reported in parentheses below point estimates. *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

(a) Advanced economies

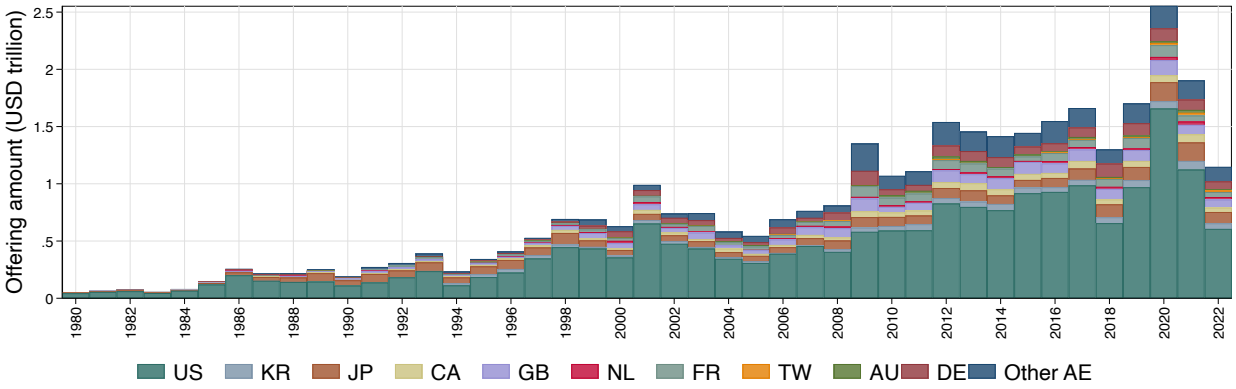
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Bonds	Loans	Loans, B&L issuers	Loans, L issuers	Δ share int. credit	Δ share int. credit, B&L issuers	Revolver util	CP util
Offering amt	0.34	0.06	0.00	0.06	-0.42	-0.64	-0.02	-0.01
	(0.11)***	(0.09)	(0.06)	(0.07)	(0.37)	(0.26)**	(0.01)***	(0.01)*
Adj. R-sqr	0.12	0.01	-0.01	0.01	-0.03	-0.03	0.36	0.49
W/in adj. R-sqr.	0.03	0.00	-0.00	0.03	-0.00	-0.00	0.00	-0.00
N. of obs	405	405	405	405	405	405	423	260

(b) Emerging economies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Bonds	Loans	Loans, B&L issuers	Loans, L issuers	Δ share int. credit	Δ share int. credit, B&L issuers	Revolver util	CP util
Offering amt	0.34	0.21	0.49	-0.28	-0.26	-0.07	-0.03	0.00
	(0.07)***	(0.31)	(0.19)**	(0.22)	(0.17)	(0.46)	(0.01)***	(0.04)
Adj. R-sqr	0.68	0.46	0.54	0.10	-0.04	-0.03	0.22	0.47
W/in adj. R-sqr.	0.45	0.02	0.18	0.14	-0.00	-0.00	0.01	-0.03
N. of obs	267	267	266	266	266	265	241	45

Figure 1. Primary market bond issuance over time. This figure plots the time series of the total offering amount (in USD equivalents) of non-financial corporate, fixed-coupon bonds issued by ultimate parents domiciled in a country within a year for each country for the top 10 advanced economies, the top 10 emerging market economies, the remaining advanced economies and the remaining emerging market economies. Countries ranked based on total number of unique non-financial corporate fixed-rate bonds issued by issuers domiciled within the country.

(a) Advanced economies



(b) Emerging market economies

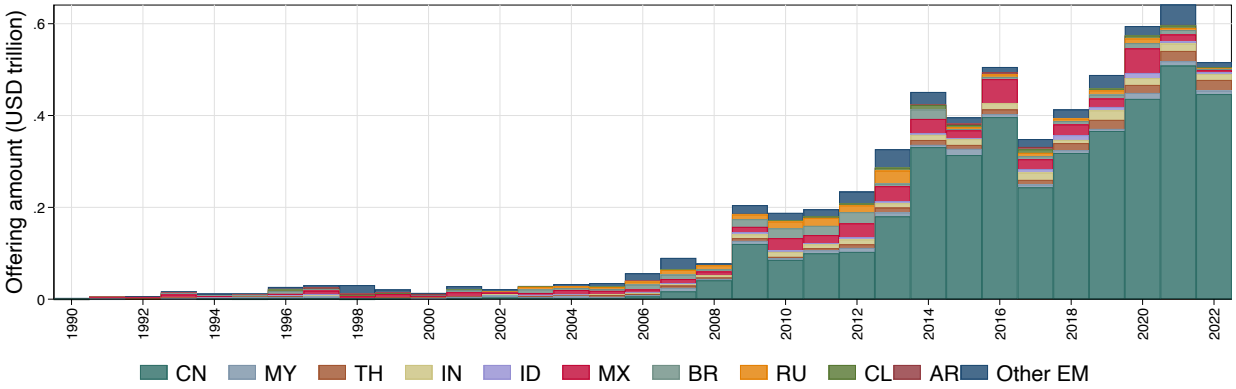
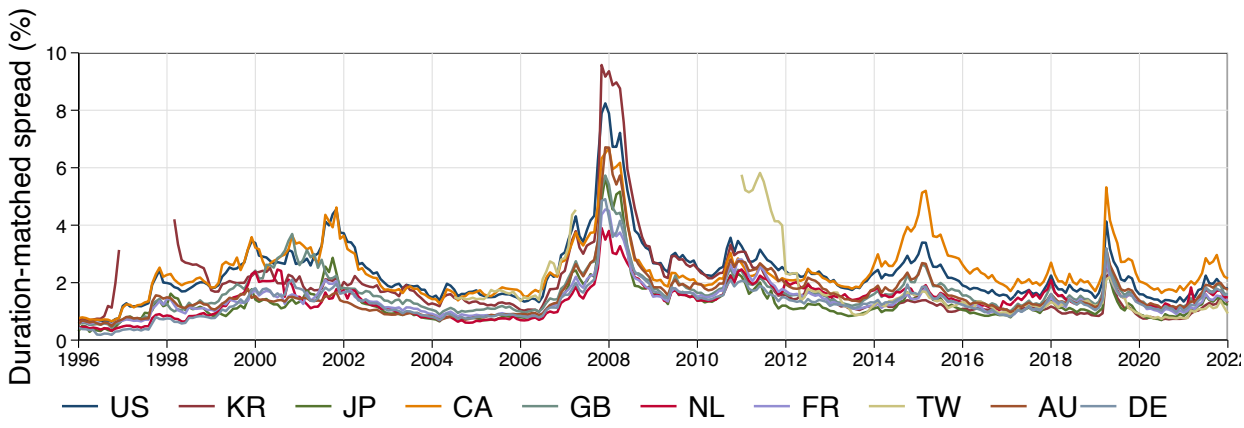


Figure 2. Secondary market average duration-matched spreads. This figure plots the time series of the amount-outstanding-weighted average monthly secondary market spreads of non-financial corporate, fixed-coupon bonds issued by ultimate parents domiciled in a country for each country for the top 10 advanced economies and the top 10 emerging market economies. Secondary market spreads measured using quotes on the constituents of the ICE Global Corporate Index and the ICE Global High Yield Corporate Index. Secondary market yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020).

(a) Advanced economies



(b) Emerging market economies

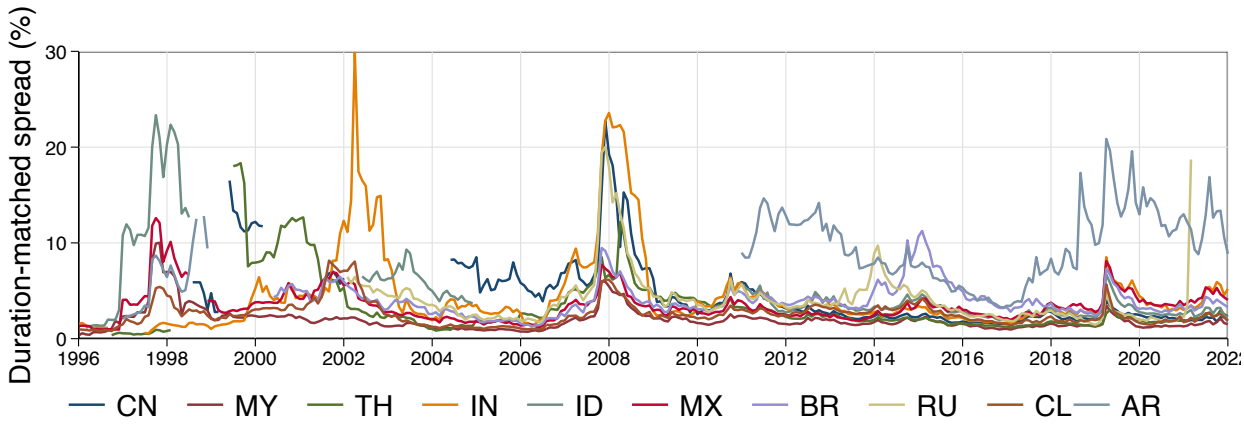


Figure 3. Coverage of national accounts in Capital IQ Debt Structure Data. This figure plots the percent of national accounts totals for non-financial corporations covered in Capital IQ Debt Structure Dataset (total debt and composition of debt) and consolidated Compustat/Worldscope (total assets). Debt securities include "bonds and notes", "debentures", "notes payable" and "commercial paper". "Loans" include all other types of debt. Only non-financial ultimate parents included in Capital IQ/consolidated balance sheet totals; country assigned based on ultimate parent domicile.

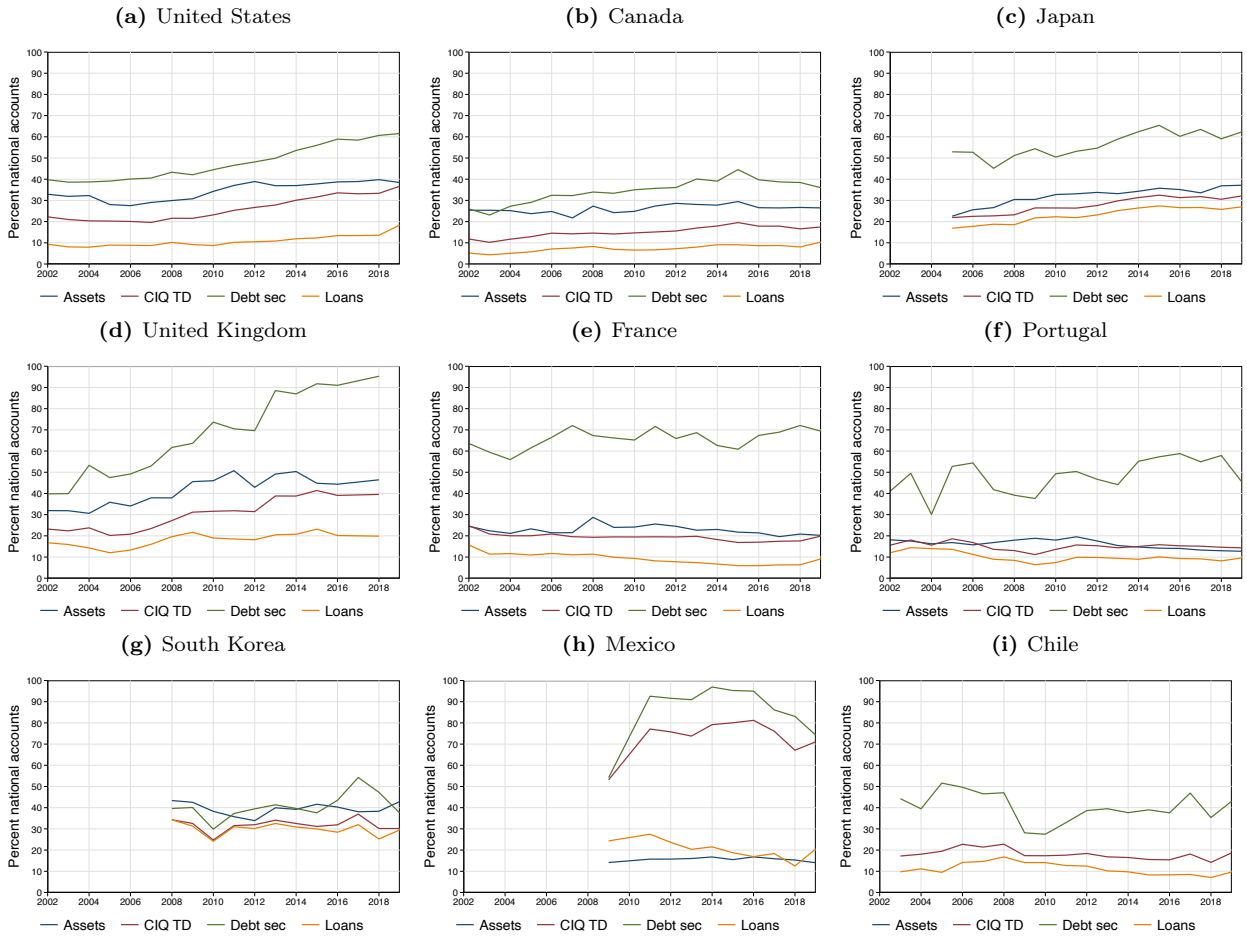


Figure 4. Gap between average currency-adjusted duration-matched spread for two alternative definitions of country. This figure plots the time series of the currency-adjusted, duration-matched weighted-average spreads of non-financial corporate, fixed-coupon bonds for two definitions of issuer domicile. "Domestic only" only includes issuances by either parents or subsidiaries in a given country; "Including foreign subsidiaries" also includes issuances by foreign subsidiaries of domestic parents. Offering yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020). Spreads averaged using offering amounts (in USD equivalents).

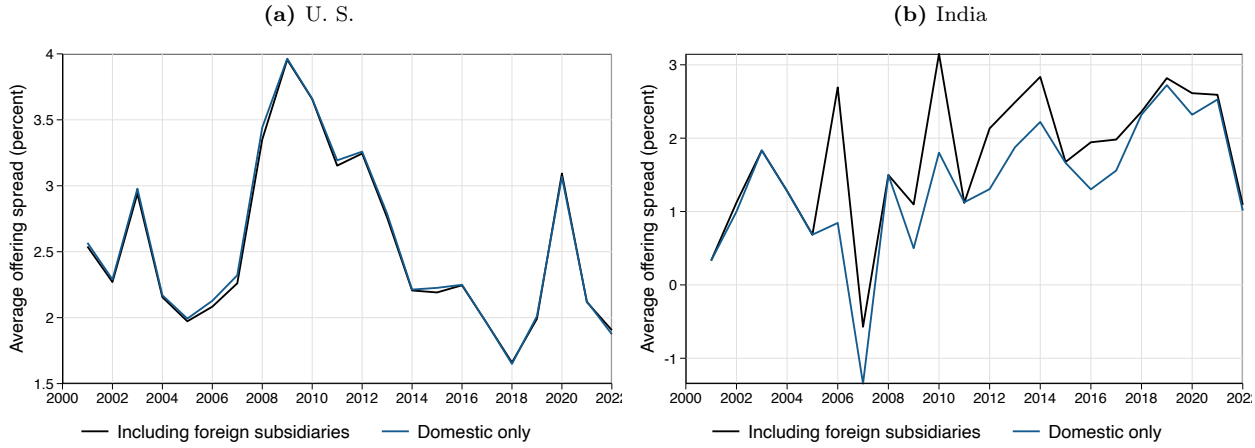


Figure 5. Issuance to inclusion premium. This figure plots the time series of the primary-secondary spread at the bond level on changes in aggregate conditions, with the secondary market spread measured as the first observation of the secondary market spread for the bond itself, restricting to bonds that enter the ICE Global Indices within a week of issuance. Both offering and secondary market yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020). Default-adjusted spreads calculated as in Gilchrist and Zakrajšek (2012).

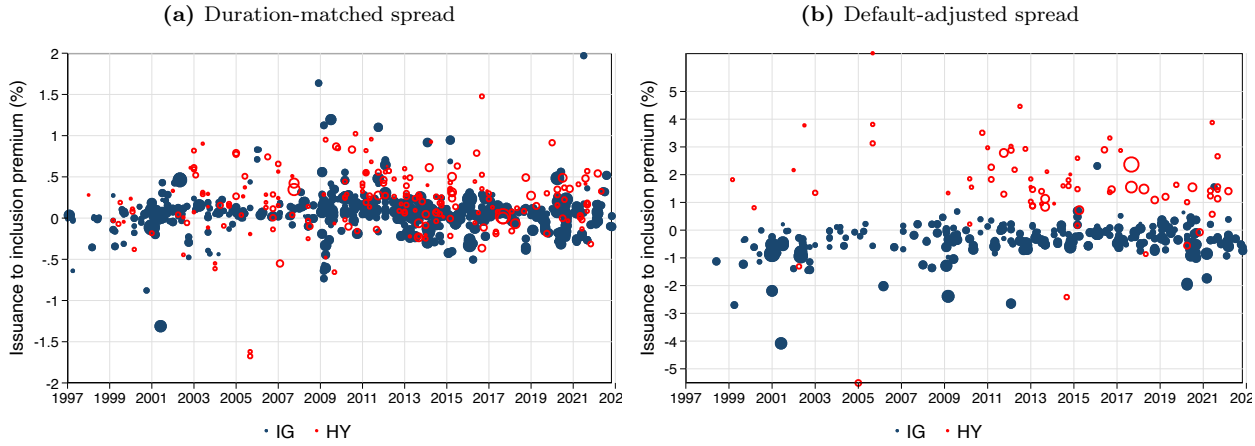


Figure 6. Time series of country-level average primary and secondary market spreads. This figure plots the time series of the country-level average primary and secondary market spreads. Country-level spreads measured as the weighted-average spread at the country-quarter level. Both offering and secondary market yields are duration-matched to the sovereign discount curve of the currency of denomination of the bond; currency-adjustment to USD-equivalent spreads done as in Liao (2020).

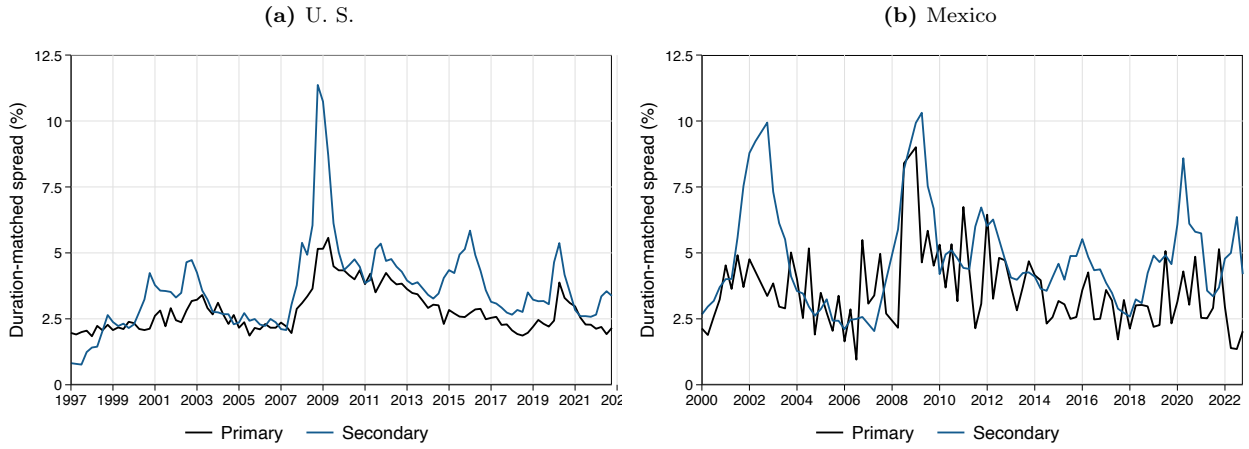
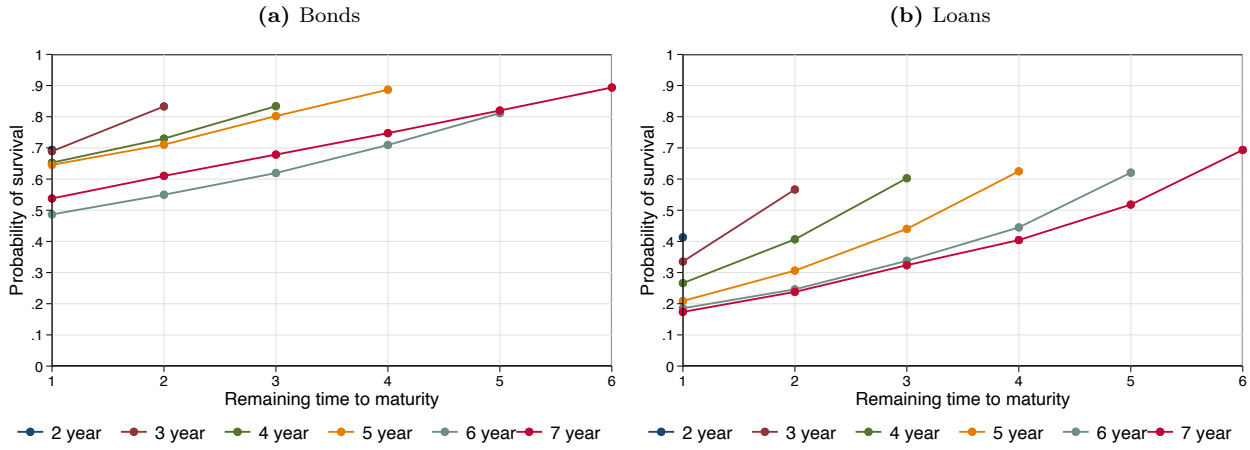


Figure 7. Term structure of survival probabilities by initial maturity. This figure plots the average probability of an instrument surviving to τ years before maturity conditional on the original time to maturity of the instrument and instrument type. "Loans" defined to include bank loans and term loans only. Linear probability regressions include firm and country fixed effects at the original maturity-instrument type level.



Appendix

While data quality has improved substantially over the last 20 years, the available data still have some drawbacks. In this appendix we describe in detail each of the datasets, how we clean them, how we combine them, and describe the challenges faced in the process as well as our preferred solution.

A Primary bond market data

We begin with data on primary market issuances. In creating a broad dataset of bond primary market issuances, we include both original issuances and issue re-openings. While issue re-openings are only available to firms with existing corporate bonds outstanding, re-openings do represent the cost of borrowing for those firms and should thus be included when measuring primary market conditions.

A.1 International primary market data

We use SDC Platinum New Issues database (SDC) to capture primary market activity for issuers outside of the United States. SDC reports bond and issuer characteristics as of the time of a new bond issuance – or the reopening of an existing bond issuance–, including issuer and parent domicile, issuer industry, currency of issuance, offering amounts, coupon type, rate, and payment frequency, bond seniority, and call and put provisions. SDC coverage starts in 1980 and our sample runs through the end of 2022. We clean SDC as follows (summarized in Table A.1).

1. **Package deals.** Some bonds are issued in a package, with same bond characteristics but offering amount split across multiple deal IDs.
   What do we do? Within a package and issuer, we identify bonds that have the same offering date, maturity date, coupon characteristics, principal offered in all markets, and proceeds raised in all markets, and sum up the principal offered in this market and proceeds raised in this market within such groups. We then keep one observation per each grouping. This removes 40,662 duplicate observations.

2. **Multiple issuers per package.** Some packages have issuers with different 6 digit CUSIPs, suggesting multiple issuers issuing with the same package id.
   What do we do? We drop packages with multiple issuers. This removes 12 observations.

3. **Multiple deal IDs per issuer-bond.** Some bonds have multiple observations with the same ISIN/9 digit CUSIP, same 6 digit CUSIP, offering date and maturity date but different deal IDs. Such bonds are primarily issued by financials (securitizers) and federal agencies.
   What do we do? We drop bonds with multiple observations with the same ISIN/9 digit CUSIP, same 6 digit CUSIP, offering date and maturity date. This removes 9,100 observations.

4. **Bond re-openings.** Some issuers choose to reopen an existing bond issuance – increasing the amount outstanding of the bond while keeping the rest of the bond characteristics the same – instead of issuing new bonds. In SDC, such reopenings are recorded as new deals, with new deal IDs.
   What do we do? We identify reopenings as observations with the same ISIN/9 digit CUSIP, same 6 digit CUSIP, and maturity date but different offering dates, restricting to bonds in which the number of unique observations per bond equals the number of unique offering dates per bond. For the purposes of creating a dataset of bond characteristics to be used in conjunction with secondary market prices, we keep one observation (the initial offering) per reopening grouping. For the purposes of tracking amounts offered and offering spreads over time, we keep all the observations in a reopening grouping.

5. **Multiple observations per ISIN/9 digit CUSIP**. Some bonds have multiple observations per ISIN/9 digit CUSIP that are not reopenings and not maturity extensions. Such bonds are primarily issued by financials (securitizers) and federal agencies.
   What do we do? We drop bonds with multiple observations with the same ISIN/9 digit CUSIP that are not identified as reopenings. This removes 3,023 observations.

6. **Multiple issue types per ISIN/9 digit CUSIP**. Some bonds have multiple observations per ISIN/9 digit CUSIP that report different issue types in different observations. Such bonds are primarily issued by financials (securitizers) and federal agencies.
   What do we do? We drop bonds with multiple observations with the same ISIN/9 digit CUSIP with multiple issue types. This removes 708 observations.

7. **Other duplicates**. Some bonds in SDC have neither ISIN nor 9 digit CUSIP reported.
   What do we do? We identify duplicates amongst such bonds based on 6 digit CUSIP, offering date, maturity date, and coupon characteristics (coupon rate for fixed coupon bonds, and floating rate index and basis point spread to floating rate index for floating rate bonds). Dropping duplicates along these dimensions removes 16,535 observations.

A.2 U. S. primary market data

We supplement the primary market pricing and bond characteristics data on international corporate bonds from SDC with primary market pricing and bond characteristics data for U. S. corporate bonds from Mergent FISD (Mergent). Mergent provides comprehensive coverage for publicly offered U. S. debt securities. Mergent tracks issuer and bond characteristics over the lifetime of the bond, including issuer and parent domicile, issuer industry, currency of issuance, offering amounts, coupon type, rate, and payment frequency, bond seniority, and call and put provisions. We identify re-openings in Mergent using the amount outstanding history table, selecting amount outstanding changes identified as reopenings by Mergent.[11] Mergent coverage begins in 1950, though there are only 2,873 unique non-financial corporate bonds with maturity greater than a year in the pre-1980 sample, and reliable data on changes

[11]Note that there is a small number of increases in amount outstanding that are not identified by Mergent to be reopenings.

in amount outstanding begins in 1995. As with SDC, we end our Mergent sample at the end of 2022.

A.3 Consolidating U. S. and international primary market data

We create a consolidated dataset of global primary market data by combining the information captured in SDC with that captured in Mergent. Since the same bond may appear in both datasets, we merge the two together using bond-level identifiers and offering characteristics. We start by merging based on ISINs or 9 digit CUSIPs (giving preference to the matches based on ISINs) and recorded issuance date. Since Mergent assigns the settlement date as the observation date for issue reopenings, we consider a Mergent and an SDC observations to be a potential match if the observation date in Mergent is the same as either the issue date or the payment date in SDC.

This procedure results in a many-to-many potential mapping between Mergent and SDC. To disambiguate among the many-to-many matches, we first retain matches that correspond to the closest match between the offering amounts reported in both datasets, requiring that the difference in offering amounts reported is no more than 30%.[12] Among the remaining many-to-many matches, we first select the matches where the offering date in Mergent coincides with the payment date (not the issue date) in SDC, and then matches where the offering price reported in both datasets is the same. We drop any matches that cannot be disambiguated following this procedure.

Our consolidated database of primary market corporate bond issuances thus contains 311,702 unique bonds (10,589 unique issuers) captured only in Mergent, 435,109 unique bonds (61,617 unique issuers) captured only in SDC, and 55,417 unique bonds (9,265 unique issuers) captured in both datasets. It is worth noting that ISIN/9 digit CUSIP information is missing for some observations in SDC, especially earlier in the sample and for bonds issued by Japanese issuers. To the extent that some of the bonds with missing issue-level identifiers are also present in Mergent, the consolidated dataset will double count those bonds. We use the overlapping sample of bonds to verify that, for bonds present in both Mergent and SDC, the two databases provide similar information on primary market pricing and bond characteristics.

Table A.2 summarizes the coverage across countries of the consolidated primary issuance dataset for non-financial issuers and issues with a maturity of over a year. Three features of the consolidated dataset are worth noting. First, the median size of the issuances captured in both datasets is larger than the median size of the issuances that are reported in only one of SDC or Mergent, suggesting that the overlapping coverage is dominated by larger issues. Second, comparing the number of unique bonds and issuers across countries, we see that, on average, U. S. issuers captured in Mergent have more bonds per issuer than either those captured only in SDC or issuers outside the U. S. Finally, floating rate data for issuers in emerging market economies is captured almost exclusively by SDC.

Turning next to the industry composition of the consolidated dataset, in Table A.3 we see that, among non-financial issuers, most issuers and bond issues are in the manufacturing

[12] In a few instances, the total offering amount in Mergent corresponds to the sum across multiple observations in SDC that have the same settlement date but issuance dates less than a week apart. In these cases, we add up the SDC observations to a single observation and consider that to be a true match to Mergent.

and utilities sectors. Outside of the U. S., construction and services sectors issuers also issue a substantial number of bonds.

Finally, Table A.4 reports the currency composition of the consolidated primary market dataset. USD-denominated issues represent almost half of the overall sample. The median size of Euro-denominated bonds is larger than those denominated in other currencies, and the prevalence of floating-rate bonds is higher among Euro-denominated bonds.

One characteristic of new bond issuances that differs noticeably between U. S. and the rest of the world is the time-to-maturity at issuance. Figure A.1a[13] shows that U. S. issuances tend to have longer maturities than issuances in the rest of the world, with the majority of U. S. issuances concentrated in the 5 to 10 years segment and 10 years being the most common maturity for fixed coupon issuances. In contrast, in the rest of the world, the most common maturity is 3 years, and 40% of issuances have maturity of 3 years or lower. U. S. issuances also seem to be concentrated around standard U. S. Treasury maturities. Turning to floating rate issuances in Figure A.1b, the distribution of maturities is more similar between U. S. and non-U. S. issuances, with around 70% of issuances having maturity of 3 years or less, and the remaining issuances concentrated at the 5, 10, 15 and 30 year maturity.

In general, corporate bonds may not survive to the contractual maturity, through corporate actions such as selective default, debt restructuring, and full or partial calls. Figure A.2 shows that, while still relatively rare in bonds issued by issuers in emerging market economies, call provisions – which provide firms with a contractual right to recall its debt prior to maturity – are becoming increasingly common, with almost 80% of U. S. bonds, more than 50% of bonds in other AE countries, and more than 20% of bonds in EM countries being issued callable by the end of the sample.

B Secondary bond market data

Firms' ability and willingness to access primary debt markets is shaped by a variety of factors, including secondary market credit spreads on both their own and related firms' credit spreads. For example, primary market offering spreads are often determined on a "matrix-pricing" basis, with secondary market spreads on existing comparable bonds of the same firm or firms with a similar credit rating operating in the same industry used as the benchmark in determining yields at issuance. Secondary market prices and spreads, moreover, contain information about the global credit cycle and the local deviations from the global credit cycle in their own right.

B.1 Sample

We use secondary bond market quotes from ICE Global Bond Indices, and define our universe of corporate bonds to be the underlying constituents from the ICE Global Corporate (G0BC) and the ICE Global High Yield Corporate (HW00) Indices. The two indices track the performance of investment grade and speculative grade (high yield), respectively, corporate debt

[13]The figure plots the fraction of bonds within each category – bonds issued by U. S. issuers and bonds issued by issuers outside the U. S. – issued with a given maturity. Thus, for example, the blue bars, representing the distribution of maturities for the sample of bonds issued by U. S. issuers, add up to 1.

publicly issued (including 144a securities) in major domestic and eurobond markets. To qualify for inclusion in the respective index, securities must have an average rating of above (below) investment grade, at least 18 months original maturity, at least one year remaining time to maturity (as of each monthly rebalance date), a fixed coupon schedule[14] and a minimum amount outstanding. The high yield index includes issues denominated in either USD, EUR, GBP, or CAD, with minimum amount outstanding of USD 250 million, EUR 250 million, GBP 250 million, and CAD 100 million, respectively. The investment grade index additionally includes bonds denominated in AUD (minimum AUD 100 million), CHF (minimum CHF 100 million), JPY (minimum 20 billion), and DKK (1 billion). Data on ICE Global Indices starts in January 1998; as before, we end our sample at the end of 2022. ICE constituents data is available daily for the covered time period. Since our primary applications of this data are understanding the composition of the constituent universe relative to primary market issuances and understanding the dynamics of global credit cycles, we focus on monthly observations, selecting data as of the third Wednesday of each month to reduce volatility in quotes due to month-end rebalancing.

Table A.5 summarizes the coverage of ICE Global Corporate Index and the ICE Global High Yield Corporate Index of bonds issued by non-financial and financial corporations[15] by country. Bonds issued by U. S. issuers represent the majority of the sample, especially for non-financial issuers and even more so for high yield non-financial issuances. More generally, a larger fraction of U. S. bonds included in the two indices are issued by non-financials, while the split between financial and non-financial issuers is more even for the other countries captured by the indices.

Bonds issued by firms in the three largest European issuer countries (Netherlands, France, and Germany) have larger median face value (in USD equivalents) than bonds issued by U. S. firms. In terms of the median OAS spread, Japan stands out for its low spread for investment grade bonds, with the median spread for non-financials at 23 basis points (bps) and the median spread for financials at 30 bps.

Turning to the currencies of the bonds included in the two indices, Table A.6 shows that USD is the dominant currency of bonds included in either index, followed by the EUR. Mirroring the patterns in the distribution of bond sizes across countries, the median EUR-denominated bond is larger than the median USD-denominated bond ($751 million vs $500 million). Similarly, investment grade JPY-denominated bonds have substantially lower OAS than bonds denominated in other currencies.

B.2 Merging primary and secondary market bond data

While the constituents data for ICE Global Indices provides some information on the characteristics of the individual bonds included, not all characteristics (such as the coupon pay-

[14]Bonds with a fixed coupon schedule include fixed coupon bonds (including zero coupon bonds), pay-in-kind, and fixed-to-floating rate securities, provided that they are callable within the fixed rate period and are at least one year away from the last call date within the fixed rate period (so that the minimum effective time to maturity is at least one year).

[15]To be consistent with industry classifications in the primary bond market data, we define financials to be any issuer that either has "Financial" as a Level 2 industry or has "Industrials" as a Level 2 industry and "Real Estate" as a Level 3 industry according to ICE classifications.

ment frequency or the call schedule) are included. We thus merge the secondary bond market quotes provided by ICE for index constituents with the consolidated primary market issuance and bond characteristics dataset described in Appendix A, first based on the ISIN and then based on the 9 digit CUSIP. In cases where one ICE index constituent is matched to multiple primary market bond characteristic observations, we resolve the multiple matches based on also matching the reported issuance and maturity dates. We are able to match 86.8% of all ICE observations to primary market observations, corresponding to 85.1% percent of unique bonds matched. Out of the more than 3.3 million ICE observations matched to primary market data, 20% are matched to primary market observations in Mergent alone, 34% are matched to primary market observations in SDC alone, and 46% are matched to primary market observations present in both Mergent and SDC.

The merged primary and second bond market data also allows us to investigate whether the constituent universe is representative of the universe of corporate bonds issued. Table A.7 reports the coverage of fixed coupon corporate bond issuances by bonds ever included in ICE Global Corporate Index and the ICE Global High Yield Corporate Index. The table shows that, although the number of bonds included in ICE is low relative to the overall number of bonds issued, the median size of bonds in ICE is much larger than the median size of bonds that are never included in these two ICE indices, so that the ICE universe covers a large fraction of amount issued. The median offering yield of bonds included in ICE is also somewhat lower than the median offering yield of bonds not included in ICE, suggesting that the bonds included are somewhat safer. This is also in-line with the results in Calomiris et al. (2019), who document an index-inclusion premium (and, hence, a reduction in credit spreads) in the pricing of corporate bonds.

Table A.8 shows that the distribution of industries included in ICE is similar to that of the primary issuance universe. Moreover, bonds included in ICE are consistently large across industries relative to bonds not included in ICE, suggesting that the size differences highlighted above are not driven by any one industry.

Examining the distribution of bonds across currencies, in Table A.9 we see that, amongst bonds included in ICE, those issued in EUR and USD have the largest median offering amount. Moreover, the bonds issued in currencies excluded by ICE Index methodology from being included in the corporate indices are significantly smaller. The median offering yield of bonds issued in those currencies is also systematically higher than that of bonds included in ICE.

Finally, Figure A.3 shows that the differences in initial maturities documented in Figure A.1 between bonds issued by U. S. and non-U. S. issuers are concentrated in bonds not included in ICE. Combined with the size differences between bonds included and not included in ICE described in Tables A.7–A.9, this suggests that the differences in initial maturities are driven by smaller bonds.

To sum up, the universe of ICE index constituents is larger, has lower offering yields, and has longer maturities than the universe of bonds not included in the two ICE Global Indices that we consider. Thus, the two ICE Global Indices cover a large fraction of the global bond offering amount issued but the secondary market quoted spreads for the index constituents may not be representative of the overall secondary market credit spreads.

C Data on debt securities outstanding

We use data on debt securities outstanding from the Capital IQ Debt Capital Structure dataset. The Capital IQ Debt Capital Structure dataset collects information on debt securities outstanding for each company from its accounting statements. For each instrument captured in the database, we observe a number of security characteristics including the security type, interest rate, currency, maturity, security seniority and, crucially, amount outstanding. Each debt instrument appears in the dataset in each accounting statement filed over its lifetime (including in some cases for the fiscal period immediately after its maturity, with the security reported as having 0 amount outstanding).

We focus on retaining the most recent filing for each fiscal period, which reflects the most up-to-date information on the firm's debt instruments for a given fiscal period. Following the recommendations in the S&P Capital IQ Premium Financials documentation, we thus retain observations that the Debt Capital Structure dataset indicates as being the latest filing for the fiscal period and the latest filing for instance.

While S&P Capital IQ provides an instrument-level identifier (component id) that tracks the instrument over time, there are instances in which the component id may not be constant.[16] We identify instruments that potentially have company ids that change over time by grouping instruments of the same firm that have the same coupon characteristics (fixed or floating; coupon rate value (for fixed rate securities); benchmark index and spread to benchmark index (for floating rate securities), maturity, seniority, collateral, and security optionality features (such as convertibility). For instruments that share these characteristics, appear only once per filing, and have multiple component ids associated with them, we reassign the earliest component id to the entire time series of that instrument.

Because debt securities of subsidiaries appear also on the consolidated balance sheet of the parent company, we restrict the sample to companies identified as "operating" as of the fiscal period end date to avoid double counting.[17] In addition, we restrict the sample to fiscal period end dates starting in 2001, when the debt securities data becomes more comprehensive.

One drawback of Capital IQ Debt Capital Structure Data is that the issuance date of securities is usually not reported. As such, we use the first observation date of an instrument as a proxy for the issuance data. For the subset of securities with a reported "start date" (the issuance date), Table A.10 compares the reported start date and the first fiscal period end date in which an instrument appears for bank loans and corporate bonds. On average, more than 68% of bank loans and more than 81% of corporate bonds first appear on a filing within a year of the stated issuance date, suggesting that data on amount outstandings can be used to identify an instrument's issuance quarter/year, even in the absence of primary market data.

[16] Correspondence with S&P Capital IQ representatives suggests that this may happen for two reasons. First, changes implemented in the data collection process in 2010 can lead to an instrument having different component ids before and after 2010. Second, for securities that undergo registration rights changes over time, such as transitioning from a 144a registration to public trading, component ids may change as the registration rights change.

[17] We discuss the procedure for identifying operating firm historically in detail in Section D.

D Matching to firm characteristics

The final type of information necessary for understanding global corporate credit risk, credit risk pricing, and how access to credit affects real outcomes in an international context is the issuers' financial statements. In matching individual bonds issued (primary market data), quoted (secondary market data), or outstanding to firm financial statements, a number of decisions have to be made. The first is whether the matching happens at the parent or the issuer level. This choice is salient from an economic perspective to the extent that internal capital markets may not be frictionless and to the extent that the ultimate parent companies may not be based in the same geography as the borrowing issuer. Second, financial statements for international firms are available from a number of data providers, with different country coverage. We compare the coverage of corporate bond issuers in two of the most commonly used datasets, Worldscope and Compustat –the combination of Compustat North America and Compustat Global.

D.1 Identifying companies that are ultimate parents

We match bond issuances, bond outstandings and secondary market bond quotes to balance sheet information for the ultimate parents of the bond issuers. We rely on proprietary versions of two datasets from S&P Capital IQ Business Entity Cross Reference Service (BECRS) to identify which firms have ultimate parents (that are different from the firm itself) and firms at the top level of the organizational structure. The first is the "Company Foundation File", which provides descriptive data such as the entity name, the entity type (private or public company, investment firm, etc), and the entity status (operating, operating subsidiary, etc). Entities with "operating" status are those which are not controlled by any single company – so that no majority stake is held – or non-strategically controlled with a majority stake held by a financial buyer. We consider entities with operating status as being at the top level of their corresponding corporate structure.

The second is the ultimate parent – entity mapping file, which links an entity covered by the BECRS to the entity's ultimate parent. Under the S&P Capital IQ definition, an ultimate parent is the company at the top of a corporate structure or the legal organization that is ultimately responsible for all associated entities below it. An entity rolls up to a parent when the parent has at least a 51% ownership stake in the entity; if two organizations jointly own 50% each of an entity, the entity remains its own parent. We verify that firms identified as ultimate parents in the ultimate parent – entity mapping file are also identified as being operating entities in the company foundation file, so that the top organizational structure level information is consistent across the two datasets.

The main drawback of the BECRS is that the cross-reference relationships reported are only valid as of the download date. That is, for example, an entity that was sold from ultimate parent A to ultimate parent B in 2021 will have ultimate parent B listed in data downloaded in 2023, and BECRS data alone would not be sufficient to capture the prior relationship to ultimate parent A. We address this drawback in two steps. First, instead of starting with the snapshot provided by a current (e.g. 2023) download from S&P Capital IQ, we start from the proprietary version of BECRS maintained by the Federal Reserve System, which saves daily snapshots of the BECRS data starting from January 15, 2017, on an on-

going basis. That is, starting from January 15, 2017, we have point-in-time information on entity type and status and on the ultimate parents of entities in the BECRS data.

Second, to create a point-in-time version of the data prior to January 15, 2017, we start with the snapshot as of January 15, 2017, and identify corporate actions that would result in different entity status and/or different entity-ultimate parent pairings historically: bankruptcies, spin-offs, and merger and acquisition (M&A) activity, obtained from S&P Capital IQ transactions data (through the screener tool). We use the spin-off data to obtain the date at which entities that are reported as operating firms in January 2017 become operating firms, and what was the ultimate parent at the time of the spin-off. For example, PayPal, Inc., is listed as an operating firm as of the January 15, 2017, snapshot. We observe in the spin-off data that PayPal, Inc., was spun-off from eBay Inc., with a completion date of July 17, 2015. Using this information, we assign the operating firm status and itself as the ultimate parent to historical PayPal, Inc., observations starting on July 17, 2015. Prior to July 17, 2015, we assign operating subsidiary status and eBay Inc. as the ultimate parent to historical PayPal, Inc., observations.

Similarly, we use the M&A data to track when entity-ultimate parent relationships start and end, and the bankruptcy information to identify when an entity enters into a "liquidating", "reorganizing", or "out of business" status. To the extent that entities, for example, are spun-off and then acquired by a different ultimate parent prior to January 15, 2017, using data on these three corporate action types jointly allows us to observe such ownership changes over time.

Complications arise when firms are acquired and then their acquirer undergoes corporate structure changes. For example, Tektronix, Inc. was acquired by Danaher Corporation on November 20, 2007 (so that the company status of Tektronix, Inc. changes from operating to operating subsidiary on November 20, 2007, and the ultimate corporate parent changes from Tektronix, Inc. to Danaher Corporation). Danaher Corporation then spun-off its specialty industrial businesses into a separate company, Fortive Corporation, on July 2, 2016. Tektronix, Inc., was one of the units included in the spin-off, so that starting on July 2, 2016, Tektronix, Inc., is an operating subsidiary of Fortive Corporation (the ultimate corporate parent of Tektronix, Inc. changes from Danaher Corporation to Fortive Corporation on July 2, 2016).

There are a number of other complications that can arise when using corporate actions data to estimate historical firm – ultimate corporate parent relationships. We list a few representative examples here. By processing information from historical M&A, spin-off and bankruptcy data jointly, our procedure is able to account for such complicated corporate structure evolutions.

1. **Company A spins-off company B but the spin-off is done gradually.** Frontline Ltd. spins off Ship Finance International Limited in pieces (7 times), first one in June 16, 2004 and the last one in March 22, 2007).

   What do we do? We treat the final spin-off date as the date on which company B becomes its own ultimate parent.

2. **Ultimate parent company A acquires company B but ultimate parent in 2017 is company C.** Alex Brown Inc. is acquired by Bankers Trust New York

Corporation on September 1, 1997, but the ultimate parent listed in the snapshot data as of January 15, 2017 is Deutsche Bank Aktiengessellschaft. Bankers Trust New York Corporation was acquired by Deutsche Bank Aktiengessellschaft on June 4, 1999.

What do we do? We use M&A transactions to identify when the ultimate parent company A is acquired by ultimate parent company C, and change the ultimate parent – firm relationship for companies A and B to end when company A is acquired. We repeat this process iteratively until we can no longer find M&A transactions where the ultimate parent companies are targets.

3. **Ultimate parent company A acquires company B and ultimate parent company C buys ultimate parent company A on the same date.** ATW Automation Inc acquires Advanced Assembly Automation, Inc, on July 13, 2014. Thompson Street Capital Manager LLC acquires ATW Automation Inc on July 13, 2014.

   What do we do? We assign ultimate parent company C to both ultimate parent company A and company B starting with the (common) acquisition date.

4. **Ownership of company A transferred between two subsidiaries of the same ultimate parent company B, and company A spun-off on the same date.** Brake Parts Inc. is sold to Global Brake & Chassis Group and is spun-off from Affinia Group on November 30, 2012.

   What do we do? We retain the spin-off observation only, and treat the spin-off date as the date on which company A becomes its own ultimate parent.

The end result of this two-stage procedure is a database of S&P entities, whether the entity is an operating firm in its own right, and, if not, the entity's ultimate parent at any given moment in time. Throughout this procedure, we keep track of individual entities and their ultimate parents using the S&P company ID. According to S&P Capital IQ, the company ID remains invariant to changes in corporate ownership and name changes, and is only retired if an entity fully ceases to exist.[18]

D.2 Matching between Compustat and Worldscope

We use company identifiers data from Capital IQ to assign Capital IQ company ids to firm-fiscal period end date observations. The company identifiers data provides ISINs, 9 digit CUSIPs and GVKEYs (Compustat identifiers) – for both debt and equity issuances – associated with a particular Capital IQ company ID for a specified date range. Using the identifier information in Compustat allows us to also infer a date-range specific SEDOL – company id mapping, which we use to supplement company identifiers data provided by Capital IQ directly. When more than one company ID are matched to the same firm-level ID from Worldscope for a given fiscal period end date, or vice versa, we resolve the multiple matches by first choosing the pairing that has the closest match in terms of total debt reported in Worldscope and in Capital IQ, and then the remaining many-to-many matches based on the nearest distance between company names in both datasets.

[18] For example, if a company reorganizes internally, merging two of its subsidiaries, ceasing the operations of one of the subsidiaries in the process.

We begin by comparing the samples of firms captured in Compustat and Worldscope. We merge Compustat and Worldscope based on the fiscal period end date and Capital IQ company ids merged into both datasets. For both Worldscope and Compustat, we use the annual filings data (which gives us the greatest coverage in terms of the number of firms filing), and retain the latest available restatement of each annual filing. Table A.11 reports the number of unique firm-years that are matched across both datasets, are unique to Compustat or are unique to Worldscope.[19] The table also reports the match rates separately for firms identified as ultimate parents following the procedure described above and firms identified to be subsidiaries at the time of the fiscal period end date. Comparing first the overall sample size between Worldscope and Compustat, we see that at both the subsidiary and the ultimate parent level, Compustat has somewhat more firm-year observations than Worldscope, with around 234,000 firm-year observations remaining unmatched at the ultimate parent level from Compustat, but only around 179,000 observations remaining unmatched from Worldscope.

Comparing the match rates at the subsidiary and the ultimate parent level, we see the importance of using ultimate parent level information in matching across different datasets: the match rate at the ultimate parent level between Compustat and Worldscope is more than 66% but only 46% at the subsidiary level. One potential reason for the lower match rate of subsidiaries is that Compustat and Worldscope capture different subsidiaries of the same ultimate parent. For example, General Electric Company (ultimate corporate parent) appears in both Compustat and Worldscope. At the subsidiary level, Worldscope also captures General Electric de Chile, SA, while Compustat captures General Electric Capital Services and General Electric Canada Company. Thus, while the ultimate parent may appear in both datasets (and, hence, appear as a matched observation), the subsidiaries will not. For the rest of this section, we focus on the financial filings of the ultimate parent companies.

Turning to the cross-country comparison of Compustat and Worldscope coverage in Table A.12, we see that, overall, Worldscope provides better coverage of European advanced economies and of some emerging market economies, while Compustat has better representation of firms in the U. S., South Korea, Japan, Australia, and, notably, significantly more coverage of firms in China and India. Thus, depending on the countries being studied, either Compustat or Worldscope may provide more extensive coverage.

A natural question to ask is whether Compustat and Worldscope provide similar information about firm financials for firms that are common to both datasets. Table A.13 reports summary statistics for some key variables and financial ratios of interest for each dataset, together with the correlation between the values reported in both for firms in the overlapping sample between Compustat and Worldscope.[20] In both datasets, we define leverage as the ratio of total liabilities to total assets, profitability as the ratio of EBITDA to total assets, asset tangibility as the ratio of (net) property, plant, and equipment (PPE) to total assets, and market-to-book as the ratio of the sum of market value of equity and the book

[19] Compustat North America has historical coverage prior to 1980. To make the comparison between Compustat and Worldscope fair, we exclude Compustat observations prior to 1980 for the purpose of these comparison tables.

[20] We translate all level variables to USD million equivalents. Within each dataset, each level variable is trimmed at the 1% level of outliers before ratios are computed; each ratio is then subsequently trimmed at the 1% level as well.

value of liabilities to total assets. Overall, the correlation between values reported in the two datasets are quite high – more than 90% for all the variables considered except for long-term debt maturing in 1 year. The values reported in Worldscope for the variables in levels are somewhat more right skewed, suggesting that Worldscope may capture larger firms than Compustat. The mean firm in Compustat has lower PPE and long-term debt (both total and maturing within one year) and lower overall total liabilities values reported but larger cash and short-term investments.

Overall, the results in Tables A.11 – A.13 suggest that, while there are differences in country coverage between Compustat and Worldscope, there is substantial overlap between the two datasets at the ultimate parent company level and that, for firms that appear in both datasets, Compustat and Worldscope report similar information for key variables of interest. Thus, a plausible strategy to having the greatest cross-country coverage of firm financial statements is to combine the information on financial filings of ultimate parents from Compustat and Worldscope, retaining the full union of financial filing information between the two datasets. This is a strategy that we pursue, for example, in Boyarchenko and Elias (2024e), to get the widest possible cross-section of corporate bond returns.

D.3 Matching bond-level and firm financial statement data

As with the financial filings data, we use company identifiers data from Capital IQ to assign Capital IQ company ids to bond-date observations and the company id – ultimate parent company id mapping to assign (date-specific) ultimate parent company ids. For the primary market data, we first assign company ids based on instrument-level identifiers (ISIN and/or 9 digit CUSIP), then based on the ultimate parent 6 digit CUSIP and/or SEDOL reported in SDC Platinum, then based on the issuer 6 digit CUSIP and/or SEDOL. For the secondary market data, we assign company ids based on the instrument-level identifiers only.

We then match bond-date level data from either the primary, outstanding or secondary market data to financial statement data at the ultimate parent company – annual filing level. In the case of primary and secondary bond market data, we require that the fiscal period end date of the financial statement filing is at least 3 month prior to the bond observation date, so that the financial statement information is "observable" to the market as of the bond observation date. For financial filings that are restated, we use the latest filing for each fiscal period.

For some applications, such as computing default-adjusted spreads in Boyarchenko and Elias (2024e), financial filing data alone is not sufficient. We augment the data from financial filings with expected default frequency (EDFs) data from Moody's KMV CreditEdge (KMV). In particular, using the identifier mappings provided by KMV between KMV firm identifiers and external identifiers, we assign Capital IQ company ids to firm-level EDFs. We then retain the end-of-month observations (since historical data is only available as of the end of the month) for each company id, and match lagged monthly EDF observations to bond-date level data at the ultimate parent company id – month level.

Table A.14 reports the country-level match rates for primary market issuances to firm financial filings at the ultimate parent level for firms captured only in Compustat, only in Worldscope, or in both. Three facts are striking about Table A.14. First, at the ultimate parent level, the match rate to firm financial statements is substantial for issuers in both

advanced and emerging market economies. Amongst the advanced economies, only South Korea and the Netherlands have a match rate below 50%; when we restrict our sample of bond issuances to only issues by firms able to issue in major currencies[21] (Table A.15), the match rate for South Korea rises to 56%. Similarly, among the emerging market economies, the match rate for bonds issued by issuers in China is particularly low (14% overall) but rises to a slightly higher 18% match rate when we restrict the set of issuance currencies. The overall comparison between the full issuer sample match rate in Table A.14 and the match rate restricted to issuers accessing debt markets in major currencies in Table A.15 suggests that smaller, private issuers are the ones restricted to accessing debt markets in local currencies.

Second, out of the primary market issuances matched to firm financial statements, the majority are matched to firms that appear in both Compustat and Worldscope. That is, the 66% overlap at the ultimate parent level between Compustat and Worldscope we saw in Table A.11 translates into an even higher rate of overlap for bond issuers. Finally, Table A.14 shows that, even for the bonds matched ultimate parent characteristics, data on at least some characteristics is frequently missing, with information on EDFs, total assets (in USD equivalents), and leverage the most readily available.

Figure A.4 plots the match rate between primary market issuances and firm financial filings for advanced economies, excluding South Korea, emerging market economies, excluding China, South Korea, and China over time. The average match rate for issuers in advanced economies has remained between 60% and 70% throughout our more than 40 year sample period. Throughout, the average match rate for issuers in advanced economies remains higher than for issuers in emerging market economies, but the match rate for issuers in emerging market economies increases steadily from around 30% before 1995 to between 50% and 60% over the last decade. This reflects the greater coverage of firms domiciled in emerging market economies in Compustat and Worldscope over time.

Finally, Table A.16 reports the country-level match rates for secondary market quotes to firm financial filings at the ultimate parent level for firms captured only in Compustat, only in Worldscope, or in both. Not surprisingly, given the minimum bond size and issuance in major currency restrictions imposed by ICE in constructing the global bond indices, the match rates (at the bond-month level) for bonds included in ICE are even higher than for primary market issuances over all. As with the primary market issuances, the majority of ICE observations are matched to firms that appear in both Worldscope and Compustat. The major exception are bonds issued by firms domiciled in Mexico, with a third of the matches only captured by firms appearing in Compustat.

[21] More specifically, we retain issuers that ever issue in a major currency, and keep all issues of those issuers once they access a major currency market.

Table A.1: Data cleaning for SDC Platinum New Issues database. This table reports number of observations, unique issuers, and unique debt packages, together with the median size of the bonds (in USD million) as each filter is sequentially applied to the SDC Platinum New Issues database. A unique issuer is identified based on the 6 digit CUSIP of the issuer.

Sample	N. obs	N. issuers	N. packages	Median size
Full sample	924,650	102,046	786,097	54.00
Coalescing package deals	879,721	102,046	786,097	60.00
Dropping multiple issuers per package	879,709	102,044	786,095	60.00
Dropping multiple deal IDs per issuer-bond	870,619	101,991	777,307	60.00
Dropping multiple observations per ISIN/9 digit CUSIP	865,348	101,677	773,194	60.00
Dropping multiple issue types per ISIN/9 digit CUSIP	865,088	101,663	772,952	60.00
Dropping other duplicates	848,579	101,217	757,655	61.50

Table A.2: Consolidated primary market sample coverage. This table reports number of unique non-financial bonds and issuers, together with the median size of the bonds (in USD million), the first year a country is in the sample, and the number of year with non-missing observations for each country for the top 10 advanced economies, the top 10 emerging market economies, the remaining advanced economies and the remaining emerging market economies. Countries ranked based on total number of unique non-financial corporate fixed-rate bonds issued by issuers domiciled within the country. A unique issuer is identified based on the 6 digit CUSIP of the issuer. We exclude bonds with less than one year maturity.

(a) Fixed rate

	Mergent FISD only					Both Mergent FISD and SDC Platinum					SDC Platinum only				
	First year	Years	Issuers	Bonds	Median size	First year	Years	Issuers	Bonds	Median size	First year	Years	Issuers	Bonds	Median size
USA	1950	70	5,114	27,126	16	1980	43	4,886	22,823	350	1980	43	9,448	25,731	57
South Korea	1992	20	28	49	348	1992	25	36	130	448	1984	39	7,468	32,612	6
Japan	1984	21	11	486	5	1988	28	25	150	500	1980	43	1,796	13,788	97
Canada	1966	56	319	677	190	1980	42	329	1,038	376	1980	43	1,061	3,684	119
United Kingdom	1975	32	164	346	284	1992	29	151	462	649	1981	42	1,124	4,033	138
Netherlands	1972	32	92	183	200	1991	31	103	261	700	1980	43	559	2,726	150
France	1976	21	49	84	400	1991	26	48	144	797	1980	43	430	2,854	259
Taiwan	.	.	.	.	.	2020	3	1	7	999	1981	35	683	2,303	27
Australia	1976	23	43	68	300	1983	31	57	144	500	1980	43	541	1,681	87
Germany	1985	14	29	43	265	2000	16	24	35	500	1982	41	349	1,235	326
Other AE	1974	33	227	434	320	1992	31	268	633	550	1980	43	2,627	8,169	105
China	1997	11	18	30	444	1996	17	48	125	717	1987	30	3,981	23,083	138
Malaysia	1993	11	9	21	493	1999	6	4	8	697	1987	34	354	2,569	23
Thailand	1996	4	5	8	249	2004	9	8	14	473	1985	33	281	2,542	48
India	1995	6	11	18	269	1997	9	24	41	500	1986	31	670	2,487	31
Indonesia	1996	12	15	25	268	1993	17	27	46	589	1990	32	207	1,184	27
Mexico	1993	29	85	211	268	1993	28	71	158	478	1980	42	235	790	149
Brazil	1993	29	88	141	248	1996	23	61	101	500	1988	34	440	882	96
Russia	1997	11	17	24	400	2002	15	19	33	650	1991	26	270	723	155
Chile	1995	23	27	55	298	1995	23	43	81	425	1989	33	147	503	86
Argentina	1985	23	48	81	132	1994	17	31	41	300	1988	34	172	445	35
Other EM	1960	63	542	979	84	1992	31	221	471	544	1980	43	932	2,351	48

(b) Floating rate

	Mergent FISD only					Both Mergent FISD and SDC Platinum					SDC Platinum only				
	First year	Years	Issuers	Bonds	Median size	First year	Years	Issuers	Bonds	Median size	First year	Years	Issuers	Bonds	Median size
USA	1964	45	878	1,816	100	1984	38	622	1,471	250	1980	43	1,344	2,333	57
South Korea	1996	4	5	5	200	1998	3	3	3	300	1983	39	256	625	56
Japan	1993	21	10	249	50	1994	18	3	255	100	1980	40	345	800	46
Canada	1984	17	27	44	180	1993	23	29	56	500	1981	40	97	241	152
United Kingdom	1995	15	28	45	150	1994	24	22	59	500	1981	38	228	742	70
Netherlands	1997	9	17	28	400	1999	15	17	27	500	1980	41	142	650	101
France	1980	8	16	21	115	2000	5	7	10	645	1981	42	132	461	197
Taiwan	.	.	.	.	.	.	.	.	.	.	1995	17	50	88	29
Australia	1993	3	3	5	80	1995	5	5	6	688	1981	34	126	286	103
Germany	2000	5	8	9	150	1996	1	1	1	100	1993	27	71	247	293
Other AE	1996	21	57	114	223	1996	18	30	39	500	1980	43	1,011	2,095	77
China	2000	3	3	3	550	2014	2	4	5	500	1996	23	1,403	2,172	141
Malaysia	.	.	.	.	.	.	.	.	.	.	1991	26	72	384	5
Thailand	.	.	.	.	.	.	.	.	.	.	1983	27	62	136	60
India	1997	1	1	1	25	.	.	.	.	.	1985	28	89	140	42
Indonesia	2002	1	1	1	124	.	.	.	.	.	1992	14	35	44	22
Mexico	1994	8	8	11	275	1994	7	6	9	250	1981	36	270	621	56
Brazil	1994	4	5	5	112	2003	1	2	2	265	1990	33	981	2,460	63
Russia	2003	1	1	1	297	.	.	.	.	.	1997	15	89	237	90
Chile	2019	1	1	1	450	2013	1	1	1	450	1990	15	37	66	68
Argentina	1994	4	5	7	90	.	.	.	.	.	1990	28	127	322	12
Other EM	1978	33	104	301	80	1992	8	8	11	200	1980	39	536	1,431	5

Table A.3: Primary market issuance by industry. This table reports number of unique non-financial bonds and issuers, together with the median size of the bonds (in USD million), the first year an industry is in the sample, and the number of year with non-missing observations for each industry. A unique issuer is identified based on the 6 digit CUSIP of the issuer. We exclude bonds with less than one year maturity.

(a) Fixed rate

	Mergent FISD only					Both Mergent FISD and SDC Platinum					SDC Platinum only				
	First year	Years	Issuers	Bonds	Median size	First year	Years	Issuers	Bonds	Median size	First year	Years	Issuers	Bonds	Median size
Agriculture	1970	19	22	33	138	1984	24	27	36	200	1980	43	343	1,053	43
Construction	1979	38	113	452	75	1980	39	124	437	300	1980	43	2,873	15,256	77
Manufacturing	1955	65	2,267	8,862	40	1980	43	2,249	9,638	400	1980	43	13,838	50,320	44
Mining	1965	55	567	1,762	171	1980	43	650	2,133	499	1980	43	1,846	7,070	129
Public Administration	1996	19	36	59	236	1994	27	86	166	747	1980	43	378	6,844	158
Retail Trade	1960	58	415	1,421	50	1980	43	374	1,569	425	1980	43	1,670	5,888	57
Services	1967	54	934	3,544	20	1980	42	1,097	3,437	400	1980	43	4,587	13,991	50
Utilities	1950	70	1,702	11,179	25	1980	43	1,698	8,988	300	1980	43	6,879	37,194	99
Wholesale Trade	1969	51	244	620	100	1980	41	283	724	350	1980	43	2,160	6,655	14

(b) Floating rate

	Mergent FISD only					Both Mergent FISD and SDC Platinum					SDC Platinum only				
	First year	Years	Issuers	Bonds	Median size	First year	Years	Issuers	Bonds	Median size	First year	Years	Issuers	Bonds	Median size
Agriculture	1985	3	4	5	17	2005	1	1	1	14	1986	32	102	231	10
Construction	1984	9	9	15	50	1998	12	4	30	45	1982	39	528	1,172	71
Manufacturing	1979	38	347	859	100	1986	35	297	1,110	200	1980	43	2,912	5,772	68
Mining	1980	27	38	56	150	1985	23	39	62	500	1980	43	345	711	122
Public Administration	2003	5	4	5	200	2003	7	6	9	800	1984	32	112	249	50
Retail Trade	1964	30	77	120	80	1992	22	42	65	326	1981	42	409	917	60
Services	1983	29	102	155	100	1985	27	81	142	250	1980	43	1,104	2,302	50
Utilities	1980	37	348	630	160	1984	32	261	509	300	1980	43	1,876	4,612	93
Wholesale Trade	1986	16	25	36	50	1993	14	20	25	200	1980	42	337	1,095	18

Table A.4: Primary market issuance by currency. This table reports number of unique bonds and issuers, together with the median size of the bonds (in USD million), the first year a country is in the sample, and the number of year with non-missing observations for each country for the top 10 currencies. Currencies ranked based on total number of unique non-financial corporate fixed-rate bonds issued in that currency. "EUR" includes both Euro and Euro-precursor currencies. A unique issuer is identified based on the 6 digit CUSIP of the issuer. We exclude bonds with less than one year maturity.

	Fixed rate					Floating rate				
	First year	Years	Issuers	Bonds	Median size	First year	Years	Issuers	Bonds	Median size
USD	1950	70	20,500	90,231	101	1964	46	3,508	7,901	100
KRW	1994	29	7,481	32,316	6	1994	24	183	400	53
CNY	1998	23	3,933	22,824	138	2001	21	1,392	2,166	141
JPY	1980	43	1,397	12,101	98	1985	38	286	1,065	36
EUR	1980	43	3,893	11,285	303	1984	39	1,236	2,757	144
CHF	1982	41	1,424	3,026	70	1985	30	106	127	27
CAD	1975	43	816	2,693	143	1993	29	61	132	137
THB	1991	32	276	2,531	47	1994	22	55	122	57
MYR	1990	33	346	2,522	23	1991	22	59	371	5
INR	2001	22	617	2,333	28	2002	20	74	120	35
Other	1980	43	3,615	10,731	62	1981	42	2,398	5,964	45

Table A.5: ICE Global Bond Indices sample coverage. This table reports number of unique bonds and issuers, together with the median size of the bonds (in USD million), the median OAS (in bps), the first year a country is in the sample, and the number of year with non-missing observations for each country for the top 10 advanced economies, the top 10 emerging market economies, the remaining advanced economies and the remaining emerging market economies. Countries ranked based on total number of unique non-financial corporate fixed-rate bonds issued by issuers domiciled within the country. A unique issuer is identified based on the 6 digit CUSIP of the issuer.

(a) Non-financial corporations

	Investment grade						High yield					
	First year	Years	Issuers	Bonds	Median size	Median OAS	First year	Years	Issuers	Bonds	Median size	Median OAS
USA	1996	28	3,751	20,838	487	116	1997	27	4,746	14,485	350	420
South Korea	1996	27	200	370	400	109	1999	21	17	23	230	320
Japan	1996	28	1,577	2,695	272	23	2004	19	18	32	779	365
Canada	1996	28	562	2,631	228	140	1997	27	395	988	305	428
United Kingdom	1996	28	1,424	2,251	545	114	1997	27	656	902	418	455
Netherlands	1996	28	580	841	623	87	1997	27	254	349	463	450
France	1996	28	1,316	1,641	778	91	1998	26	465	539	586	376
Taiwan	2005	15	11	29	750	110	2011	4	1	1	226	416
Australia	1996	28	584	731	316	120	1998	26	47	77	400	508
Germany	1996	28	1,214	1,789	781	90	1997	27	357	416	500	335
Other AE	1996	28	2,189	2,979	656	112	1997	27	1,102	1,397	508	414
China	1999	17	398	585	500	143	2000	22	135	147	378	565
Malaysia	1996	28	42	58	525	144	2008	8	4	4	300	465
Thailand	1997	27	22	39	400	184	2000	19	8	10	250	686
India	1996	19	54	75	500	197	2004	20	71	95	500	405
Indonesia	2012	12	24	65	800	244	1997	20	57	71	475	468
Mexico	1996	28	116	329	750	202	1997	26	112	238	400	554
Brazil	2008	16	95	191	785	279	1998	21	185	338	605	431
Russia	2004	19	84	141	960	265	2003	20	96	153	600	387
Chile	1996	28	63	178	499	194	2002	21	33	52	405	423
Argentina	1998	8	3	4	300	354	1997	16	38	75	400	753
Other EM	1998	26	274	483	750	189	1997	27	406	631	500	505

(b) Financial corporations

	Investment grade						High yield					
	First year	Years	Issuers	Bonds	Median size	Median OAS	First year	Years	Issuers	Bonds	Median size	Median OAS
USA	1996	28	2,943	10,383	500	111	1997	27	622	1,506	400	408
South Korea	1997	24	112	186	400	121	2002	17	6	12	500	220
Japan	1996	28	1,173	2,151	500	30	2009	14	30	40	743	358
Canada	1996	28	434	1,702	381	95	1997	24	36	61	168	391
United Kingdom	1996	28	1,540	2,135	538	139	2000	24	247	277	398	497
Netherlands	1996	28	1,385	1,775	500	60	1999	21	38	50	499	344
France	1996	28	1,497	1,772	669	112	2008	16	57	62	624	411
Taiwan	2005	10	2	2	500	236	.	.	.	.	.	.
Australia	1996	28	1,071	1,420	366	98	1998	8	5	5	340	588
Germany	1996	28	1,518	1,912	421	81	1998	22	90	96	573	361
Other AE	1996	28	3,030	3,672	624	121	1998	25	658	697	548	379
China	1996	20	528	608	500	149	2006	18	513	572	400	702
Malaysia	1996	27	28	28	400	123	1998	7	3	3	200	299
Thailand	2005	19	19	34	500	135	2002	17	8	10	267	228
India	1996	20	76	100	500	200	2005	19	40	48	350	346
Indonesia	1997	13	12	12	500	160	1997	16	30	33	300	591
Mexico	2002	22	24	36	750	237	1997	23	27	38	392	660
Brazil	2004	11	34	57	750	311	2008	16	50	95	500	379
Russia	2003	16	44	65	776	350	2005	18	77	105	500	519
Chile	1997	27	42	51	300	152	2007	14	2	2	500	470
Argentina	.	.	.	.	.	.	1998	14	10	16	207	826
Other EM	1996	28	727	845	500	151	1998	25	280	395	500	481

Table A.6: ICE Global Bond Indices sample coverage by currency. This table reports number of unique bonds and issuers, together with the median size of the bonds (in USD million), the median OAS (in bps), the first year a country is in the sample, and the number of year with non-missing observations for each currency included in the ICE Global Bond Indices. "EUR" includes both Euro and Euro-precursor currencies. A unique issuer is identified based on the 6 digit CUSIP of the issuer.

(a) Non-financial corporations

	Investment grade						High yield					
	First year	Years	Issuers	Bonds	Median size	Median OAS	First year	Years	Issuers	Bonds	Median size	Median OAS
USD	1996	28	4,784	24,367	500	122	1997	27	6,062	17,295	381	428
CAD	1996	28	505	2,189	184	134	1997	27	155	280	181	423
EUR	1996	28	5,059	6,604	749	96	1997	27	2,344	2,589	519	402
GBP	1996	28	1,208	1,366	460	120	1997	27	425	456	381	428
JPY	1996	28	1,370	2,326	263	21	.	.	.	.	.	.
AUD	1996	28	703	724	170	112	.	.	.	.	.	.
CHF	2020	4	251	275	246	65	.	.	.	.	.	.

(b) Financial corporations

	Investment grade						High yield					
	First year	Years	Issuers	Bonds	Median size	Median OAS	First year	Years	Issuers	Bonds	Median size	Median OAS
USD	1996	28	4,236	13,829	500	116	1997	27	1,724	2,957	425	458
CAD	1996	28	489	1,624	273	94	1997	24	28	39	129	301
EUR	1996	28	5,583	6,613	681	102	1998	26	757	780	560	399
GBP	1996	28	1,667	1,852	448	138	2000	23	254	268	323	539
JPY	1996	28	1,402	2,202	429	28	.	.	.	.	.	.
AUD	1996	28	1,362	1,450	164	105	.	.	.	.	.	.
CHF	2020	4	614	625	206	77	.	.	.	.	.	.
DKK	2020	3	1	1	629	241	.	.	.	.	.	.

Table A.7: Coverage of primary market issuances in secondary market quotes. This table reports number of unique non-financial bonds and issuers, together with the median size of the bonds (in USD million), and the median offering yield (in bps) for bonds ever included and bonds that are never included in ICE Global Bond Indices for each country for the top 10 advanced economies, the top 10 emerging market economies, the remaining advanced economies and the remaining emerging market economies. Countries ranked based on total number of unique non-financial corporate fixed-rate bonds issued by issuers domiciled within the country. A unique issuer is identified based on the 6 digit CUSIP of the issuer. We exclude bonds with less than one year maturity, non-fixed coupon bonds, and bonds maturing prior to 1999.

(a) Non-financial issuers

	Included in ICE				Not included in ICE			
	Issuers	Bonds	Median size	Median offering yield	Issuers	Bonds	Median size	Median offering yield
USA	3,898	26,802	450	566	8,166	41,177	68	663
South Korea	51	251	372	333	7,044	29,088	6	517
Japan	111	1,183	274	147	1,244	18,787	122	81
Canada	475	2,644	265	549	1,364	6,023	97	391
United Kingdom	400	1,623	549	475	981	4,071	84	479
Netherlands	223	1,413	590	432	313	1,828	102	412
France	180	1,218	698	319	444	2,933	196	412
Taiwan	1	7	999	147	685	2,302	29	180
Australia	117	470	322	438	503	1,760	89	479
Germany	117	581	638	263	402	5,393	144	325
Other AE	670	2,410	571	446	2,629	15,362	101	460
China	120	303	496	440	4,197	32,517	146	393
Malaysia	5	20	672	498	380	2,797	23	500
Thailand	13	25	398	466	289	2,688	47	395
India	37	82	500	466	693	2,609	31	895
Indonesia	32	83	580	550	224	1,384	29	900
Mexico	74	340	590	615	218	830	200	736
Brazil	65	155	573	675	408	866	139	870
Russia	37	80	625	651	345	961	144	860
Chile	49	143	492	520	144	550	97	480
Argentina	28	57	300	869	179	664	82	896
Other EM	295	833	500	600	954	5,697	120	589

(b) Financial issuers

	Included in ICE				Not included in ICE			
	Issuers	Bonds	Median size	Median offering yield	Issuers	Bonds	Median size	Median offering yield
USA	1,350	9,982	498	494	16,363	262,434	35	400
South Korea	27	146	303	342	1,647	25,266	26	295
Japan	70	901	389	130	3,372	8,404	55	86
Canada	194	1,337	379	341	571	14,240	100	457
United Kingdom	391	1,569	522	425	1,479	30,627	26	610
Netherlands	210	1,352	542	410	541	4,957	62	462
France	124	1,212	557	293	373	6,488	80	410
Taiwan	3	8	598	204	199	1,169	46	210
Australia	174	1,080	220	442	603	5,045	39	410
Germany	120	800	356	420	533	8,298	100	388
Other AE	755	2,789	563	295	3,363	35,725	50	330
China	219	553	300	650	4,020	24,792	139	509
Malaysia	18	40	400	327	434	4,000	23	465
Thailand	11	24	498	432	192	1,720	40	371
India	21	44	474	458	670	9,311	22	893
Indonesia	16	23	300	521	196	1,512	33	890
Mexico	30	61	400	669	162	636	89	772
Brazil	37	89	500	568	221	584	99	817
Russia	41	82	500	695	379	1,334	67	825
Chile	15	63	296	326	73	390	40	350
Argentina	6	12	224	864	122	447	13	1,125
Other EM	527	1,219	497	463	4,009	11,054	50	440

Table A.8: Coverage of primary market issuances in secondary market quotes by industry. This table reports number of unique non-financial bonds and issuers, together with the median size of the bonds (in USD million), and the median offering yield (in bps) for each industry. A unique issuer is identified based on the 6 digit CUSIP of the issuer. We exclude bonds with less than one year maturity.

	Included in ICE				Not included in ICE			
	Issuers	Bonds	Median size	Median offering yield	Issuers	Bonds	Median size	Median offering yield
Agriculture	28	57	225	800	312	981	47	561
Construction	193	869	350	547	2,663	14,039	80	520
Manufacturing	2,344	14,023	499	489	11,765	44,143	44	545
Mining	699	3,499	500	625	1,608	6,312	132	636
Public Administration	55	148	399	440	411	6,800	163	293
Retail Trade	367	2,271	498	525	1,375	5,176	60	638
Services	1,158	4,984	496	538	3,968	13,541	51	492
Utilities	1,925	13,275	400	499	6,229	37,566	91	578
Wholesale Trade	270	1,073	400	588	1,956	5,996	10	457

Table A.9: Coverage of primary market issuances in secondary market quotes by currency. This table reports number of unique bonds and issuers, together with the median size of the bonds (in USD million), and the median offering yield (in bps) for each currency for the top 10 currencies. Currencies ranked based on total number of unique non-financial corporate fixed-rate bonds issued in that currency. "EUR" includes both Euro and Euro-precursor currencies. A unique issuer is identified based on the 6 digit CUSIP of the issuer. We exclude bonds with less than one year maturity.

(a) Non-financial issuers

	Included in ICE				Not included in ICE			
	Issuers	Bonds	Median size	Median offering yield	Issuers	Bonds	Median size	Median offering yield
USD	5,545	32,055	495	575	11,886	51,578	99	650
KRW	.	.	.	.	7,057	28,805	6	520
CNY	.	.	.	.	4,191	32,588	146	390
JPY	129	1,016	255	128	1,478	20,388	111	90
EUR	1,221	5,103	651	309	2,783	14,051	201	409
CHF	68	162	209	90	929	3,291	112	300
CAD	317	1,498	204	464	1,038	4,333	80	362
THB	.	.	.	.	292	2,697	47	398
MYR	.	.	.	.	377	2,753	23	498
INR	.	.	.	.	654	2,805	26	868
Other	357	864	403	524	3,614	16,804	52	574

(b) Financial issuers

	Included in ICE				Not included in ICE			
	Issuers	Bonds	Median size	Median offering yield	Issuers	Bonds	Median size	Median offering yield
USD	2,818	14,018	499	479	22,156	324,221	35	410
KRW	.	.	.	.	1,643	23,751	25	295
CNY	1	2	448	222	4,151	27,393	116	462
JPY	137	906	284	71	4,203	14,089	38	128
EUR	1,293	5,694	562	363	4,535	22,358	100	404
CHF	163	508	193	50	784	4,540	147	239
CAD	240	1,106	229	402	526	2,256	98	402
THB	.	.	.	.	201	1,744	40	373
MYR	.	.	.	.	429	3,893	22	470
INR	.	.	.	.	682	9,433	21	890
Other	492	1,137	402	504	3,811	24,742	31	430

Table A.10: First observation date vs reported start dates. This table reports the fraction of instrument-level observations for which the first observed fiscal period end date is a year or less later than the reported start date in Capital IQ Debt Structures database for bank debt and bonds for the top 10 advanced economies, the top 10 emerging market economies, the remaining advanced economies and the remaining emerging market economies. Countries ranked based on total number of unique non-financial corporate fixed-rate bonds issued by issuers domiciled within the country.

(a) Loans

	> 1 year	≤ 1 year	Total
USA	17.58	82.42	100.00
South Korea	36.16	63.84	100.00
Japan	37.28	62.72	100.00
Canada	16.37	83.63	100.00
United Kingdom	29.10	70.90	100.00
Netherlands	40.22	59.78	100.00
France	48.30	51.70	100.00
Taiwan	21.96	78.04	100.00
Australia	27.64	72.36	100.00
Germany	37.55	62.45	100.00
Other AE	34.33	65.67	100.00
China	31.41	68.59	100.00
Malaysia	40.55	59.45	100.00
Thailand	29.44	70.56	100.00
India	42.62	57.38	100.00
Indonesia	38.09	61.91	100.00
Mexico	43.23	56.77	100.00
Brazil	40.95	59.05	100.00
Russia	37.16	62.84	100.00
Chile	25.02	74.98	100.00
Argentina	19.01	80.99	100.00
Other EM	33.87	66.13	100.00

(b) Bonds

	> 1 year	≤ 1 year	Total
USA	11.06	88.94	100.00
South Korea	20.68	79.32	100.00
Japan	23.99	76.01	100.00
Canada	14.13	85.87	100.00
United Kingdom	24.01	75.99	100.00
Netherlands	25.32	74.68	100.00
France	36.81	63.19	100.00
Taiwan	20.09	79.91	100.00
Australia	24.85	75.15	100.00
Germany	17.48	82.52	100.00
Other AE	26.52	73.48	100.00
China	12.40	87.60	100.00
Malaysia	21.37	78.63	100.00
Thailand	7.95	92.05	100.00
India	40.70	59.30	100.00
Indonesia	13.72	86.28	100.00
Mexico	15.93	84.07	100.00
Brazil	20.45	79.55	100.00
Russia	29.54	70.46	100.00
Chile	21.71	78.29	100.00
Argentina	11.10	88.90	100.00
Other EM	23.51	76.49	100.00

Table A.11: Matching between Compustat and Worldscope for ultimate parents and subsidiaries. This table firm-year observation counts for firms in Compustat, Worldsope, or in the matched Compustat-Worldscope sample, for firms identified as being at the highest level of the organization structure and for subsidiary firms. Compustat includes Compustat North America and Compustat Global. Both datasets are at an annual frequency.

	Subsidiary	Ultimate parent	Total
Compustat only	140,572	234,119	374,691
WS only	84,360	179,155	263,515
Both	194,529	819,610	1,014,139
Total	419,461	1,232,884	1,652,345

Table A.12: Cross-country coverage in Compustat and Worldscope. This table reports firm-year observation counts for firms at the highest level of organization structure for each country for the top 10 advanced economies, the top 10 emerging market economies, the remaining advanced economies and the remaining emerging market economies. Countries ranked based on the total number of unique non-financial corporate fixed-rate bonds issued by issuers domiciled within the country. Compustat includes Compustat North America and Compustat Global. Both datasets are at an annual frequency.

	Compustat only	Both	WS only
USA	69,348	163,818	42,516
South Korea	11,275	35,830	4,756
Japan	13,410	97,935	5,481
Canada	11,017	27,229	26,322
United Kingdom	5,101	17,430	9,687
Netherlands	453	3,493	966
France	898	14,768	5,417
Taiwan	6,141	30,998	3,234
Australia	1,853	35,213	4,828
Germany	1,490	15,404	3,756
Other AE	14,931	103,238	18,656
China	16,834	69,706	3,770
Malaysia	2,183	19,706	1,840
Thailand	738	13,920	1,312
India	42,494	49,275	3,750
Indonesia	940	8,498	808
Mexico	299	2,712	715
Brazil	1,138	7,067	1,418
Russia	448	3,009	6,863
Chile	438	3,031	663
Argentina	155	1,505	439
Other EM	22,587	77,911	26,484

Table A.13: Financial information in Compustat and Worldscope. This table reports summary statistics for key accounting variables from Compustat and Worldscope, together with correlations between the values reported in each dataset. Level variables reported in USD million. Each level variable is trimmed at the 1% level for outliers before ratios are computed; each ratio is then subsequently trimmed at the 1% level as well. Compustat includes Compustat North America and Compustat Global. Both datasets are at an annual frequency.

	Mean	Std. dev.	P10	P25	P50	P75	P90	N. obs.	Correlation
Total assets									
Compustat	1449.41	5143.30	4.87	23.95	114.60	542.03	2608.93	976,831	1.00
Worldscope	1442.28	5068.89	5.12	26.05	121.27	557.96	2616.60	963,946	
Total liabilities									
Compustat	1001.01	3920.86	1.47	8.63	49.24	285.23	1601.13	976,064	0.99
Worldscope	995.47	3855.15	1.44	9.12	51.93	296.35	1618.11	959,760	
Long-term debt maturing in 1 year									
Compusta	27.91	105.99	0.00	0.00	0.66	7.50	48.33	796,323	0.88
Worldscope	43.38	165.58	0.00	0.00	0.79	11.18	75.65	639,053	
Total long-term debt									
Compustat	236.81	893.05	0.00	0.01	4.17	54.10	423.32	961,766	0.98
Worldscope	263.05	978.01	0.00	0.00	5.72	68.13	478.54	955,230	
Cash and short-term investments									
Compustat	123.26	406.86	0.13	1.52	11.34	58.66	245.61	985,730	0.98
Worldscope	99.07	299.92	0.20	1.70	11.21	55.44	214.02	911,293	
Property, plant, and equipment (Net)									
Compustat	249.13	833.54	0.18	2.42	19.46	105.56	493.07	958,389	0.99
Worldscope	264.00	873.22	0.25	3.06	22.11	116.36	526.55	948,341	
EBITDA									
Compustat	100.81	339.19	-2.00	0.24	7.24	40.99	209.34	966,459	0.97
Worldscope	105.06	344.06	-2.82	0.59	9.17	48.10	224.58	871,005	
Log total assets									
Compustat	4.72	2.43	1.58	3.18	4.74	6.30	7.87	976,831	1.00
Worldscope	4.73	2.50	1.63	3.26	4.80	6.32	7.87	963,946	
Profitability									
Compustat	0.05	0.22	-0.09	0.02	0.08	0.14	0.23	865,935	0.92
Worldscope	0.04	0.33	-0.13	0.02	0.08	0.16	0.24	785,881	
Asset tangibility									
Compustat	0.29	0.27	0.01	0.06	0.23	0.44	0.68	864,057	0.96
Worldscope	0.30	0.28	0.01	0.06	0.24	0.46	0.71	855,539	
Leverage									
Compustat	0.74	27.69	0.15	0.31	0.51	0.71	0.90	970,974	0.98
Worldscope	0.99	24.27	0.14	0.30	0.51	0.72	0.91	953,433	
M/B									
Compustat	1.77	1.85	0.73	0.92	1.18	1.84	3.24	680,887	0.96
Worldscope	1.95	2.62	0.74	0.94	1.19	1.88	3.44	814,597	

Table A.14: Country-level match rates between primary market data and firm financial statements. This table reports the percentage match rates in terms of number of unique non-financial corporate bonds issued for each country for the top 10 advanced economies, the top 10 emerging market economies, the remaining advanced economies, and the remaining emerging market economies. Countries ranked based on the total number of unique non-financial corporate fixed-rate bonds issued by issuers domiciled within the country. Compustat includes Compustat North America and Compustat Global.

		Matched to:				Percent of matched with non-missing:						
	Not matched	Compustat only	Both	WS only	Total matched	EDFs	Assets	Leverage	M/B	Profitability	Asset tangibility	All
USA	32	3	62	3	68	72	77	77	32	65	60	18
South Korea	64	4	31	1	36	82	77	77	66	69	65	46
Japan	47	1	49	4	53	88	68	66	61	56	47	36
Canada	69	1	27	3	31	69	95	95	58	80	69	32
United Kingdom	46	2	50	2	54	76	77	76	60	59	56	31
Netherlands	81	1	18	0	19	75	89	89	58	70	73	35
France	58	0	38	4	42	81	58	58	44	44	39	25
Taiwan	21	0	74	5	79	92	91	91	83	81	77	72
Australia	58	1	39	2	42	77	97	97	80	86	83	57
Germany	51	15	31	3	49	54	31	31	24	23	18	6
Other AE	55	3	40	1	45	81	47	47	30	40	39	19
China	86	0	14	0	14	86	92	92	87	88	78	67
Malaysia	59	1	39	1	41	88	96	96	92	91	77	66
Thailand	36	0	62	1	64	95	97	97	93	93	79	73
India	33	2	65	1	67	87	98	97	85	92	85	71
Indonesia	67	0	32	0	33	84	86	86	82	82	83	67
Mexico	58	10	30	3	42	68	80	80	64	67	65	51
Brazil	51	2	44	3	49	65	89	89	77	79	77	46
Russia	66	1	32	1	34	74	74	74	53	54	43	23
Chile	58	1	40	2	42	71	96	96	85	84	81	57
Argentina	80	0	18	1	20	69	97	97	82	78	71	38
Other EM	68	2	28	1	32	71	67	67	49	55	49	28

Table A.15: Country-level match rates between primary market data and firm financial statements, conditional on issuance in major currencies. This table reports the percentage match rates in terms of number of unique bonds issued for non-financial corporate bonds that have access to major currency (USD, EUR, GBP, JPY, AUD, CAD, CHF, DKK) markets for each country for the top 10 advanced economies, the top 10 emerging market economies, the remaining advanced economies, and the remaining emerging market economies. Countries ranked based on the total number of unique non-financial corporate fixed-rate bonds issued by issuers domiciled within the country. Compustat includes Compustat North America and Compustat Global.

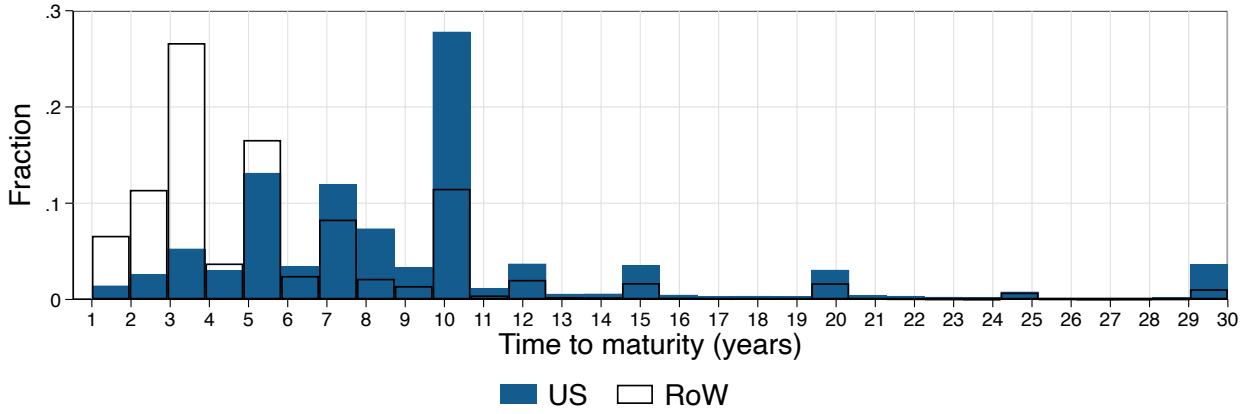
	Not matched	Compustat only	Both	WS only	Total matched
USA	32	3	62	3	68
South Korea	44	0	55	0	56
Japan	47	1	49	4	53
Canada	69	1	27	3	31
United Kingdom	46	3	50	2	54
Netherlands	81	1	18	0	19
France	60	0	36	4	40
Taiwan	11	0	88	1	89
Australia	58	1	38	2	42
Germany	51	16	30	3	49
Other AE	54	4	41	1	46
China	82	0	17	0	18
Malaysia	54	0	45	1	46
Thailand	41	0	58	1	59
India	17	5	76	1	83
Indonesia	80	1	19	1	20
Mexico	54	13	30	3	46
Brazil	46	2	47	4	54
Russia	58	1	40	0	42
Chile	52	1	46	1	48
Argentina	80	0	18	1	20
Other EM	73	3	23	1	27

Table A.16: Country-level match rates between secondary market data and firm financial statements. This table reports the percentage match rates in terms of number of unique bond-months quoted for non-financial corporate bonds for each country for the top 10 advanced economies, the top 10 emerging market economies, the remaining advanced economies, and the remaining emerging market economies. Countries ranked based on the total number of unique non-financial corporate fixed-rate bonds issued by issuers domiciled within the country. Compustat includes Compustat North America and Compustat Global.

	Not matched	Compustat only	Both	WS only	Total matched
USA	25	2	70	3	75
South Korea	38	0	62	0	62
Japan	39	0	61	0	61
Canada	32	2	61	5	68
United Kingdom	25	2	71	2	75
Netherlands	31	3	65	2	69
France	41	0	58	1	59
Taiwan	0	0	100	0	100
Australia	38	1	59	3	62
Germany	17	6	77	1	83
Other AE	24	3	71	2	76
China	70	0	30	0	30
Malaysia	50	0	50	0	50
Thailand	10	1	90	0	90
India	33	0	65	2	67
Indonesia	79	0	21	0	21
Mexico	39	19	38	4	61
Brazil	34	0	66	0	66
Russia	29	2	69	0	71
Chile	41	0	59	0	59
Argentina	36	1	60	3	64
Other EM	47	4	45	3	53

Figure A.1. Distribution of initial time to maturity. This figure plots distribution of time-to-maturity at issuance for bonds issued by non-financial corporate issuers, for U. S. issuers and issuers located in the rest-of-the-world (RoW). The figure plots the fraction of bonds within each category – bonds issued by U. S. issuers and bonds issued by issuers outside the U. S. – issued with a given maturity. Thus, for example, the blue bars in each panel, representing the distribution of maturities for the sample of bonds issued by U. S. issuers, add up to 1.

(a) Fixed rate



(b) Floating rate

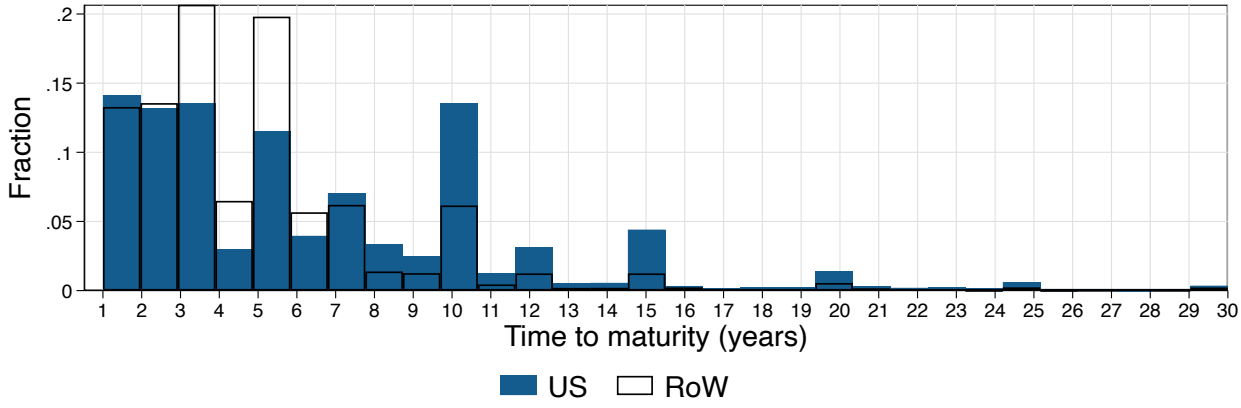
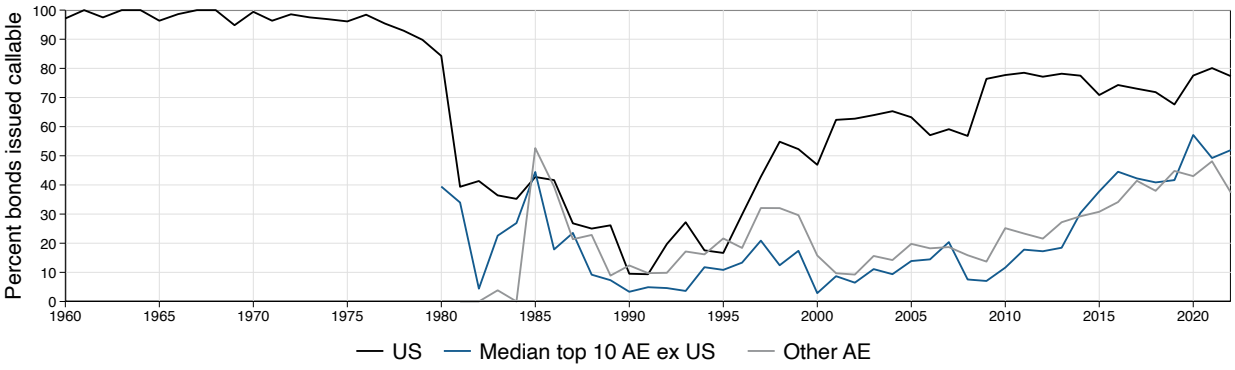


Figure A.2. Fraction of bonds issued with call provisions. This figure plots the time series of the fraction of non-financial corporate, fixed-coupon bonds issued with call provisions by issuers domiciled in a country within a year for each country for the top 10 advanced economies, the top 10 emerging market economies, the remaining advanced economies and the remaining emerging market economies. Countries ranked based on total number of unique non-financial corporate fixed-rate bonds issued by issuers domiciled within the country.

(a) Advanced economies



(b) Emerging market economies

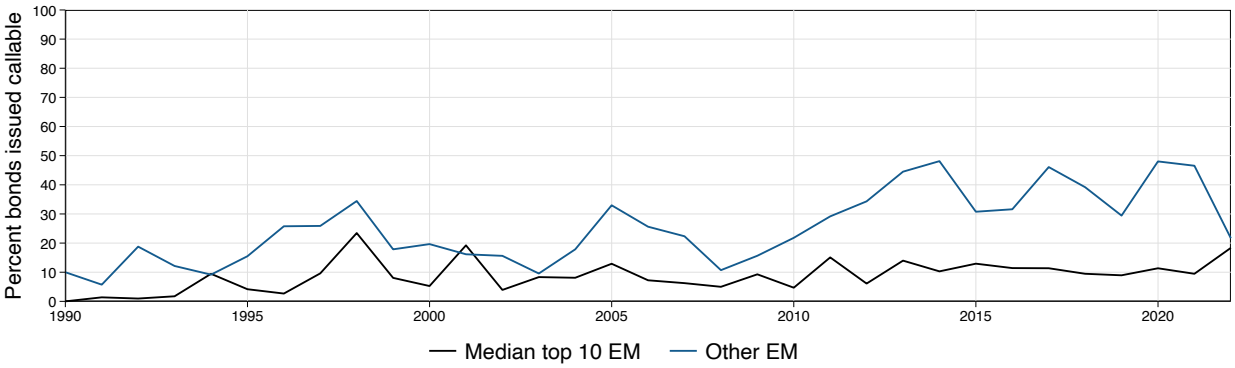
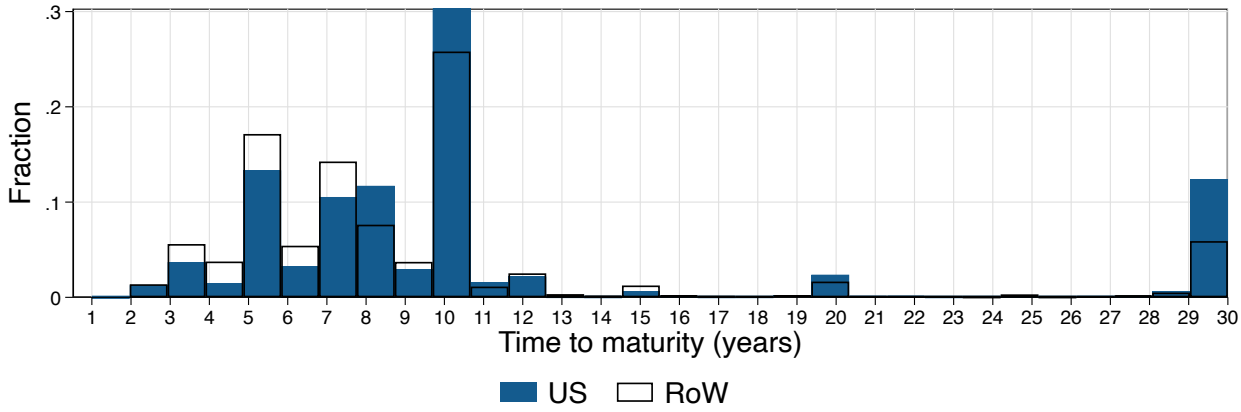


Figure A.3. Distribution of initial time to maturity for bonds appearing in ICE Global Corporate Bond Indices. This figure plots distribution of time-to-maturity at issuance for bonds issued by non-financial corporate issuers, for U. S. issuers and issuers located in the rest-of-the-world (RoW). "Included in ICE Global Corporate Bond Indices" are primary market issuances that are ever included in either the ICE Global Corporate Bond Index or the ICE Global High Yield Corporate Bond Index. The figure plots the fraction of bonds within each category – bonds issued by U. S. issuers and bonds issued by issuers outside the U. S. – issued with a given maturity. Thus, for example, the blue bars in each panel, representing the distribution of maturities for the sample of bonds issued by U. S. issuers, add up to 1.

(a) Included in ICE Global Corporate Bond Indices



(b) Not included in ICE Global Corporate Bond Indices

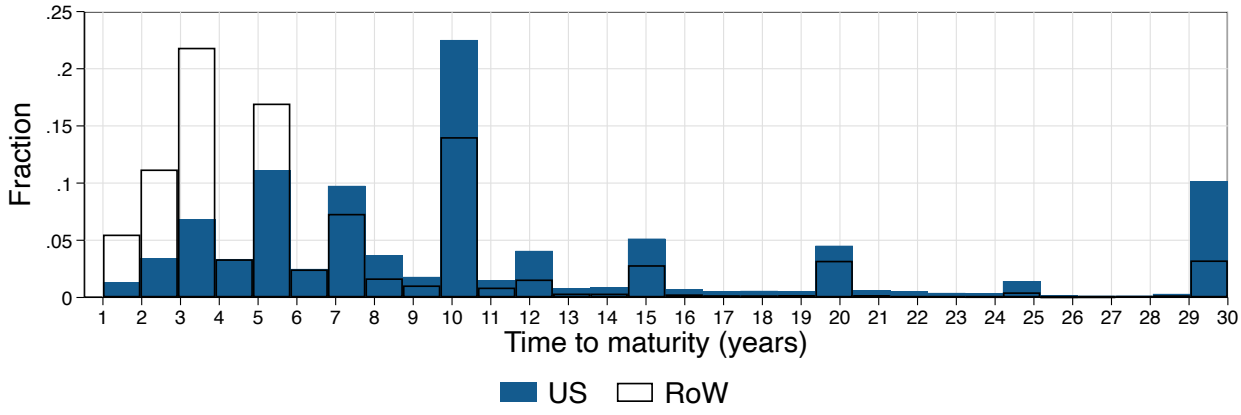


Figure A.4. Merge rates between primary market data and firm financial statements over time. This figure plots the time series of the percentage match rates in terms of number of observations for non-financial corporate bonds for advanced economies (AE) and emerging market economies (EM).