The Jagged Firm-Level Origins of Aggregate Credit Disintermediation *

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Abstract

Corporate bond markets have grown steadily, and this growth is often interpreted as firms shifting from bank to market finance. In the aggregate the shift looks smooth, but for individual firms it is not. Using national accounts for 36 countries and firm-level data for more than 50, we show that part of the growth is credit deepening. Where the financing mix does change, it changes within large firms, and in jumps: a firm's bond share rises when it issues, and new bank loans erode it unless the firm issues again. Large bond issues account for 30 percent of the variance of annual changes in the aggregate bond share, although issuers' share of corporate debt is only 15 percent. A shift toward bonds raises the foreign-currency share of debt in countries where bonds are more often in foreign currency than loans and lowers it where loans are. Aggregate data therefore overstate how broadly and durably firms have moved away from bank finance.

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1 Introduction

Global corporate bond markets have grown substantially over the past three decades.[1] The growth is usually read as a shift from bank to market finance. Yet growth in bonds outstanding is not, by itself, evidence that firms have substituted bonds for loans. Bonds outstanding relative to GDP is the product of the bond share of corporate debt and corporate debt relative to GDP, and rises just as readily when firms borrow more of everything as when they change what they borrow: since 1950, U. S. corporate bonds have more than doubled relative to GDP, while the bond share of U. S. corporate debt rose only from 52 to 59 percent. Moreover, the bond share of the corporate sector is a debt-weighted average that can rise without any firm changing its financing mix, if bond-heavy firms grow or loan-dependent firms exit. Even where firms do change their mix, the aggregate can rise smoothly while individual firms move toward bonds in a few large issues. In this paper, we argue that the smooth rise of bond finance in the aggregate is the sum of firm-level paths that are uneven across firms and jagged over time.

The bond share matters because it governs how shocks reach firms. Firms that borrow in bond markets can substitute away from banks when bank credit tightens, which dampens the transmission of bank and monetary shocks (Kashyap et al., 1993; Becker and Ivashina, 2014; Crouzet, 2021). Bond issuance made up much of the lost bank credit in 2007–09 in the United States (Adrian et al., 2013) and, to a lesser extent, in the euro area (De Fiore and Uhlig, 2015). More broadly, whether banks or nonbanks finance a credit expansion shapes subsequent real activity and the probability of a crisis, in part because bank credit is more sensitive to downturns (Boyarchenko and Elias, 2024b). Bonds are also more often fixed-rate, so policy rates pass through more slowly to firms' interest expense (Ippolito et al., 2018), and outside the United States they are often in foreign currency, which exposes firms to the

[1] Bonds of nonfinancial corporations in advanced economies other than the U. S. rose from 9 percent of GDP in 2002 to 12 percent, global nonfinancial corporate bond issuance in 2008–19 ran at twice its pre-crisis pace (Çelik et al., 2020), and euro-area corporate bonds outstanding roughly tripled in real terms between 2002 and 2021 (Darmouni and Papoutsi, 2022).

exchange rate (Eichengreen and Hausmann, 1999; Bruno and Shin, 2015). The rise of bond markets, however, changes how these shocks reach firms only to the extent that it amounts to disintermediation, in which the corporate sector moves away from banks. Whether it does depends on four questions. First, whether the growth of bond markets reflects a shift in the composition of corporate debt or simply more borrowing, which leaves firms no less dependent on banks. Second, how broadly the move is shared: an economy where many firms can substitute between banks and markets responds to a bank shock very differently from one where a few large firms are heavily in bonds and the rest remain bank-dependent. Third, how durable it is: if firms move toward bonds through large, infrequent issues that are later reversed as they take out new loans and their bonds mature, the aggregate bond share reflects when firms last issued rather than a lasting capacity to substitute, and that capacity may not be there when a shock arrives. Fourth, what comes with it: whether a firm that moves toward bonds becomes a fixed-rate borrower, a longer-maturity one, or a foreign-currency one determines which shocks it becomes more or less sensitive to.

To answer these questions, we combine the national financial accounts of 36 countries with instrument-level data on the debt of firms in over 50 countries over 2002–2024. The national financial accounts report the debt securities and loans of the entire nonfinancial corporate sector on a basis that is comparable across countries. Capital IQ's debt capital structure data report each debt instrument outstanding on a firm's balance sheet (term loans, revolving facilities, bonds, commercial paper, leases), with its type, currency, maturity, coupon, and amount outstanding. The national accounts tell us whether the composition of corporate debt has shifted, and the firm-level data tell us how broadly the move is shared, how durable it is, and what comes with it. Together, they let us answer the four questions in turn.

First, outside the U. S., the growth of bond markets mainly reflects a shift in the composition of corporate debt rather than credit deepening, in which firms borrow more relative to GDP. The shift toward bonds accounts for 56 percent of the increase in bonds relative to GDP in

the average advanced economy and 76 percent in the average emerging economy. A given amount of corporate debt therefore depends less on banks than it did two decades ago.

Second, the shift toward bonds is concentrated among the largest tenth of firms, which account for most of the debt. Moreover, only about a third of the firms in our sample in advanced economies, and about a quarter in emerging economies, have any bonds outstanding. Outside the U. S., the increase in the aggregate bond share reflects changes in the composition of firms' own debt, which more than offset the reallocation of debt toward firms with lower bond shares and the net entry of loan-heavy firms. A rising aggregate bond share therefore overstates how many firms could replace bank credit with bonds if bank lending contracted. This ability has grown mostly for the largest firms, while most firms remain dependent on banks.

Third, firms move toward bonds in large jumps that are partly reversed. Outside the U. S., firms borrow in the bond market in fewer than one year in six, against more than half of years for loans. A large bond issue raises the issuer's bond share 46 percentage points above that of its matched peers, and within five years about half of this gap closes, mainly as the issuer takes out new loans. Issuers keep most of the gap only if they issue again. Large bond issues account for 30 percent of the variance of annual changes in the aggregate bond share, although issuers' share of corporate debt is only 15 percent. Because firms tend to issue at the same time, the aggregate is also more volatile than it would be if they issued independently. The aggregate bond share is thus closer to a measure of recent access to the bond market than of a lasting capacity to substitute away from banks. Common timing also points to market-wide conditions, so that the aggregate bond share moves with those conditions rather than with a lasting change in how firms finance themselves.

Fourth, a shift toward bonds makes firms' debt more fixed-rate and longer in maturity in every country group, as in Ippolito et al. (2018) and Boyarchenko and Elias (2023), but its effect on currency exposure depends on the country. In the U. S. and in emerging economies,

a firm's bonds and loans are about as often in foreign currency, while in advanced economies its bonds are more often in foreign currency, by 8 percentage points on average. A shift toward bonds raises the foreign-currency share of corporate debt where bonds are more often in foreign currency than loans, as in Denmark and Australia, and lowers it where loans are, as in Chile. Most of the change in countries' foreign-currency shares since 2002, however, reflects which firms borrow and in which currency. Measuring currency mismatch therefore requires data on individual firms and instruments.

The cross-country coverage of our data allows us to document that, while the aggregate trends in bond markets are similar across countries, the forces behind them differ sharply. In the U. S., bond markets grew only because firms borrowed more, while elsewhere cross-country differences in the growth of bond markets reflect differences in composition more than differences in credit deepening. Among the large firms in our sample, the rest of the world has been catching up with the U. S.. Their bond share rose from 42 to 61 percent in advanced economies and from 19 to 30 percent in emerging economies, against about 80 percent in the U. S.. Common timing raises the volatility of the aggregate bond share everywhere, but most in the U. S., where firms issue bonds in about a third of years. If firms issued independently, the variance of annual changes in the aggregate bond share would fall to about a tenth of its actual value in the U. S., against about three quarters in emerging economies, where firms issue in about one year in ten.

We contribute to three literatures. The first literature documents the growth of corporate bond markets and its sources. Studies at the Bank for International Settlements, the OECD, and the ECB establish the size, timing, and geography of this growth (Aldasoro et al., 2021; Avdjiev et al., 2020; Committee on the Global Financial System, 2021; Çelik et al., 2020; Holm-Hadulla et al., 2022; Chan et al., 2025). Other studies trace the development of corporate bond markets over long periods in the United States (Graham et al., 2015) and Japan (Hoshi and Kashyap, 2001), and across emerging economies (Abraham et al., 2020;

Cortina et al., 2021). These studies measure the growth of bond markets in aggregate data, without separating a shift in the bond share from more borrowing. At the firm level, debt structure is heterogeneous. Some firms use several types of debt at once and shift the mix as their credit quality changes (Rauh and Sufi, 2010), but most concentrate their borrowing in a single type (Colla et al., 2013). The choice among these types depends on market access (Denis and Mihov, 2003; Faulkender and Petersen, 2006; Hale and Santos, 2008). The aggregate composition of debt also depends on the distribution of debt across firms (Chen, 2023; Winterberg, 2025). Crouzet (2021) and Bochner et al. (2020) examine whether the U. S. loan share changed within firms or through the population of borrowers. Darmouni and Papoutsi (2022) document that many new euro-area issuers are small, private, and unrated. We contribute to this literature by separating the growth of bond markets into credit deepening and a shift in the bond share, and by tracing this shift to individual firms in a broad set of countries, where it is concentrated among the largest firms.

The second literature studies how firms adjust when adjustment is costly, and what this implies for aggregates. In macroeconomics, plants invest in infrequent spikes (Doms and Dunne, 1998; Cooper and Haltiwanger, 2006), so that aggregate investment depends on the number of plants close to their adjustment thresholds (Caballero et al., 1995; Caballero and Engel, 1999), although price movements in general equilibrium may smooth these lumps (Thomas, 2002; Khan and Thomas, 2008). In corporate finance, leverage ratios are highly persistent (Lemmon et al., 2008), and fixed costs of issuing and retiring securities lead firms to rebalance their leverage infrequently and in large steps (Leary and Roberts, 2005; Strebulaev, 2007). Large increases in leverage are often transitory, as firms borrow to fund investment (DeAngelo et al., 2011) or operating needs (Denis and McKeon, 2012) and repay the debt over the following years. Bonds and loans differ in the costs of adjustment, since bank credit agreements are renegotiated frequently and at low cost (Roberts and Sufi, 2009), whereas bonds are costly to retire before maturity (He and Xiong, 2012; Diamond and He, 2014; Harford et al., 2009). External financing also occurs in aggregate waves when its cost

is low (Eisfeldt and Muir, 2016), and firms time their issuance to market and macroeconomic conditions (Erel et al., 2012), shifting between debt and equity as their relative cost changes (Ma, 2019) and between bonds and loans as global credit conditions change (Boyarchenko and Elias, 2024a). We contribute to this literature by showing that the composition of debt adjusts in large, partly reversed jumps through bond issuance, and that the common timing of these jumps across firms drives the aggregate bond share.

The third literature examines the exposures that come with the choice between bonds and loans. Bonds are more often fixed-rate and have longer maturities than loans, so that bond finance slows the pass-through of policy rates to firms' interest expense (Ippolito et al., 2018), and other work studies the maturity structure of corporate debt (Barclay and Smith Jr, 1995; Stohs and Mauer, 1996; Greenwood et al., 2010). Outside the U. S., the growth of bond markets after 2008 coincided with substantial dollar issuance by emerging-market firms (Shin, 2016; Bruno and Shin, 2017), and a rising bond share is therefore often interpreted as a sign of increasing currency mismatch (Eichengreen and Hausmann, 1999; Du and Schreger, 2022). The currency of corporate debt, however, also reflects natural hedges and firms' ability to borrow abroad (Bleakley and Cowan, 2008; Burger and Warnock, 2006; Maggiori et al., 2020). Boyarchenko and Elias (2023) show that bond issuance passes through only partially to bonds outstanding, displacing loans in advanced economies but not in emerging economies. We contribute to this literature by showing that a firm's shift toward bonds consistently makes its debt more fixed-rate and longer in maturity, and changes its currency exposure in a direction that varies across countries.

The rest of the paper is organized as follows. Section 2 describes the two data sources. Section 3 decomposes the growth of bond markets into a shift in the bond share and credit deepening, and the bond share into the contributions of individual firms. Section 4 studies how firms' bond shares evolve over time and the corporate actions that drive these changes. Section 5 examines the exposures that come with bonds. Section 6 concludes.

2 Data

The analysis draws on two sources that complement each other: the national financial accounts, which measure the debt securities and loans of the entire nonfinancial corporate sector but do not identify individual borrowers; and the detailed S&P Capital IQ Debt Capital Structure dataset, which records the debt instruments on the balance sheets of individual firms. Our sample covers 36 countries in the national accounts and firms in 57 countries in the instrument-level data, over 2002–2024.

2.1 National financial accounts

From the OECD's annual financial accounts, we take the outstanding stocks of debt securities and of loans of nonfinancial corporations, on a non-consolidated basis, and measure the bond share as debt securities over debt securities plus loans; nominal GDP is from the IMF's World Economic Outlook and, for the United States, from the Bureau of Economic Analysis.[2] The sample is limited to the countries for which the OECD reports non-consolidated financial balance sheets of nonfinancial corporations, which include its members and several other economies; after the exclusions described in Appendix A.1, it covers 36 countries, 11 of them emerging economies (Table A.1).

We express debt securities at face value rather than at market value, at which the accounts record them, by dividing each country's stock by an index of the prices of its nonfinancial corporations' bonds, so that the bond share measures the composition of what firms owe. For the United States, we take the debt securities and loans of nonfinancial corporate business from the Federal Reserve's Financial Accounts, the perimeter closest to that of the other

[2] We measure firms' debt as their liabilities in debt securities (AF3) and loans (AF4), which correspond to borrowing from investors and lenders and to the bonds and loans in the firm-level data. We leave out the other liabilities in the financial accounts, which include trade credit and other accounts payable, pension entitlements, and equity.

countries' accounts, rather than those of the broader nonfinancial business sector that the Federal Reserve reports to the OECD. Appendix A.1 explains these choices in more detail and describes how we construct the rest of the national accounts data.

2.2 Instrument-level firm data

We rely on the international debt market data collected in Boyarchenko and Elias (2023), and in particular on the *instrument*-level debt outstanding data from the Capital IQ Debt Capital Structure dataset, which allows us to track the debt instruments on firms' balance sheets. For each instrument, we observe a number of characteristics, including its maturity, currency, security type, interest rate type, coupon or spread, and amount outstanding. We match the instrument-level data with firm-level balance sheet data from consolidated Compustat and Worldscope.[3] Throughout, we consolidate firms to the ultimate parent level, which avoids double-counting instruments that appear on the balance sheets of both the ultimate parent and the issuing subsidiary, and we assign each firm to the country of its ultimate parent.

We restrict the sample to nonfinancial firms that are not government entities and report annually, and keep the firm-years for which we observe both balance-sheet and instrument-level data. Among these, we drop those in which the sum of the firm's instruments differs substantially from the debt on its balance sheet, which signals instruments recorded in the wrong units or currency or debt that Capital IQ misses; the screen removes 6 percent of firm-years and 2 percent of their debt. Our sample covers fiscal years 2002 to 2024 and the 57 countries, other than financial and offshore centers, with at least 25 sample firms a year on average. We follow the International Monetary Fund in classifying the countries in our sample into the U. S., 26 other advanced economies, and 30 emerging market economies; throughout the paper, "advanced economies" refers to the advanced economies other than

[3]Compustat includes Compustat North America and Compustat Global. See Boyarchenko and Elias (2023) for details on the Compustat–Worldscope consolidation procedure as well as a detailed description of the data sources and the matching procedure between debt amount outstanding and balance sheet data.

the U. S. (Table A.3). Appendix A.2 describes these choices, and Table A.2 reports the size of the sample at each stage of its construction.

The firms in our data account for most of the nonfinancial corporate bonds in the national accounts but for a much smaller share of loans: 67 to 72 percent of bonds in the U. S. and 71 to 86 percent in advanced economies over 2002–2024, against 30 to 46 and 13 to 18 percent of loans (Appendix A.3). Since firms with public bonds must publish financial statements, which Capital IQ collects, the firms missing from our data are likely to borrow mostly from banks.

We define the bond share of a firm's debt as bonds and notes over bonds and notes plus loans, where loans are term loans, revolving credit, and mortgages; commercial paper, other borrowings, and leases are left out of both the numerator and the denominator.[4] Our definition thus measures the choice between bonds and loans, while the national accounts' concept is broader, counting commercial paper as a debt security and finance leases and intercompany loans as loans.

Table 1 reports the size and the debt composition of the sample. In 2014–2024, it includes about 6,500 firms in the U. S., 20,600 in advanced economies, and 17,900 in emerging economies, which owed 8.9, 9.8, and 4.7 trillion dollars of debt in 2024, respectively. Bonds account for 81 percent of the bonds and loans of U. S. firms, against 59 percent in the average advanced economy and 28 percent in the average emerging economy, where term loans make up more than half of all debt. Overall, our sample covers a large number of firms and a substantial amount of corporate debt, and the bond share differs widely across country groups.

[4]Commercial paper fell from 5.3 percent of U. S. firms' debt in 2002–2013 to 2.4 percent in 2014–2024 (Table 1), and including it would add a decline unrelated to the choice between bonds and loans. The accounting for leases changed in 2019, when IFRS 16 and ASC 842 brought operating leases onto balance sheets, which Capital IQ records together with capital leases; excluding leases keeps their recognition from appearing as a shift away from bonds (Boyarchenko and Elias, 2026b).

3 Decomposing the growth of corporate bond markets

In this section, we document the growth in global corporate bond markets since 2002 and decompose that growth into a credit deepening component —firms borrowing more through bond markets because they borrow more relative to the size of the economy— and a debt composition component —firms shifting the composition of their debt toward bonds. We then use firm-level data to study whether country-level changes in the composition component are driven by particular firms in the economy or equally spread out across firms.

3.1 Aggregate bond market growth

We begin with the national accounts. Let b_{ct} denote debt securities (bonds) of nonfinancial corporations relative to GDP in country c and year t, d_{ct} their total debt relative to GDP, and $s_{ct} = b_{ct}/d_{ct}$ the bond share of their debt. Then

$$b_{ct} = s_{ct} d_{ct}, \qquad \Delta b_{ct} = \underbrace{\bar{d}_{ct} \Delta s_{ct}}_{\text{composition}} + \underbrace{\bar{s}_{ct} \Delta d_{ct}}_{\text{credit deepening}}, \tag{1}$$

where Δ is the change from $t-1$ to t and bars denote averages of the two years. The first term is the growth in bonds relative to GDP that comes from a higher bond share at a given level of debt; the second is the growth that comes from more debt at a given bond share. We compute the two terms each year for each country and cumulate them from 2002. For advanced economies and emerging economies, we first average the annual terms across the countries observed in both years, so that countries entering the panel do not affect the group's path.

Figure 1 plots bonds relative to GDP and its two components for the U. S. (Figure 1a), advanced economies (Figure 1b), and emerging economies (Figure 1c). In the U. S., bonds outstanding rose from 27.2 percent of GDP in 2002 to 29.4 percent in 2024. Credit deepening

accounts for more than the entire increase, 2.8 percentage points, while composition shifted slightly away from bonds (−0.6 percentage points): U. S. firms borrowed more relative to GDP but held a slightly smaller share of their debt in bonds. Bond markets outside the U. S. remain smaller but grew faster. Bonds outstanding rose from 8.9 to 11.6 percent of GDP in the average advanced economy and from 4 to 7.3 percent in the average emerging economy, and composition accounts for 56 and 76 percent of these increases, respectively.[5]

These averages mask substantial heterogeneity across countries. Figure 2 plots, for each country, the composition component against the credit-deepening component over the country's sample; countries above the dashed line saw bonds grow relative to GDP. In Spain, Italy, and Portugal, the shift toward bonds added 6 to 11 percentage points of GDP to bonds outstanding even as debt fell relative to GDP. In Sweden, Norway, Chile, and Mexico, both components contributed, while France's bond market grew almost entirely through credit deepening. In Canada and the U. S., instead, the bond share fell, and bonds rose relative to GDP only because firms increased their overall borrowing; in Korea, more borrowing did not make up for the lower bond share, and bonds fell relative to GDP. Overall, cross-country differences in bond market growth mostly reflect differences in composition: across the 32 countries observed from 2012 or earlier through 2024, the total change in bonds relative to GDP has a correlation of 0.75 with the composition component and of 0.47 with the credit-deepening component.

Put together, outside the U. S. a shift toward bonds accounts for most of the growth of corporate bond markets since 2002, but the shift has been uneven across countries. The national accounts do not reveal how the shift came about: whether firms changed the composition of their own debt, debt moved toward firms that already borrowed in bonds, or new bond issuers entered, and whether the shift was broad-based or concentrated among a few firms. We use the firm-level data to distinguish between these explanations.

[5]Boyarchenko and Elias (2026a) further explore how these growth patterns vary across subperiods.

3.2 Decomposing the bond share across firms

For firm i in country c and year t, let s_{it} denote the bond share of the firm's debt, bonds over bonds plus loans, and w_{it} the firm's share of the bonds plus loans of the firms in its country. The bond share of the country's firms is the debt-weighted average

$$S_{ct} = \sum_{i \in c} w_{it}\, s_{it}, \tag{2}$$

the firm-level counterpart of s_{ct} in equation (1). We compare it with the equal-weighted average of s_{it} across the country's firms, the bond share of the average firm. As in Section 3.1, we report both for the average country in each group, so that each country counts equally, and chain the averages so that countries entering the sample do not affect them.

Figure 3 plots the two firm-level averages, together with the national accounts' bond share for the countries in both sources. Outside the U. S., the national accounts' bond share is close to that of the average firm and far below the debt-weighted share. In the average advanced economy, the national accounts' bond share was 13 percent in 2002 and 15 percent in 2024, against 16 and 23 percent for the average firm and 42 and 61 percent for the debt-weighted share. In the average emerging economy, the debt-weighted share, 19 percent in 2002 and 30 percent in 2024, is more than twice the bond share of the average firm, 11 to 13 percent, and of the national accounts, 10 percent in 2004, when its series starts, and 14 percent in 2024. The U. S. is the exception: most U. S. firms in our sample have bonds outstanding, and the national accounts' share, around 60 percent, lies between the equal-weighted share, about half, and the debt-weighted share, around 80 percent. The gaps persist when we measure the firm-level bond share on the national accounts' definition and keep only the country-years in both sources (Figure A.2).

The gap between the two firm-level averages reflects how concentrated bond financing is. In the average country, only about a third of the firms in our sample in advanced economies, and

about a quarter in emerging economies, have any bonds outstanding. The national accounts also cover firms that are not in Capital IQ and borrow mostly from banks (Section 2.2), so that their bond share lies below the debt-weighted share of the firms we observe.

The two firm-level averages also evolved differently over time. In advanced economies, the debt-weighted share rose by 19 percentage points between 2002 and 2024, almost three times the increase in the bond share of the average firm; in emerging economies, it rose by 11 percentage points, against 2 for the average firm. The shift toward bonds documented in Section 3.1 thus took place mainly among the firms that account for most of the debt, and the rest of this section asks whether those firms changed their own debt or debt moved toward them.

Figure 4 illustrates three ways in which the debt-weighted bond share can rise in an economy with two firms, one bond-heavy and one loan-heavy; the size of each marker is the firm's debt. In Figure 4a, both firms raise their bond share and their debt is unchanged. In Figure 4b, neither firm changes its debt composition, but debt grows at the bond-heavy firm and shrinks at the loan-heavy firm, so that the bond-heavy firm receives a larger weight in the aggregate. In Figure 4c, neither firm changes, but a bond-heavy firm enters; the exit of a loan-heavy firm would have the same effect. Only in the first case do firms substitute bonds for loans; in the other two, credit is reallocated across firms whose debt composition does not change. This distinction is central to the debate on whether shifts in the aggregate composition of bank and market debt reflect substitution within firms (Kashyap et al., 1993) or reallocation across firms (Gertler and Gilchrist, 1994; Oliner and Rudebusch, 1996); Crouzet (2021) finds that in the U. S. the loan share moved mostly within firms.

To measure the three channels, we decompose each year's change in each country's debt-weighted bond share following Melitz and Polanec (2015) and average the terms across countries. Within country c, let $\mathcal{S}_{ct}$ denote the firms in the sample in both $t-1$ and t, $\mathcal{E}_{ct}$ the firms that enter in t, and $\mathcal{X}_{ct}$ the firms that exit after $t-1$. For a group of countries, let

$\mathcal{C}_t$ denote the N_t countries in the sample in both $t-1$ and t. Then

$$\Delta S_t = \frac{1}{N_t} \sum_{c \in \mathcal{C}_t} \Bigg[\underbrace{\sum_{i \in \mathcal{S}_{ct}} \bar{\phi}_{it} \left(\Delta s_{it} - \Delta s_{it}^{fx} \right)}_{\text{within}} + \underbrace{\sum_{i \in \mathcal{S}_{ct}} \bar{\phi}_{it} \, \Delta s_{it}^{fx}}_{\text{revaluation}} + \underbrace{\sum_{i \in \mathcal{S}_{ct}} \Delta \phi_{it} \, \bar{s}_{it}}_{\text{between}} + \underbrace{W_{ct}^{\mathcal{E}} \left(S_{ct}^{\mathcal{E}} - S_{ct}^{\mathcal{S}} \right)}_{\text{entry}} + \underbrace{W_{c,t-1}^{\mathcal{X}} \left(S_{c,t-1}^{\mathcal{S}} - S_{c,t-1}^{\mathcal{X}} \right)}_{\text{exit}} \Bigg], \tag{3}$$

where ϕ_{it} is firm i's share of the debt of the surviving firms in its country, $W_{ct}^{\mathcal{E}}$ and $W_{c,t-1}^{\mathcal{X}}$ are the shares of the country's debt owed by entering firms in t and exiting firms in $t-1$, $S_{ct}^{\mathcal{S}}$, $S_{ct}^{\mathcal{E}}$, and $S_{ct}^{\mathcal{X}}$ are the debt-weighted bond shares of surviving, entering, and exiting firms, and bars denote averages of years $t-1$ and t.

The within term is the change in surviving firms' own bond shares net of Δs_{it}^{fx}, the part that comes from exchange-rate movements beyond relative inflation on the firm's existing foreign-currency debt, which forms the revaluation term (Appendix A.2). A firm enters when it first appears in our sample with positive debt, whether because it starts to borrow, first appears in Capital IQ, or first passes our sample screens. It exits after its last year in the sample, whether because it stops borrowing, leaves Capital IQ, or no longer passes our screens. When a firm leaves the sample for some years and later returns, we fill in the missing years with the average of its bond share and debt in the last year before and the first year after the gap, so that a temporary absence does not count as an exit and a re-entry. As in Section 3.1, averaging over the countries in the sample in both years means that countries entering the sample do not affect the group's change, and we sum the annual terms over 2003–2024, so that they add up to the change in the group's chained debt-weighted bond share between 2002 and 2024. We leave out country-years with fewer than ten firms in the sample.

Table 2 reports the decomposition for the U. S., advanced economies, and emerging economies. In every group, firms changing the composition of their own debt account for more than the

entire change.[6] The within term is 25.8 percentage points against a total increase of 19.0 in advanced economies and 17.8 against 11.0 in emerging economies.

In the U. S., the debt-weighted bond share was essentially unchanged, but this stability conceals offsetting movements. Firms raised their own bond shares by 6.6 percentage points, offset by debt moving toward firms with lower bond shares (-4.4) and by the net entry of loan-heavy firms (-1.6). In every group, both entering and exiting firms have lower bond shares than surviving firms, so that entry lowers the aggregate and exit raises it. Exchange-rate revaluation contributes 0.2 percentage points in emerging economies and almost nothing elsewhere.

To assess how much these terms depend on the firms we observe, we report two sets of standard errors: from a bootstrap that resamples firms, with their entire histories, within each country, and from leaving out one country at a time. The within term is at least five bootstrap standard errors from zero in every group. Leave-one-out standard errors are larger, since a single country can account for a substantial part of a group's terms, but the within term remains the largest term regardless of which country is excluded: between 25 and 27 percentage points in advanced economies and between 16 and 19 percentage points in emerging economies. Outside the U. S., the within term is also the largest term in the balanced panel of firms that are in our sample in every year from 2002 to 2024, where entry and exit play no role (Table A.4): 21.3 percentage points against a total increase of 17.0 in advanced economies, and 26.2 against 24.3 in emerging economies. In the U. S. balanced panel, the bond share fell by 1.4 percentage points, as debt moved toward firms with lower bond shares (-3.2) while firms' own bond shares rose only slightly (1.8).

Finally, we examine which firms changed the composition of their debt. We rank firms in two ways: by size, using total assets within their country and year, and by investment intensity, capital expenditures over the previous year's total assets, assigning each firm to a fixed

[6] The results are similar when we measure the bond share on the national accounts' definition, bonds and commercial paper over all debt except leases (Tables A.6 and A.7).

group by its average percentile among the firms of its country over its years in our sample. In both cases, we split firms into the bottom half, the 50th to 90th percentiles, and the top decile. For each country, we split the change in the debt-weighted bond share between 2002 and 2024 into changes within groups, weighted by each group's average share of the country's debt, and shifts of debt across groups, and we average over the countries with at least ten ranked firms and firms in every group in both years: 26 advanced economies, and 22 emerging economies by size and 19 by investment intensity. Table 3 reports the results.[7]

In advanced economies, almost the entire increase took place within groups: 17.7 of 19.0 percentage points by size and all of it by investment intensity. By size, the bond share rose proportionally most for firms between the 50th and 90th percentiles, but the top decile, whose share of the debt is about three quarters, accounts for most of the increase, with its bond share rising from 49 to 67 percent. By investment intensity, the shift toward bonds was strongest among firms that invest little or moderately relative to their assets, which together account for most of the increase, although the bond share of the top decile also rose.

The results for emerging economies display similar patterns. The increase took place mostly within groups, by size and by investment intensity, and was concentrated among the largest borrowers: the top size decile, whose share of the debt also grew, accounts for most of the increase, while the bond share of the bottom half rose only slightly. By investment intensity, the increase was instead broad-based, of similar size in every group.

By contrast, in the U. S. the bond share was essentially unchanged in every investment group, and by size the 2.7 percentage point increase within groups was offset by debt moving from the largest firms toward the 50th to 90th percentiles, where the bond share is lower (-2.1).

Put together, the results in this section show that, outside the U. S., the shift toward bonds came from firms changing the composition of their own debt, not from credit moving toward

[7] In the balanced panel of firms in the sample in every year from 2002 to 2024, the increase outside the U. S. also took place almost entirely within groups and mostly in the top size decile (Table A.5).

bond-heavy firms or from the entry of new bond issuers. The shift was far from shared: in both advanced and emerging economies, it was concentrated among the largest firms, which account for most of the debt, while most firms in our sample have no bonds outstanding at all. The steady rise of the aggregate bond share thus describes the debt of a few large firms rather than a gradual move by the corporate sector as a whole. The next section examines how these firms change the composition of their debt, and shows that their paths toward bonds are far from steady.

4 Lumpy bond issuance and the dynamics of debt composition

Section 3 showed that, outside the U. S., the aggregate shift toward bonds reflects changes in the composition of firms' own debt, concentrated among the largest firms. A steady aggregate trend would suggest that these firms moved toward bonds gradually. In this section we show that they did not. We first document that bond borrowing is lumpy — infrequent and concentrated in a few large issues— while loan borrowing is relatively more continuous, so that a firm's bond share jumps when it issues and is partly given back as it borrows from banks. We then examine how these jagged firm paths add up to the aggregate: how much of the variation in the aggregate bond share the jumps account for, and whether it reflects the size of individual issues or their common timing across firms.

4.1 The lumpiness of bond and loan borrowing

We consider four flows: bond borrowing (new bonds), loan borrowing (new loans and draws on existing revolving credit), and the repayment of each. Following Doms and Dunne (1998),

we call a flow lumpy if firms undertake it in few years and concentrate it in fewer still. Table 4 reports the results.

Outside the U. S., bond borrowing is infrequent and concentrated. Firms borrow in the bond market in fewer than one year in six, against more than half of years for loans. Among firms observed for at least ten years, the largest year accounts for about two thirds of a firm's bond borrowing, against just over a third for loans (Figure 5). Within a country, the 10 percent of firm-years with the largest bond borrowing relative to debt account for more than four fifths of all bond borrowing, against about a fifth for loans (Table 4). Repayments display the same asymmetry.

This asymmetry is consistent with fixed costs of bond issuance, such as underwriting, disclosure, and rating costs, and with a minimum efficient issue size. Bonds large enough to enter the major bond indices attract passive demand and lower borrowing costs, and firms size their issues to meet the index thresholds (Calomiris et al., 2022; Dathan and Davydenko, 2025). Fixed costs and a minimum issue size make infrequent, large bond issues optimal, whereas loans can be adjusted at low cost. The two markets differ in how often firms use them, not in the size of individual flows: when firms borrow heavily, the median large loan flow is in fact larger relative to their debt than the median large bond issue. Loans are therefore the margin along which firms adjust their debt from year to year. Consistent with fixed costs, bond borrowing is less lumpy for the largest firms, for which an index-eligible bond is a smaller share of debt (Appendix A.5).

In the U. S., bond borrowing is more frequent, in about a third of years against half for loans, but still more concentrated (Figure 5a). There, the continuous margin is revolving credit: term-loan borrowing alone is as concentrated as bond borrowing (Appendix A.5). The relevant distinction is therefore between debt raised in a single transaction, such as bonds and term loans, and committed credit lines that firms draw at will.

Because bond borrowing is lumpy, large increases in a firm's bond share stem mostly from

bond issuance, and large decreases mainly from new loans and draws on credit lines rather than from bond repayments (Appendix A.5). Overall, firms adjust the bond component of their debt infrequently and in large steps, and the loan component continuously. As a result, a firm's bond share at any date depends on the time since its last issue, and cross-sectional differences in bond shares partly reflect the timing of issuance rather than differences in firms' preferred debt composition.

4.2 Debt composition after large bond issues

How persistent are the changes in debt structure that lumpy bond issues produce? To answer this question, we follow firms around large bond issues, which we define as new bonds amounting to at least 15 percent of the firm's bonds and loans at the end of the previous fiscal year, made by a firm without a large issue in the preceding three years. Because issuers may differ systematically from other firms, we compare each issuer with matched peers: the five firms in the same country, industry, and size tercile that made no bond issue in the issue year and no large bond issue in the three previous years, and whose bond share in the year before the issue was closest to the issuer's, together with any firms equally close. We refer to the difference between the bond shares of the issuer and its peers as the gap. We consider issues in 2003–2019, so that each can be followed for five years, and in each year after the issue we average over the issuers and peers still in the sample (Appendix A.4).

Figure 6a plots the bond shares of issuers and their peers around the issue. Before the issue, issuers and their peers have the same bond share, about 9 percent. In the issue year, the bond share of issuers rises to 54 percent, while that of their peers remains at 8 percent. Five years after the issue, the gap between the two has narrowed by about half, mainly because the bond share of issuers declines.[8]

[8]This pattern does not depend on the choice of benchmark. Five years after the issue, the bond share of issuers exceeds the average bond share of all peers with bonds by 10 percentage points and the issuer's own past average by 19 percentage points (Figure A.3). First-time issuers and issuers with existing bonds follow similar paths (Figure A.4).

The increase in the bond share in the issue year rises with the size of the issue (Figures 6b to 6d). This pattern is largely mechanical, since a larger issue adds more bonds relative to the firm's debt. Outside the U. S., however, the increase exceeds this mechanical effect by up to 9.5 percentage points, because issuers also repay loans in the issue year (Table A.11). Large issues thus partly refinance existing loans.

After the issue, the gap narrows steadily. Five years after an issue of 35 to 100 percent of the firm's debt, it has fallen by 19 percentage points in advanced economies and by 24 in emerging economies, about half of its initial size, and by 7 percentage points, about two fifths, in the U. S. (Table A.11).[9] The gap closes mainly through new loans rather than through bond repayments (Appendix A.5). It narrows least when the firm issues again. Issuers that make no further large bond issue within five years give back at least 69 percent of the gap, against 20 to 33 percent for those that issue again (Table A.12). A lasting increase in a firm's bond share therefore requires repeated issuance rather than a one-time change in its debt mix.

This pattern is consistent with issuers overshooting, raising more bond debt than they intend to hold in the long run and growing into it with loans, which can be optimal when issuance carries fixed costs. Most firms report that they have a target debt ratio (Graham and Harvey, 2001). It is also consistent with firms that have no target composition and finance later needs with loans, which are cheaper to adjust. Because firms' preferred debt composition is not observed, we cannot distinguish between the two.

In sum, a large bond issue substantially raises a firm's bond share relative to that of comparable firms, and subsequent loan borrowing reverses part of this increase unless the firm issues again. Leary and Roberts (2005) document a similar pattern for leverage. Because adjustment is costly, firms rebalance their leverage infrequently and in large steps, and subsequent financing partly undoes each adjustment. Our results show that the composition of

[9] Between a fifth and almost half of issuers leave the sample within five years of the issue. Treating every exit either as a full reversal or as fully retained gives lower and upper bounds on retention (Table A.12).

debt adjusts in the same way.

4.3 Bond issuance and the aggregate bond share

We now quantify how much of the variation in the aggregate bond share these jumps and reversals account for. We split the within term of equation (3) by each firm's issuance status in the year, using only information available in that year: firms in the year of a large bond issue, firms in the five years after one, other firms with bonds, and firms without bonds. Table 5a reports each group's share of the variance of annual changes in each country's debt-weighted bond share, together with the group's share of debt.

Outside the U. S., the firms that make a large bond issue in a given year move the aggregate far more than their share of the debt would suggest. They account for 26 percent of the variance in advanced economies and 33 percent in emerging economies, while their shares of the debt are 18 and 13 percent, respectively. The results are similar for the bond share of the average firm and when countries are excluded one at a time (Appendix A.5). Year-to-year changes in the aggregate bond share are thus driven by the minority of firms that issue in a given year rather than by gradual shifts across many firms. In the U. S., by contrast, issue years account for 26 percent of the variance, in line with their 23 percent share of the debt. U. S. jumps matter for the aggregate because firms make them at the same time.

Jumps and reversals also shape the long-run change in the aggregate (last column of Table 5a). Over 2003–2024, averaged across all countries, years of large bond issues raise the debt-weighted bond share by 26 percentage points, and the following five years reduce it by 9, against a total increase of 14. About a third of the increase produced by large issues is thus reversed within five years, and gross issuance overstates the durable shift toward bonds.

To separate the size of firms' jumps from their timing, we construct a bootstrap distribution under the null hypothesis that firms issue independently of one another. In each of 500

replications, we shift each firm's sequence of within terms circularly by a random number of years, independently across firms. Each replication preserves the firm's jumps and reversals but removes any common timing across firms (Table 5b). The contribution of issue years depends little on their timing. Under the null, issue years account for 39 percent of the variance of the within term across all countries, compared with 42 percent in the data, just above the 95th percentile of the bootstrap distribution. Common timing, however, raises the volatility of the aggregate. Under the null, the variance of the within term is 11 percent of its actual value in the U. S., 63 percent in advanced economies, and 74 percent in emerging economies, and in all three groups the actual variance lies above the 95th percentile of the bootstrap distribution.

Common timing takes the form of issuance waves, which point to market-wide conditions that lead many firms to issue at the same time. We define a wave year as a year in which the share of a country's firms making a large bond issue exceeds the 67th percentile of its values over the previous seven years, so that waves are identified in real time. Figure 7 plots the cumulative change in the debt-weighted bond share around wave years. The bond share does not move before a wave. In the wave year, it rises by 1.3 percentage points more than in other years, and it remains 0.5 to 1.2 percentage points higher over the following four years (Appendix A.5). Because individual issues are large, such conditions move the aggregate bond share considerably more than they would if firms adjusted gradually.

Overall, the aggregate bond share rises when many firms make large bond issues at the same time. For an individual firm, part of each jump is subsequently reversed as it takes out loans, and the increase lasts only if the firm issues again. Movements in the aggregate bond share thus reflect when firms issue rather than a gradual shift by firms in general from loans to bonds.

5 How does the bond share shape firms' exposures?

Bonds and loans can differ in many dimensions, including interest-rate type, maturity, and currency, so a shift toward bonds can change firms' exposure to interest rates and exchange rates. While the fact that bonds are predominantly fixed-rate and of longer maturity than loans is well established (e.g., Ippolito et al., 2018), the relationship between the bond share and firms' currency exposure is relatively unexplored.[10] We focus on currency in the text and report most of the results for interest-rate type and maturity in the appendix. We first compare the currency of the bonds and loans on the same firms' balance sheets, then examine whether a large bond issue changes the currency composition of the issuer's debt, and finally decompose the change in the foreign-currency share of corporate debt over 2002–2024 into the contribution of shifts toward bonds within firms and the other sources of change.

5.1 Currency and the choice between bonds and loans

We first compare the bonds and loans of a given firm in a given year. Bonds are more often fixed-rate than loans in all but one country and are issued with longer maturities in most (Figure A.5). Figure 8 plots, for each country, the foreign-currency share of firms' bonds against that of their loans. In most countries, the two are close: bonds and loans are either both predominantly denominated in the home currency, as in Japan, Korea, and Italy, or both substantially denominated in foreign currency, as in Canada, Mexico, and Peru. The currency denomination of corporate debt is thus determined mainly by the borrower's country. This pattern is consistent with currency choices that reflect firm characteristics, such as natural hedges from foreign-currency revenues (Bleakley and Cowan, 2008) or the ability to borrow in foreign currency (Maggiori et al., 2020), both of which vary systematically across countries.

[10] The growth of corporate bond markets outside the U.S. after 2008 coincided with heavy dollar bond issuance by emerging-market firms (Shin, 2016; Bruno and Shin, 2017), and a rising bond share is therefore often read as rising currency mismatch (Eichengreen and Hausmann, 1999; Du and Schreger, 2022).

On average, bonds and loans of the same firm are about equally often in foreign currency in the U. S. and in emerging economies, while in advanced economies bonds are more often in foreign currency, by 8 percentage points, a gap concentrated among the largest firms. In some countries, however, one instrument is clearly more often in foreign currency than the other. Bonds are much more often denominated in foreign currency than loans in Denmark, Sweden, and Hong Kong, and in Argentina and Saudi Arabia. Loans are more often in foreign currency than bonds in Chile, Pakistan, and Vietnam. These differences determine how a shift toward bonds changes a country's currency exposure. Where bonds are more often in foreign currency than loans, a higher bond share means more foreign-currency debt, and where loans are, it means less.

5.2 Large bond issues and the foreign-currency share

We next examine whether a large bond issue alters the currency composition of the issuer's debt. As in Section 4.2, we compare each issuer with its matched peers and measure the change in the gap between them relative to the year before the issue. Figure 9 plots this change for the bond share (Figure 9a) and the foreign-currency share (Figure 9b). In the issue year, the gap in the foreign-currency share changes by less than 1 percentage point in all three country groups, even as the gap in the bond share widens substantially (Section 4.2).

The stability of the foreign-currency share reflects the currency composition of the new bonds. Abstracting from repayments in the issue year, the issuer's foreign-currency share after the issue is the amount-weighted average of the foreign-currency shares of its existing debt and of the new bonds. Because large issues are of the same order of magnitude as existing debt, this share would change materially if the two differed. In most countries, they are closely aligned (Figure 9c). Firms thus issue bonds in approximately the same currency mix as their existing debt.

Where the two differ, the difference follows the currency gap between bonds and loans documented in Section 5.1. The new bonds are more often in foreign currency than the issuer's existing debt in countries where bonds are more often in foreign currency than loans, such as Denmark, Australia, and the United Kingdom, and less often in countries where loans are, such as Chile and Pakistan. In these countries, a bond issue moves the issuer's foreign-currency share, in the direction of the difference between the two instruments.

After the issue, the foreign-currency share does not follow the bond share. The gap in the bond share narrows over the following five years (Section 4.2). The gap in the foreign-currency share instead widens, by up to about 4 percentage points in advanced and emerging economies and by less than 1 in the U. S.. The increase is concentrated in a few countries (Figure 9d). Five years after the issue, the gap in the foreign-currency share exceeds 10 percentage points in Argentina, the Philippines, Spain, Australia, and South Africa, and is about -12 percentage points in Belgium. Among the countries with the most issues, it is within about 3 percentage points of zero in China, India, Japan, Korea, and Taiwan, but about 9 percentage points in Canada. Across countries, it is unrelated to the remaining gap in the bond share. The post-issue change in the foreign-currency share thus reflects firms' currency choices rather than their choice between bonds and loans.

Overall, a large bond issue moves the currency composition of the issuer's debt only where bonds and loans differ in currency, and later changes in that composition are unrelated to the reversal of the bond share. The fixed-rate share and the maturity of the issuer's debt, by contrast, rise with the bond share in all three country groups (Figure A.5). Interest-rate exposure thus follows the issuance cycle documented in Section 4, while the currency exposure of an issue depends on the country.

5.3 The foreign-currency share of corporate debt

Finally, we examine how much shifts toward bonds within firms have contributed to the evolution of the foreign-currency share of corporate debt. We decompose the change in each country's foreign-currency share between 2002 and 2024 exactly into the contributions of firms' borrowing decisions, exchange-rate revaluation, and firm entry and exit (Figure 10). We further separate firms' borrowing decisions into changes in the mix of bonds and loans within firms, changes in the currency composition of their bonds and loans, and the reallocation of debt across firms. The change in the mix of bonds and loans measures the contribution of shifts toward bonds within firms.

Between 2002 and 2024, the foreign-currency share rose in the U. S. and in most advanced economies, and among emerging economies it rose in about as many countries as it fell. Most of these differences come from which firms borrow and in what currency. In most countries, the largest parts are the changes in the currency composition of firms' bonds and loans and the reallocation of debt across firms. Which firms borrow matters because firms differ systematically in how much they borrow in foreign currency. In most countries, firms that borrow in both markets borrow more in foreign currency than firms that borrow only through loans, on their loans as well as overall, by 15 percentage points of their debt in advanced economies and 9 in emerging economies on average (Table A.18). The difference is concentrated among the largest firms, which account for most of the debt. In the U. S., almost all of the increase came from firms' currency choices, mainly because firms issued a growing share of their bonds in foreign currency.

Shifts toward bonds within firms also moved the foreign-currency share, by more than 5 percentage points in several countries, and in the direction set by the currency gap between bonds and loans in Section 5.1. Where bonds are mostly in foreign currency and loans in home currency, as in Denmark, Australia, Saudi Arabia, the United Arab Emirates, and Argentina, the shift toward bonds raised the foreign-currency share, by about 10 to 35

percentage points. Where loans are more often in foreign currency than bonds, as in Chile and Thailand, it lowered the share, by about 5 percentage points.

In most emerging economies, debt also moved toward firms that borrow less in foreign currency. This reallocation lowered the foreign-currency share by about 30 to 65 percentage points in Romania, Egypt, and Russia. Exchange-rate revaluation, measured against the previous year's real exchange rate, is small in most countries.

Put together, the bond share carries currency exposure, but in a direction and by an amount that depend on the country. A shift toward bonds raises the foreign-currency share of corporate debt where bonds are more often in foreign currency than loans and lowers it where loans are. Most of the variation in currency exposure across countries comes instead from which firms borrow and in what currency. Shifts toward bonds within firms, by contrast, raised the fixed-rate share of corporate debt in most countries (Figure A.6a). Reading currency exposure from the bond share therefore requires knowing which instrument is more often in foreign currency in each country, and assessing currency mismatch requires data at the level of the firm and the instrument (Boyarchenko and Elias, 2023).

6 Conclusion

This paper studies the firm-level sources of the growth of corporate bond markets across countries and shows that a smooth aggregate trend is the sum of firm-level paths that are uneven across firms and jagged over time. Outside the U. S., the growth of bonds outstanding relative to GDP primarily reflects a higher bond share of corporate debt rather than an increase in total borrowing. This increase occurred within firms rather than through the reallocation of debt across them, and it was concentrated among the largest firms. Bond issuance is lumpy, so that a large bond issue produces a sharp increase in the issuer's bond share, much of which is reversed by subsequent loan borrowing unless the firm issues again.

Because large issues are concentrated in time across firms, variation in the aggregate bond share reflects the timing of issuance more than gradual changes in the composition of firms' debt. The interest-rate exposure of corporate debt moves with the bond share in every country, whereas its currency exposure moves in a direction that depends on which instrument is more often in foreign currency.

Our results suggest that the aggregate bond share overstates how far the corporate sector has moved away from banks. A larger bond market is commonly viewed as a "spare tire" that firms can use when bank lending contracts (Greenspan, 1999), and as weakening the bank lending channel of monetary policy. We show, however, that the bond market is used mainly by the largest firms, and that the jump in a firm's bond share when it issues overstates its lasting shift toward bonds, as later loans reverse part of it. Because firms issue together, the aggregate bond share also moves with market-wide conditions rather than with a steady shift in how firms finance themselves. Most firms, even in economies with large bond markets, still adjust their debt mainly through banks. Similarly, how quickly policy rates pass through to firms' interest expense depends on which firms have issued recently, and how a shift toward bonds changes currency exposure depends on which instrument is more often in foreign currency in each country. Neither can be read from the aggregate bond share or measured without firm- and instrument-level data. Behind its smooth trend are firm-level paths that are uneven across firms and jagged over time, and it is these paths that determine how shocks reach the corporate sector.

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Tables

Table 1: The sample and the composition of corporate debt. This table describes the firm-level sample in 2002–2013 and 2014–2024. The first panel reports the number of countries, distinct firms, and firm-years, the median of total assets, and the sum of Capital IQ debt in the last year of each window, with assets and debt converted to U. S. dollars at the fiscal-year exchange rate. The remaining panels are averages with equal weights over the countries of each group of statistics computed within each country, weighting each firm-year by its debt in U. S. dollars. The second panel reports the composition of debt by instrument type. The third panel reports the bond share on three definitions: ours, bonds over bonds plus loans (term loans, revolving credit, and mortgages); bonds over all debt except lease liabilities; and bonds plus commercial paper over all debt except lease liabilities, each weighted by its own denominator. The fourth panel reports the percentage of firm-years in which the firm holds a positive amount of the instrument type. The last panel reports four other dimensions of debt composition, excluding lease liabilities: the foreign-currency share is the share of debt denominated in a currency other than the home currency of the firm's ultimate parent, among instruments whose currency is classified; the weighted-average maturity is the amount-weighted remaining maturity, among instruments with a maturity of 0 to 30 years; the fixed-rate share is the fixed-rate fraction of debt with a classified rate type, defined only for firm-years in which at least 25% of debt is classified; and the weighted-average coupon is the amount-weighted all-in coupon. Countries: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies; country-years with fewer than ten firms are left out. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years with a balance sheet that pass the data-quality screen, in country-years with at least ten such firms. Source: S&P Capital IQ; total assets from Compustat and Worldscope.

	United States		Advanced ex-U. S.		Emerging	
	2002–13	2014–24	2002–13	2014–24	2002–13	2014–24
The sample						
Countries	1	1	26	26	30	30
Firms	9,091	6,456	19,659	20,623	13,151	17,900
Firm-years	46,701	36,441	125,665	138,666	83,973	127,757
Median assets (USD million)	193	521	140	137	63	133
Total debt, last year (USD billion)	4,589	8,862	7,801	9,825	2,726	4,686
Composition of debt (% of total debt)						
Bonds and notes	69.3	68.7	41.5	49.4	21.0	24.9
Term loans	10.3	10.4	40.6	29.7	61.8	52.7
Revolving credit	4.6	3.0	6.9	5.2	9.2	10.4
Commercial paper	5.3	2.4	2.6	2.3	0.6	0.4
Lease liabilities	1.4	8.7	3.1	9.8	3.5	8.3
Mortgages	2.9	3.1	0.7	0.4	0.4	0.2
Other	6.2	3.8	4.5	3.2	3.6	3.1
Bond share (%)						
Bonds / (bonds + loans) (main)	79.5	80.6	46.6	58.7	22.8	28.4
Bonds / debt excluding leases	70.2	75.2	42.8	54.9	21.7	27.3
(Bonds + commercial paper) / debt excluding leases	75.6	77.8	45.5	57.4	22.3	27.7
Firm-years holding each type (%)						
Bonds and notes	67.1	55.0	32.9	33.3	23.9	24.2
Term loans	47.8	52.2	86.1	79.4	89.6	86.1
Revolving credit	42.3	34.8	24.7	26.3	32.1	32.7
Other dimensions of debt composition						
Foreign-currency share (%)	3.0	6.3	30.2	39.8	35.5	36.5
Weighted-average maturity (years)	9.0	9.1	6.0	6.5	5.6	5.7
Fixed-rate share (%)	72.4	80.2	63.4	70.3	42.4	45.8
Weighted-average coupon (%)	5.7	4.2	4.8	3.5	6.6	6.3

Table 2: Decomposition of the change in the debt-weighted bond share, 2002–2024. This table decomposes the change in the debt-weighted bond share of the firms in our sample, in percentage points, into changes in firms' own bond shares (within firms), excluding the change due to exchange-rate movements beyond relative inflation on existing foreign-currency debt (exchange-rate revaluation); shifts of debt across surviving firms (between firms); and the entry and exit of firms. Each year's change in each country's debt-weighted bond share is decomposed exactly, with surviving firms weighted by their average weight in the two years and entry and exit as in Melitz and Polanec (2015); each term is averaged with equal weights over the countries of the group that are in the sample in both years, so that countries entering or leaving the sample do not move the group's bond share, and the annual terms are summed over 2003–2024. Firms enter (exit) in their first (last) year in the sample; a firm missing from the sample between two of its sample years is kept in it, at the average of its bond share and debt in the years around the gap. Bootstrap standard errors in parentheses: 200 replications resampling firms, with their entire histories, within each country. Standard errors from leaving out one country at a time in brackets (not available for the United States). The last three rows report the number of countries, firms, and firm-years in the sample over 2002–2024. Countries: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ.

	United States	Advanced ex-U. S.	Emerging
Change in the bond share, 2002–2024	0.6	19.0	11.0
	(2.0)	(2.1)	(2.3)
		[3.2]	[3.3]
Within firms	6.6	25.8	17.8
	(1.3)	(1.7)	(2.4)
		[3.7]	[4.1]
Exchange-rate revaluation	0.0	0.0	0.2
	(0.0)	(0.1)	(0.1)
		[0.1]	[0.2]
Between firms	-4.4	-7.1	-1.3
	(1.7)	(1.4)	(1.3)
		[1.5]	[2.1]
Entry	-9.5	-4.7	-5.9
	(0.8)	(1.3)	(1.6)
		[1.5]	[2.0]
Exit	7.9	5.0	0.2
	(0.9)	(0.9)	(1.5)
		[1.1]	[1.8]
Countries	1	26	30
Firms	11,194	26,118	19,380
Firm-years	74,691	243,003	194,928

Table 3: The bond share by firm size and investment intensity, 2002–2024. This table reports, for groups of firms ranked by size and investment intensity, the debt-weighted bond share of the group and its share of its country's debt in 2002 and 2024, in percent, and the change in the group's bond share between 2002 and 2024, in percentage points, averaged with equal weights over countries. Firms are ranked within their country by total assets in each year (Panel a), and by capital expenditures over the previous year's total assets, assigned to a fixed group by their average percentile over 2002–2024 (Panel b). Groups: the bottom half, the 50th to 90th percentiles, and the top decile. The last rows split each country's change into changes within groups, $\sum_g \bar{W}_g \, \Delta S_g$, and shifts of debt across groups, $\sum_g \Delta W_g \, \bar{S}_g$, where S_g is the bond share of group g, W_g its share of the country's debt, and bars denote averages of 2002 and 2024. Countries with at least ten ranked firms and firms in every group in both 2002 and 2024. Bootstrap standard errors in parentheses: 200 replications resampling firms, with their entire histories, within each country, and ranking firms again in each replication. Standard errors from leaving out one country at a time in brackets (not available for the United States). Countries: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ; capital expenditures and total assets from Compustat and Worldscope.

(a) By size

	United States	Advanced ex-U. S.	Emerging
Bottom half			
Bond share (%)	47.3 → 41.6	10.8 → 17.9	8.6 → 12.6
Share of debt (%)	1.0 → 1.6	3.4 → 2.1	5.5 → 2.4
Change (pp)	-5.8	7.1	4.0
	(3.2)	(2.0)	(2.7)
		[3.3]	[3.3]
50th–90th percentile			
Bond share (%)	61.1 → 66.5	22.1 → 38.8	16.4 → 23.1
Share of debt (%)	18.7 → 26.4	23.6 → 21.7	31.4 → 23.2
Change (pp)	5.4	16.6	6.7
	(1.9)	(2.2)	(2.3)
		[4.0]	[3.0]
Top decile			
Bond share (%)	86.6 → 88.6	48.8 → 67.3	30.0 → 43.2
Share of debt (%)	80.3 → 72.1	73.0 → 76.2	63.1 → 74.4
Change (pp)	2.0	18.5	13.1
	(2.3)	(2.8)	(4.0)
		[3.3]	[4.7]
Within groups (pp)	2.7	17.7	11.2
	(1.7)	(1.9)	(2.6)
		[3.0]	[3.8]
Between groups (pp)	-2.1	1.2	2.8
	(0.6)	(0.6)	(1.0)
		[0.7]	[0.6]
Firms, 2002 → 2024	4,143 → 2,375	6,464 → 9,486	3,750 → 9,707
Countries	1	26	22

(b) By investment intensity

	United States	Advanced ex-U. S.	Emerging
Bottom half			
Bond share (%)	81.6 → 83.4	32.1 → 54.6	15.8 → 27.8
Share of debt (%)	27.0 → 26.8	28.0 → 24.3	38.2 → 26.0
Change (pp)	1.7	22.5	12.0
	(4.4)	(3.3)	(4.1)
		[5.0]	[6.3]
50th–90th percentile			
Bond share (%)	81.7 → 82.2	44.4 → 60.6	27.1 → 37.5
Share of debt (%)	69.3 → 67.1	60.8 → 64.1	52.4 → 57.1
Change (pp)	0.5	16.2	10.4
	(2.3)	(3.0)	(3.7)
		[3.1]	[4.4]
Top decile			
Bond share (%)	79.4 → 78.4	29.1 → 45.6	24.1 → 35.1
Share of debt (%)	3.7 → 6.1	11.2 → 11.5	9.5 → 17.0
Change (pp)	-1.0	16.6	11.0
	(5.3)	(4.8)	(5.9)
		[6.0]	[9.2]
Within groups (pp)	0.8	18.9	11.8
	(1.9)	(2.1)	(2.7)
		[3.3]	[3.7]
Between groups (pp)	-0.1	0.0	2.5
	(0.2)	(0.8)	(1.1)
		[0.9]	[1.1]
Firms, 2002 → 2024	4,118 → 2,344	6,351 → 9,258	3,597 → 9,461
Countries	1	26	19

Table 4: Bond borrowing is lumpier than loan borrowing. This table reports measures of lumpiness for four flows. Bond borrowing is new bonds; loan borrowing is new loans (term loans, revolving credit, and mortgages) plus draws on existing revolving credit; bond (loan) repayment is bonds (loans) retired early or at maturity plus partial repayments. Flows are measured at the previous year's exchange rates. A flow is large when it is at least 15 percent of the firm's bonds plus loans at the end of the previous year. Lumpiness: the percentage of firm-years with a positive flow; the average, over firms in the sample for at least ten years with a positive total flow, of the share of the firm's total flow that occurs in its largest year, with the share if the flow were spread evenly over the firm's years ($1/T$) for comparison; and the median large flow. Concentration of the country's flow (as in Doms and Dunne, 1998): the percentage of firm-years with a large flow and their share of the country's flow, summed over its firms; and the share of the country's flow in the 10 percent of its firm-years with the largest flow relative to the previous year's bonds plus loans (including firm-years without a flow), which compares the flows at the same share of firm-years. Distribution: standard deviation, skewness, and kurtosis of the flow relative to the average of the firm's bonds plus loans in the previous and current years (bounded at 200 percent), over all firm-years including those without a flow. Each statistic is computed within a country and averaged with equal weights over countries with at least 50 firm-years. Sample: annual changes of firms in the bond-share sample in both years, 2003–2024, in country-years with at least ten such firms, excluding changes in which the firm's reporting currency changes. Countries: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ.

	United States				Advanced ex-U. S.				Emerging			
	Bond borrow.	Loan borrow.	Bond repay.	Loan repay.	Bond borrow.	Loan borrow.	Bond repay.	Loan repay.	Bond borrow.	Loan borrow.	Bond repay.	Loan repay.
Lumpiness												
Firm-years with a flow (%)	31.8	50.0	48.7	63.0	14.8	56.4	23.2	76.4	10.6	62.2	16.7	82.7
Largest year's share of a firm's flow (%)	51.5	41.3	45.9	37.1	61.3	36.4	55.2	32.0	72.6	38.1	60.5	31.8
Smooth flow, 1/T (%)	6.6	6.7	6.6	6.7	6.3	6.6	6.3	6.6	6.6	7.0	6.7	7.0
Median large flow (% of debt)	54.4	65.4	41.7	53.1	46.9	72.2	32.4	48.2	43.3	67.8	33.3	45.6
Concentration of the country's flow												
Firm-years with a large flow (%)	21.5	32.9	22.5	34.6	9.4	40.8	8.9	45.6	6.3	44.0	5.4	53.7
Their share of the country's flow (%)	84.5	81.5	60.4	72.7	80.9	88.6	58.8	75.9	73.3	89.9	47.5	81.7
Share of the country's flow in its top 10% of firm-years (%)	39.9	21.8	18.4	14.2	84.9	19.8	70.5	13.6	88.7	22.9	84.6	15.0
Distribution of the flow relative to average debt												
Standard deviation (% of average debt)	31.9	40.4	28.2	35.5	18.5	42.9	15.8	36.8	12.9	42.7	11.0	37.4
Skewness	3.0	1.9	3.2	2.0	5.5	1.4	6.1	1.8	9.2	1.4	9.5	1.7
Kurtosis	12.7	6.2	14.7	6.9	41.2	4.3	54.3	6.1	131.2	4.5	139.6	6.2
Countries	1	1	1	1	26	26	26	26	30	30	30	30
Firms	9,067	9,067	9,067	9,067	23,312	23,312	23,312	23,312	18,025	18,025	18,025	18,025
Firm-years	59,283	59,283	59,283	59,283	203,998	203,998	203,998	203,998	164,801	164,801	164,801	164,801

Table 5: Who moves the aggregate bond share: a variance decomposition. Panel a reports, for each piece of the annual change in each country's debt-weighted bond share, decomposed as in Table 2, its share of the variance of the annual changes (Variation), $\mathrm{cov}(c_k, \Delta S)/\mathrm{var}(\Delta S)$, its share of the country's debt (Debt), and its cumulative contribution over 2003–2024, in percentage points (Cumulative). The within-firm term is split by each firm's status in the year, using information up to that year only: a large bond issue (new bonds of at least 15 percent of the previous year's bonds plus loans), a large issue in the previous five years, other firms with and without bonds, fewer than five previous years observed, and years bridged across a gap in the sample. Panel b compares the within-firm part of the change with its distribution when each firm's sequence of within-firm terms is shifted circularly by a random number of years, independently across firms (500 replications), for the debt-weighted (upper block) and equal-weighted (lower block) bond share: mean, with 5th and 95th percentiles in brackets. Statistics are computed within each country and averaged with equal weights over countries (geometric mean for the variance ratio); standard errors clustered by country in parentheses. Sample and firm data as in Table 2. Source: S&P Capital IQ.

(a) Variance decomposition

	United States			Advanced ex-U. S.			Emerging			All countries		
	Variation	Debt	Cumulative (pp)	Variation	Debt	Cumulative (pp)	Variation	Debt	Cumulative (pp)	Variation	Debt	Cumulative (pp)
Surviving firms, within firm												
Large bond issue this year	0.26	0.23	17.2	0.26	0.18	24.9	0.33	0.13	28.2	0.30	0.15	26.4
	(0.03)			(0.03)			(0.03)			(0.02)		
One to five years after a large issue	0.25	0.37	-7.3	0.17	0.30	-5.2	0.17	0.21	-12.5	0.17	0.25	-9.0
	(0.03)			(0.02)			(0.02)			(0.01)		
Other firms with bonds	0.10	0.20	-0.8	0.09	0.19	0.5	0.08	0.11	-1.9	0.09	0.15	-0.8
	(0.03)			(0.02)			(0.02)			(0.02)		
Firms without bonds last year	0.00	0.01	0.2	0.01	0.08	1.8	0.00	0.18	1.5	0.00	0.13	1.6
	(0.00)			(0.00)			(0.00)			(0.00)		
Fewer than five earlier years observed	0.07	0.12	-1.8	0.13	0.17	3.0	0.12	0.23	-0.1	0.12	0.20	1.6
	(0.05)			(0.02)			(0.02)			(0.02)		
Gap in the sample (bridged)	-0.00	0.04	-0.9	0.02	0.06	0.8	0.04	0.09	2.6	0.03	0.08	1.6
	(0.01)			(0.01)			(0.01)			(0.01)		
Exchange-rate revaluation	0.00		0.0	-0.00		0.0	0.00		0.2	0.00		0.1
	(0.00)			(0.00)			(0.00)			(0.00)		
Surviving firms, between firms												
Between firms (debt weights)	0.29		-4.4	0.21		-7.1	0.14		-1.3	0.17		-4.2
	(0.06)			(0.03)			(0.02)			(0.02)		
Coverage												
Entry into the sample	0.02	0.02	-9.5	0.08	0.02	-4.7	0.06	0.04	-5.9	0.07	0.03	-5.4
	(0.03)			(0.03)			(0.02)			(0.02)		
Exit from the sample	0.01	0.03	7.9	0.04	0.02	5.0	0.05	0.03	0.2	0.04	0.03	2.6
	(0.02)			(0.02)			(0.02)			(0.01)		
Change in the bond share			0.6			19.0			11.0			14.5
Countries		1			26			30			57	
Country-years		22			572			642			1,236	

(b) Firms' own jumps and their timing

	United States		Advanced ex-U. S.		Emerging		All countries	
	Actual	Shifted	Actual	Shifted	Actual	Shifted	Actual	Shifted
Debt-weighted share								
Variance of the within-firm aggregate, relative to actual	1.00	0.11	1.00	0.63	1.00	0.74	1.00	0.66
		[0.06, 0.18]		[0.57, 0.69]		[0.69, 0.80]		[0.62, 0.71]
Share of its variation: large bond issue this year	0.37	0.34	0.40	0.36	0.44	0.42	0.42	0.39
		[0.16, 0.53]		[0.33, 0.38]		[0.40, 0.45]		[0.37, 0.41]
Share of its variation: issue year and five years after	0.73	0.62	0.63	0.61	0.67	0.65	0.65	0.63
		[0.44, 0.80]		[0.58, 0.64]		[0.63, 0.68]		[0.62, 0.65]
Equal-weighted share								
Variance of the within-firm aggregate, relative to actual	1.00	0.15	1.00	0.50	1.00	0.68	1.00	0.58
		[0.10, 0.22]		[0.45, 0.55]		[0.62, 0.74]		[0.54, 0.62]
Share of its variation: large bond issue this year	0.36	0.24	0.43	0.40	0.39	0.36	0.41	0.38
		[0.09, 0.36]		[0.36, 0.43]		[0.34, 0.39]		[0.36, 0.40]
Share of its variation: issue year and five years after	0.68	0.54	0.63	0.60	0.58	0.54	0.60	0.57
		[0.40, 0.68]		[0.56, 0.63]		[0.51, 0.57]		[0.54, 0.59]

Figure 1. Bond market growth since 2002: composition versus credit deepening. This figure plots the change since 2002 in debt securities of nonfinancial corporations relative to GDP (line), in percentage points of GDP, and its decomposition into a composition component (blue bars) and a credit-deepening component (grey bars), for the United States (Panel a), advanced economies (Panel b), and emerging economies (Panel c). Each year's change in bonds relative to GDP, $\Delta b = \bar{d}\,\Delta s/100 + \bar{s}\,\Delta d/100$, is split exactly into the change in the bond share s (debt securities over debt securities plus loans) at the average ratio of debt to GDP $\bar{d}$ (composition), and the change in debt relative to GDP d at the average bond share $\bar{s}$ (credit deepening); bars denote averages of the two years. The annual terms are averaged across the countries in each group observed in both years, with equal weights, and cumulated from 2002. Countries: the U. S., 24 advanced economies other than the U. S., and 11 emerging economies. Source: OECD financial accounts, nonfinancial corporations, non-consolidated; for the United States, nonfinancial corporate business in the Federal Reserve's Financial Accounts (Z.1); GDP from the IMF World Economic Outlook and, for the United States, the BEA. Debt securities are at face value: outside the United States, the market value of each country's stock is divided by the December face-weighted average price of its nonfinancial corporations' bonds in the ICE bond indices.

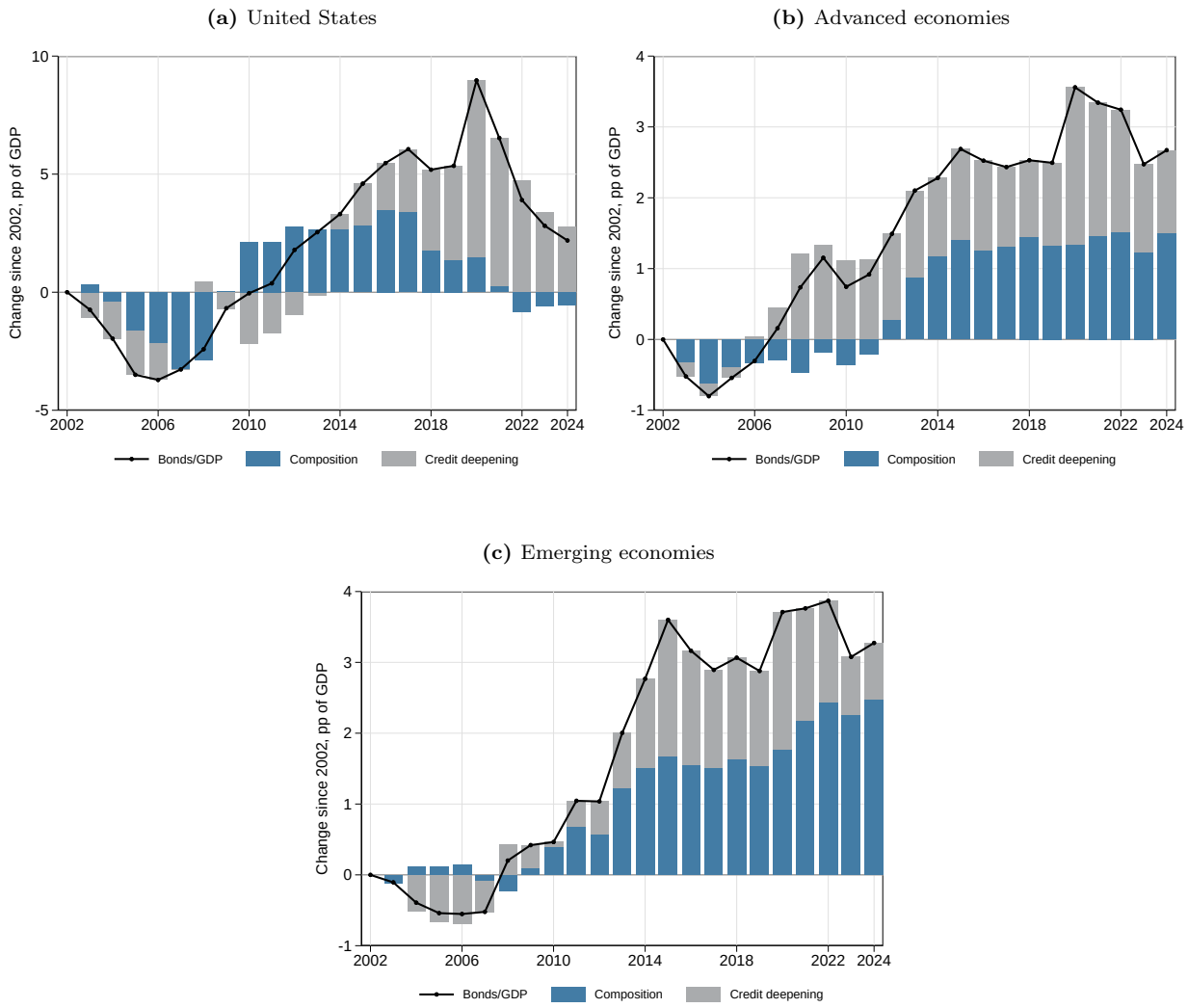


Figure 2. Composition versus credit deepening by country. This figure plots, for each country, the composition component (vertical axis) against the credit-deepening component (horizontal axis) of the change in debt securities of nonfinancial corporations relative to GDP, in percentage points of GDP, from the first to the last year of the country's sample. Each component is the sum over the country's consecutive observed years of the annual terms $\bar{d}\,\Delta s/100$ (composition) and $\bar{s}\,\Delta d/100$ (credit deepening), where s is the bond share (debt securities over debt securities plus loans), d is debt relative to GDP, and bars denote averages of the two years, so that the two components add up to the total change. The dashed line has a slope of -1; countries above it saw bonds grow relative to GDP. Circles: United States (2002–2024). Squares, advanced economies: Austria, Belgium, Canada, Croatia, Czechia, Estonia, Finland, France, Germany, Greece, Israel (2010–2024), Italy, Japan (2005–2024), Korea (2009–2024), Latvia, Lithuania, New Zealand (2007–2024), Norway, Portugal, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom. Diamonds, emerging economies: Bulgaria, Chile (2003–2024), Hungary, Mexico (2003–2024), Poland, Romania (excluding 2006), and Turkiye (2010–2024). Countries without dates are included over 2002–2024. Source: OECD financial accounts, nonfinancial corporations, non-consolidated; for the United States, nonfinancial corporate business in the Federal Reserve's Financial Accounts (Z.1); GDP from the IMF World Economic Outlook and, for the United States, the BEA. Debt securities are at face value: outside the United States, the market value of each country's stock is divided by the December face-weighted average price of its nonfinancial corporations' bonds in the ICE bond indices.

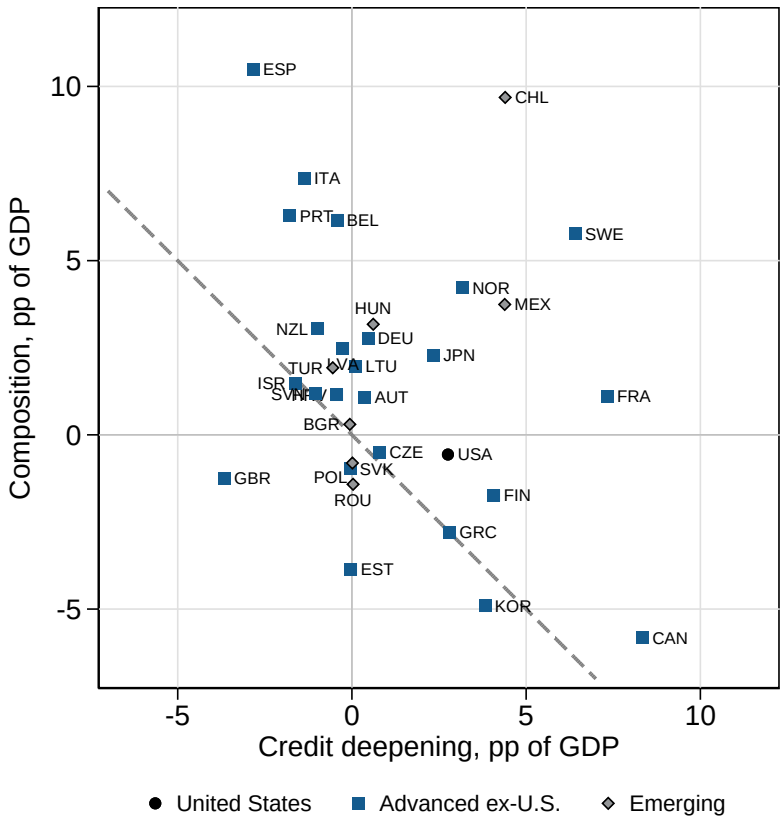


Figure 3. Debt-weighted and equal-weighted bond shares of firms. This figure plots the bond share of the debt of the firms in our sample, weighted by each firm's debt (solid line) and with equal weights across firms (dashed line), and the bond share of nonfinancial corporations in the national accounts (dashed line with crosses), in percent, for the United States (Panel a), advanced economies (Panel b), and emerging economies (Panel c). Each country counts equally: the group's bond share is the average of its countries' bond shares, chained so that countries entering or leaving the sample do not move it (the 2019 level averages all countries of the group; between consecutive years it moves with the average change over the countries observed in both). The national-accounts line is computed in the same way over the country-years of the group that are also in the firm-level sample, and is shown for years with at least four countries. Firm-level sample: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. National-accounts line: the U. S., 18 advanced economies other than the U. S., and 10 emerging economies; the emerging-economy line starts in 2004; financial centres are left out. Source: S&P Capital IQ; OECD financial accounts; Federal Reserve Financial Accounts (Z.1).

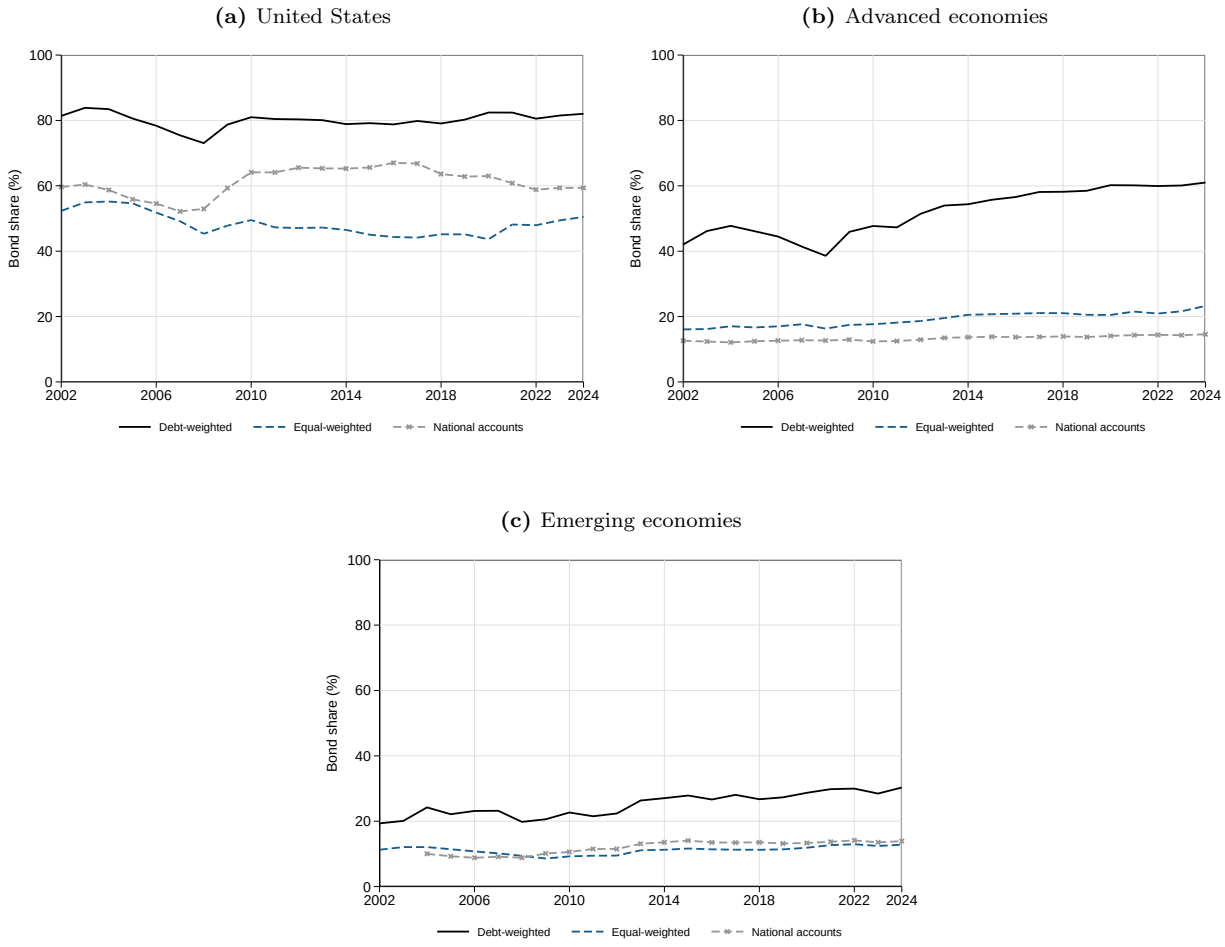


Figure 4. Three ways the aggregate bond share can rise: an illustration. This figure illustrates, for a hypothetical economy with a bond-heavy firm (blue) and a loan-heavy firm (grey), three ways in which the debt-weighted bond share (dashed line) can rise between two dates. The vertical axis is each firm's bond share, in percent, and the area of each marker is proportional to the firm's debt. In Panel (a), both firms raise their bond share and their debt is unchanged. In Panel (b), neither firm changes its bond share, but debt grows at the bond-heavy firm and falls at the loan-heavy firm. In Panel (c), neither firm changes, and a bond-heavy firm enters (light blue). The values are hypothetical.

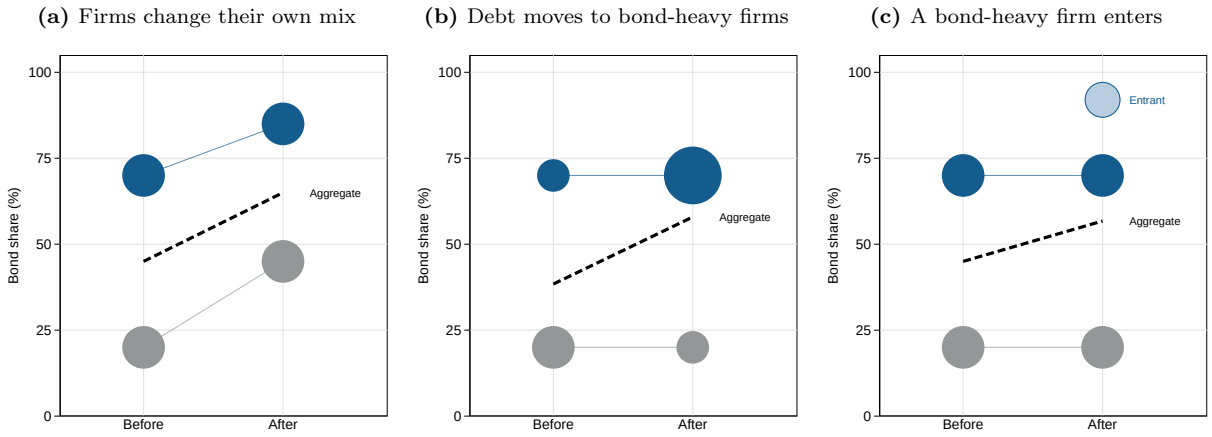
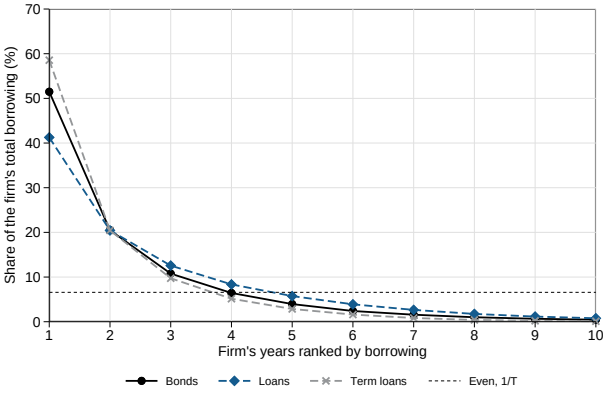
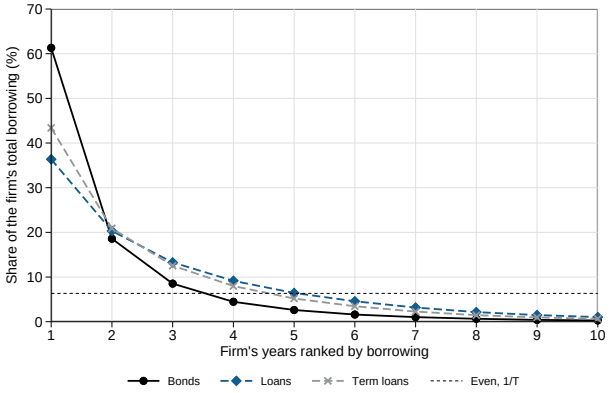


Figure 5. How concentrated is a firm's borrowing over time? This figure ranks each firm's years by the amount it borrows and plots the share of the firm's total borrowing over the sample in its largest year, its second largest, and so on, in percent, for bond borrowing, loan borrowing, and term-loan borrowing; the dotted line is the average share if borrowing were spread evenly over the firm's years ($1/T$). Bond borrowing is new bonds; loan borrowing is new loans (term loans, revolving credit, and mortgages) plus draws on existing revolving credit; term-loan borrowing is new term loans. Flows are measured at the previous year's exchange rates. Sample: firms in the bond-share sample for at least ten annual changes, 2003–2024, with positive total borrowing of the kind, in country-years with at least ten firms in the sample, excluding changes in which the firm's reporting currency changes. Each point is the average over firms in a country, averaged with equal weights over countries with at least 50 firm-years. Panel (a): United States; Panel (b): advanced economies; Panel (c): emerging economies. Countries: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Source: S&P Capital IQ.

(a) United States



(b) Advanced economies



(c) Emerging economies

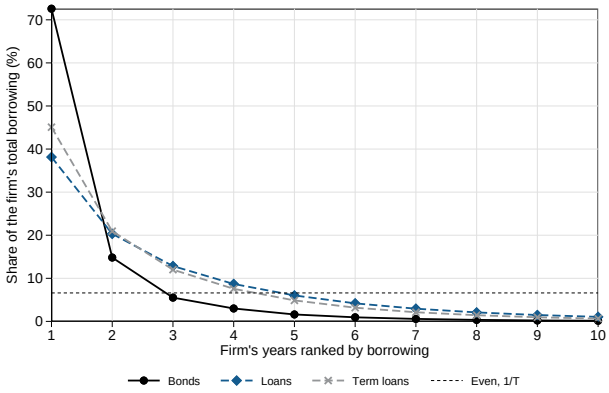


Figure 6. The bond share around large bond issues. Panel (a) plots the bond share of firms making a large bond issue and the average bond share of their matched peers, in percent, by year relative to the issue. Panels (b) to (d) plot the gap between the issuer's bond share and its matched peers' average, in percentage points, by the size of the issue relative to the firm's bonds plus loans at the end of $t_0 - 1$, for the U. S., advanced economies, and emerging economies. A large bond issue is new bonds of at least 15 percent of the firm's bonds plus loans at the end of $t_0 - 1$. Issues are in 2003–2019, and each point averages the issues observed in that year. Appendix A.4 defines the events and the matched peers. Each point is the average over countries, with equal weights, of the country's average, over countries with at least ten issues in the year (Panel a) or in the size class (Panels b to d). Firm-level sample: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Source: S&P Capital IQ.

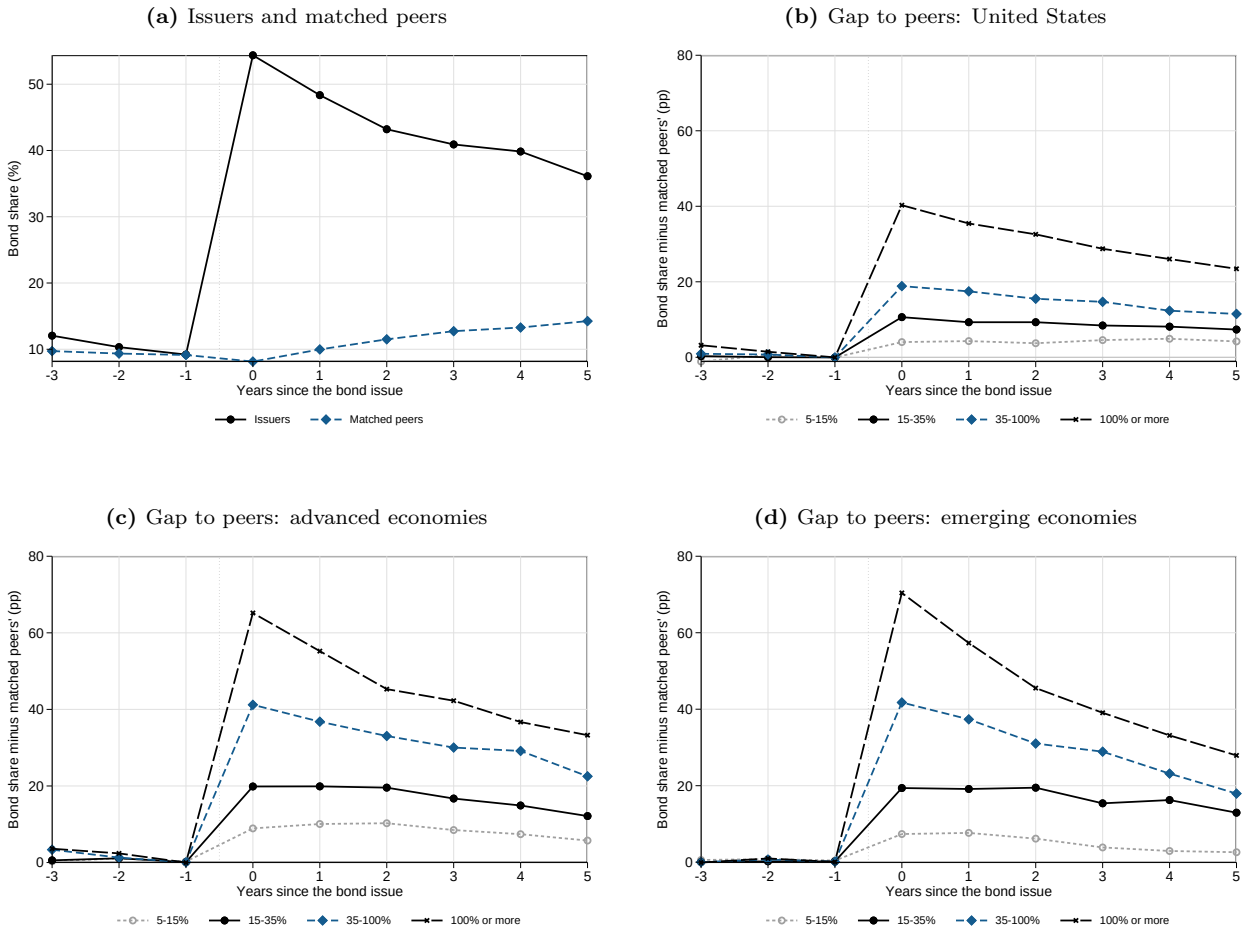


Figure 7. The bond share after an issuance wave. This figure plots the cumulative change in each country's debt-weighted bond share from the year before a wave year, in percentage points, by year relative to the wave year: the coefficients β_h of local projections $S_{c,t+h} - S_{c,t-1} = \beta_h \, wave_{ct} + \gamma_1 wave_{c,t-1} + \gamma_2 wave_{c,t-2} + \alpha_c + \varepsilon_{ct}$, with 95 percent confidence intervals based on Driscoll–Kraay standard errors (Driscoll and Kraay, 1998) with a bandwidth of $\max(2, h+1)$ years; points before -1 are leads; the year before the wave year ($h = -1$) is the reference year, at zero by construction (hollow marker). The change in the bond share is measured within firms, as the change in the debt-weighted average of firms' bond shares over firms in the sample in both years, so that entry and exit do not affect it. A wave year is a year in which the percentage of the country's firms with a large bond issue (new bonds of at least 15 percent of the previous year's bonds plus loans) is above the 67th percentile of its values in the country's previous seven years (at least five observed), so that wave status starts in 2008. Country-years with at least 20 firms in the sample in both years; each horizon uses the country-years in which the change to $t + h$ is observed. Countries: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Source: S&P Capital IQ.

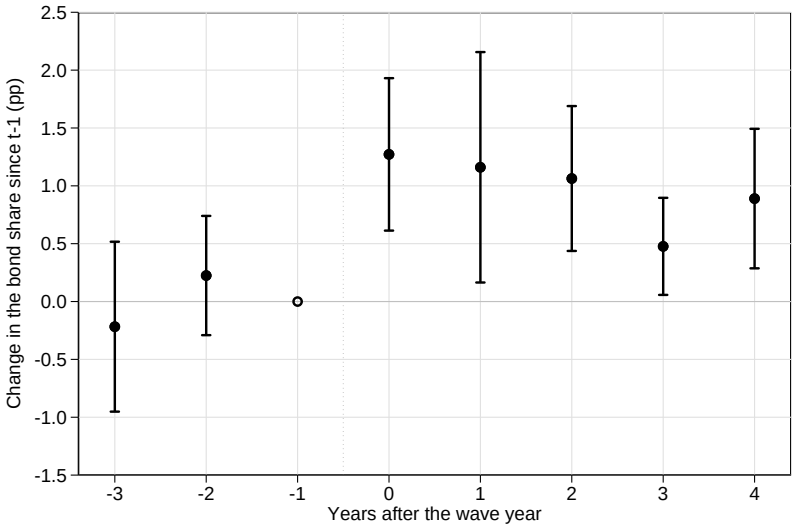


Figure 8. The currency of bonds and loans on the same balance sheet, country by country. This figure plots, for each country, the foreign-currency share of firms' bonds (vertical axis) against that of the same firms' loans (term loans, revolving credit, and mortgages; horizontal axis), in percent; the dashed line is the 45-degree line. The foreign-currency share is the share of instruments with a known currency that are not in the home currency of the firm's ultimate parent. Sample: firm-years in the bond-share sample, in country-years with at least ten such firms, holding both bonds and loans with a known currency, 2002–2024. Each point is the country's average over firm-years weighted by their bonds plus loans in U. S. dollars, for countries with at least 50 firm-years. Source: S&P Capital IQ.

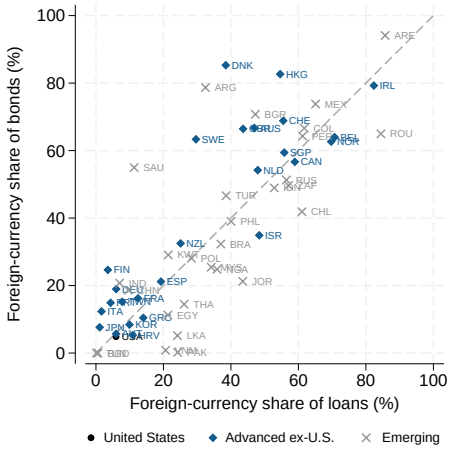
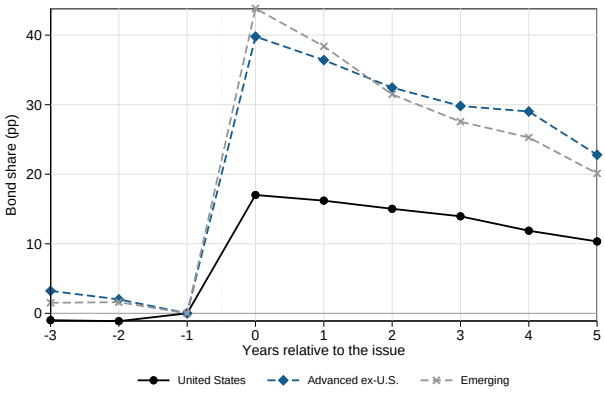
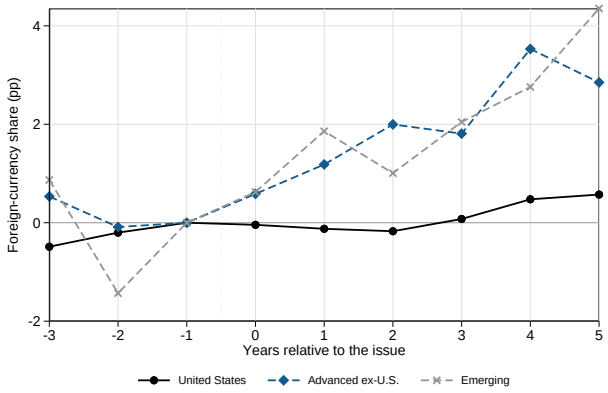


Figure 9. The bond share and the foreign-currency share around a large bond issue. Panels (a) and (b) plot the change in the bond share and in the foreign-currency share of issuers' bonds plus loans relative to their matched peers, in percentage points, by year relative to a large bond issue in t_0, for the U. S., advanced, and emerging economies. Each point is the issuer's value minus its peers' average, relative to the same difference at the end of $t_0 - 1$, with countries weighted equally. Panel (c) plots, for each country, the foreign-currency share of the issuers' new bonds in t_0 against the issuers' foreign-currency share of bonds plus loans at the end of $t_0 - 1$, in percent. The dashed line is the 45-degree line. Panel (d) plots, for each country, the changes in the foreign-currency share and in the bond share relative to peers five years after the issue, in percentage points. In Panels (c) and (d), issues are weighted equally. All panels use countries with at least ten issues. A large bond issue is new bonds of at least 15 percent of the firm's bonds plus loans at the end of $t_0 - 1$; issues are in 2003–2024 and may follow an earlier large issue within three years, and each point averages the issues observed in that year. Appendix A.4 defines the events, the matched peers, and the foreign-currency share. Firm-level sample: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Source: S&P Capital IQ.

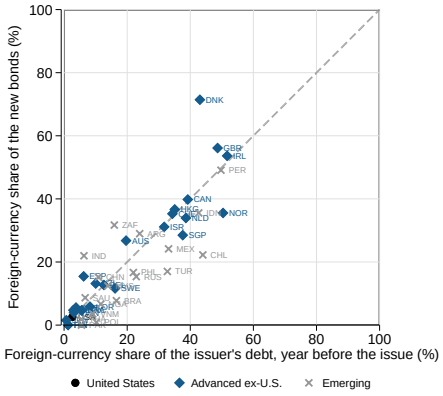
(a) Bond share



(b) Foreign-currency share



(c) Currency of the new bonds, by country



(d) Foreign-currency share five years after the issue, by country

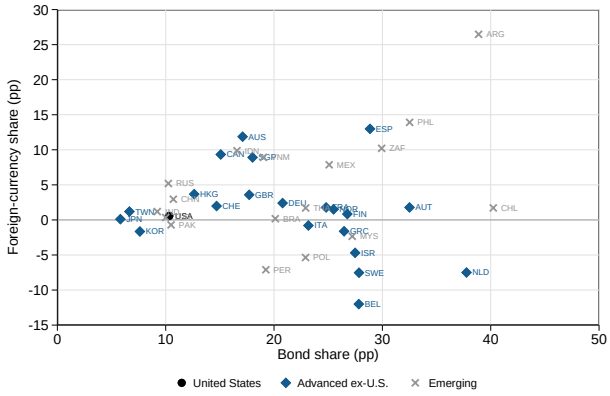
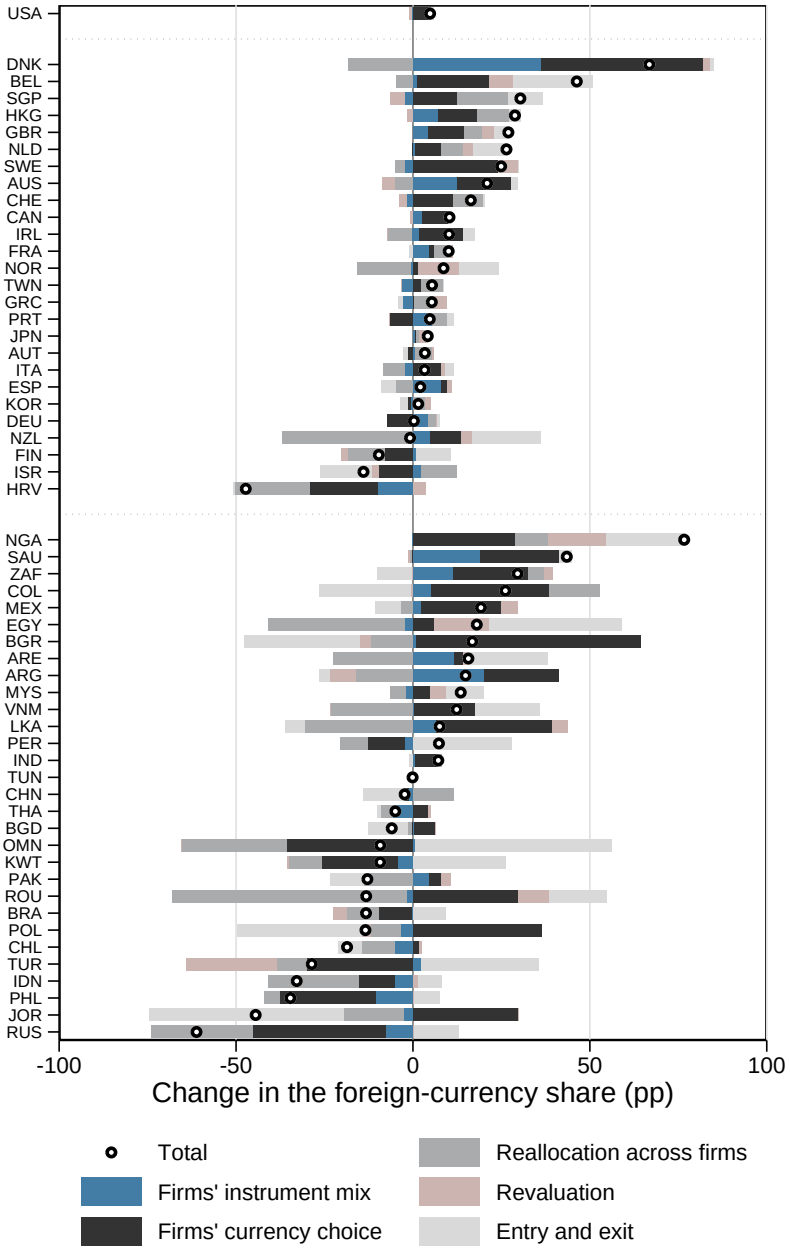


Figure 10. The foreign-currency share of corporate debt, country by country: a firm-level decomposition. This figure plots, for each country, the change in the foreign-currency share of firms' bonds plus loans over 2003–2024 (or the country's years in the sample), in percentage points (dot), and its parts (bars). Each annual change is decomposed exactly into five parts. Let ϕ_i be firm i's share of the debt of the firms in the sample in both years, x_i its foreign-currency share, w_i the bonds' part of its debt, x_i^b and x_i^l the foreign-currency shares of its bonds and loans, and bars averages of the two years. The parts are firms' instrument mix, $\sum_i \bar{\phi}_i \, \Delta w_i \, (\bar{x}_i^b - \bar{x}_i^l)$, firms' currency choice, $\sum_i \bar{\phi}_i \, [\bar{w}_i \, \Delta x_i^b + (1 - \bar{w}_i) \, \Delta x_i^l]$, reallocation across firms, $\sum_i \Delta \phi_i \, \bar{x}_i$, exchange-rate revaluation, and firm entry and exit. The first three parts are computed at the previous year's real exchange rates (adjusted for relative inflation), so that revaluation reflects real exchange-rate changes. Positive and negative parts are stacked separately. Countries are ordered by group and, within group, by the change. Appendix A.4 defines the foreign-currency share. Source: S&P Capital IQ.



A Additional details and results

A.1 National financial accounts

We take the outstanding stocks of debt securities and of loans of nonfinancial corporations from the OECD's annual financial balance sheets (Table 720), for every country for which the OECD reports them, on a non-consolidated basis and in national currency, and nominal GDP in national currency from the IMF's World Economic Outlook and, for the United States, from the Bureau of Economic Analysis. The sample ends in 2024, the last year of the firm-level data. Because the accounts are non-consolidated, loans include lending between nonfinancial corporations. In six financial centres (Denmark, Iceland, Ireland, Luxembourg, the Netherlands, and Switzerland), these loans include large intra-group lending through holding structures, and we leave these economies out of the analysis.

In the System of National Accounts, the nonfinancial corporations sector consists of corporations and quasi-corporations, unincorporated enterprises that keep a complete set of accounts and operate like corporations; sole proprietors and other household businesses are part of the household sector. The accounts of the other countries in our sample follow this definition. The U. S. is the exception: the nonfinancial corporations sector that the Federal Reserve reports to the OECD is nonfinancial business, which adds to corporations the whole noncorporate sector: sole proprietorships, partnerships, and limited liability companies taxed as partnerships. The noncorporate sector issues no debt securities but has held more than half of the sector's loans since the late 1970s. The Financial Accounts of the United States report the two parts separately, and we take U. S. debt securities and loans from the nonfinancial corporate business sector, the definition that is closest to that of the other countries and to the incorporated firms in our firm-level data; debt securities are the same under both definitions. The match is close but not exact, since partnerships that keep complete accounts can be quasi-corporations elsewhere but are noncorporate business in the United States. The choice matters for the level of the U. S. bond share: in 2002, it is 60 percent on the corporate definition and 39 percent on nonfinancial business. We use the September 2026 release of the Financial Accounts, which records the loans of private credit funds to corporations from 2012:Q4 on; earlier releases, and the series reported to the OECD, do not. Loans before 2012 therefore exclude private credit, which was small at that point (68 billion dollars at the end of 2012, against 727 billion in 2024).

The accounts record debt securities at market value and loans at nominal value, except in the United States, where debt securities are also at nominal value (van de Ven and Fano, 2017). A bond share built from market values falls when yields rise even if the debt that firms owe is unchanged. We therefore convert debt securities to face value, dividing each country's year-end stock by the December face-weighted average price, including accrued interest, of its nonfinancial corporations' bonds in the ICE corporate bond indices (ICE Data Indices, 2025). Where a country has fewer than ten such bonds, we use a pooled price for European, advanced, or other emerging issuers, and we leave the United States unchanged. Since 2021, the BIS has published both valuations for most of our countries, which allows us to convert

with the national compilers' own ratios of nominal to market value instead. For the 25 countries where this is possible, the composition component of the change in bonds relative to GDP from 2021 to the end of the sample is 0.05 percentage points in advanced economies, against 0.23 with our price conversion and −0.59 at market value, and −0.36 in emerging economies, against −0.18 and −0.61. For Chile, which the BIS statistics do not cover at nominal value, the central bank's statistics on bonds outstanding at nominal value (Banco Central de Chile, 2024) imply market-to-nominal ratios of 1.01 at the end of 2021 and 0.92 at the end of 2024, close to the 1.06 and 0.90 implied by our prices.

We drop the country-years that the OECD reports only on a consolidated basis (Australia and Indonesia throughout, and Israel before 2010), Brazil from 2017, when the source of its accounts changes, one isolated reporting error (Romania in 2006), and Korea's first year (2008), when bond prices were at a crisis trough. We also drop countries with fewer than five years of data. Table A.1 lists the countries and years that remain.

A.2 Instrument-level firm data

Instruments and firms. The debt capital structure data of S&P Capital IQ report each debt instrument outstanding at the end of a firm's fiscal year, with its amount in the currency of the firm's filing, the currency in which it is denominated, and its type. We group the instruments into bonds and notes, term loans, revolving credit, mortgages, capital leases, commercial paper, and other borrowings (Boyarchenko and Elias, 2023). Over fiscal years 2002–2024, the data contain 9.9 million instrument-years and 1.26 million firm-years with debt records. We consolidate instruments to the ultimate parent and keep only groups that are their own ultimate parent, so that the debt of a subsidiary is counted once, in its parent's balance sheet. We drop financial firms (SIC codes 60 to 67, including real estate investment trusts, and firms with no industry code), government entities, firm-years without positive debt, and fiscal years that are not annual, which leaves 714 thousand firm-years. A firm is assigned throughout to the country of its ultimate parent in the latest year in which it is in the sample.

Balance sheets and the data-quality screen. We match each firm-year to its consolidated total assets and total debt from Compustat and Worldscope, and compare the sum of the firm's instruments in Capital IQ with the total debt on its balance sheet. A firm-year fails the screen when Capital IQ's debt is more than a third above or more than a quarter below balance-sheet debt, both in the filing currency and in dollars; when balance-sheet debt exceeds three times total assets; or when assets or debt are not positive. The first two conditions identify instruments recorded in the wrong units or currency and firm-years in which Capital IQ misses much of the debt and therefore measures the bond share poorly. The band is wide enough to allow for the differences between the two sources that do not affect the composition of debt, such as unamortized discounts and fair-value hedge adjustments, which are in the balance sheet but not in the face value of the instruments; in the filing currency, 90 percent of firm-years with a balance sheet lie within 85 to 110 percent. The leverage limit allows for firms with negative book equity, whose debt exceeds their assets.

We do not use Capital IQ's own total debt for this comparison: Capital IQ reconciles it to the reported balance sheet with adjustment lines, so that it matches balance-sheet debt even when the instrument amounts are wrong by orders of magnitude.

We also drop firm-years without a balance sheet in Compustat or Worldscope. These are mostly large unlisted firms, and in China mostly state-owned groups and local-government financing vehicles, which together account for 27 percent of the debt of the firms in our sample countries; Chinese groups alone account for 19 percent. Without a balance sheet, we cannot check their instruments, and their debt is reported less consistently over time. The coverage comparison of Appendix A.3 keeps them. Of the firm-years with a balance sheet, the screen removes 6 percent, with 2 percent of their debt; in all, 80 percent of firm-years in our sample countries pass. Table A.2 reports the sample at each stage of its construction and the firm-years that fail each part of the screen.

Countries. We keep the countries with at least 25 firms a year in the sample on average over 2002–2024, other than financial and offshore centres (Cyprus and Luxembourg among the countries above the threshold), which leaves 57 countries: the U. S., 26 advanced economies, and 30 emerging economies. We classify countries as advanced or emerging as in Section 3.1. In the results of Section 3.2, which weight countries equally, we also leave out country-years with fewer than ten firms.

Bond shares and dollar amounts. The bond share of a firm-year is bonds and notes over bonds and notes plus term loans, revolving credit, and mortgages, in the firm's filing currency, and is defined when this denominator is positive; 513 thousand firm-years pass the screen and have a bond share. The national-accounts version of Figure A.2 adds commercial paper to the numerator and the denominator and other borrowings to the denominator. A firm's weight within its country is the denominator in dollars, using Capital IQ's conversion of each instrument; the weight is missing when an instrument lacks a dollar amount, and when, without other evidence on the currency of the filing, Capital IQ's conversion differs from that implied by the balance sheet by more than a factor of two.

Exchange-rate revaluation. Capital IQ reports a foreign-currency instrument in the filing currency at the year-end exchange rate, so its amount, and the firm's bond share, change with the exchange rate even when the firm neither issues nor repays. For each foreign-currency instrument, we compute its amount at the previous year-end's exchange rate, from the BIS daily exchange rates, and recompute the firm's bond share with these amounts; the difference from the reported share is the revaluation term of equation (3). Not all filings revalue foreign-currency debt: 42 percent of foreign-currency bonds move exactly with the exchange rate from one year to the next, while 20 percent are exactly unchanged, and the two patterns persist within firms and almost never coexist within a firm-year. We therefore classify each firm-year from its continuing foreign-currency instruments in years when the exchange rate moves by more than 2 percent, and apply the adjustment only to firm-years whose filings revalue; firm-years that cannot be classified take the class of the nearest classified year. The revaluation term exceeds 0.01 percentage points in absolute value in 4 percent of firm-years with a bond share, and lies between -0.3 and 0.3 percentage points in 98 percent of firm-years.

A.3 Coverage of the firm-level data relative to the national accounts

Figure A.1 compares the debt of the firms in Capital IQ with the debt of nonfinancial corporations in the national accounts. The two sources differ in two ways that matter for this comparison. We adjust the national accounts for the first, which affects bonds, and discuss the second, which affects loans.

We begin with the firm-level data. For each country and fiscal year, we sum, in U. S. dollars at face value, the debt of all nonfinancial groups in Capital IQ that are their own ultimate parent, including groups for which no balance sheet is available, together with the debt of subsidiaries that their parent does not consolidate, which we assign to the subsidiary's own country. The universe is thus wider than the sample used in the rest of the paper, which requires balance-sheet data; it adds mostly large unlisted firms, many of them state-owned. Since coverage depends on the level of debt rather than on its composition, we do not apply the data-quality screen of Appendix A.2, which also drops firm-years in which Capital IQ misses part of the debt. Instead, we drop firm-years whose instrument-level debt exceeds balance-sheet debt by more than a factor of two, which signals errors in units or currency. Among firms without a balance sheet, we drop health, education, social-service, and membership organizations, which are mostly nonprofit institutions outside the corporate sector, and firms located in the United States with most of their debt in currencies other than the dollar or the euro, which are foreign firms assigned to the wrong country. Bonds are bonds and notes plus commercial paper, which the national accounts count as debt securities. Loans are term loans, revolving credit, mortgages, and other borrowings. We exclude leases, since Capital IQ does not separate finance leases, which the national accounts count as loans, from the operating leases that firms have recorded on their balance sheets since 2019. Firm-level loans, and therefore the coverage of loans, are thus a lower bound. Fiscal years do not all end in December, and Capital IQ converts debt to dollars at the exchange rate of the period end. We therefore compare each firm-year with the national accounts at the quarter of its period end: the annual stock is moved to that quarter with the growth of a quarterly series of the same instrument (OECD, Eurostat, or BIS), and converted at that quarter's end-of-period exchange rate.

The first difference between the two sources is where debt is recorded. Capital IQ reports a group's consolidated balance sheet, which we assign to the country of the group's ultimate parent, while the national accounts record debt in the country of the entity that borrows. Many groups issue bonds through financing subsidiaries located abroad, which the national accounts record in the subsidiary's country and, in most cases, as debt of financial corporations. For bonds, we therefore put the national accounts on the same footing as the firm-level data, using the BIS debt securities statistics, which report international debt securities both by the residence of the issuer and by the nationality of its ultimate parent. We take the debt securities of resident nonfinancial corporations, subtract the international debt securities issued by resident nonfinancial corporations (keeping the difference at or above zero), and add the international debt securities of all issuers, wherever located, whose ultimate parent is a nonfinancial corporation in the country. That is, domestic bonds remain in the

country of the issuer, while international bonds are assigned to the country of the parent. The adjustment matters most for countries whose groups issue through vehicles abroad. For the advanced economies as a group, the bonds of the firms in Capital IQ amount to 114 percent of the national accounts' debt securities on a residence basis over 2017–2019, and to 83 percent on a nationality basis. The adjustment does not capture bonds that a group's foreign subsidiary issues in the domestic market of the subsidiary's country, which remain in that country. In some countries, the BIS counts as nonfinancial issuers financing vehicles that the national accounts classify as financial corporations, so that the international debt securities of resident nonfinancial corporations exceed their total debt securities in the national accounts. There, domestic bonds are set to zero and the nationality-basis stock equals the BIS international debt securities of the country's groups; since Capital IQ covers these bonds well, coverage is close to 100 percent by construction. This applies to 69 country-years in 10 countries, most notably Germany in 2019–2024 and the Netherlands.

The second difference is consolidation. The national accounts that we use are non-consolidated, so that they include loans between nonfinancial corporations in the same country, much of which is lending within groups. A consolidated balance sheet nets these loans out, so that the firm-level data cannot capture them, and the coverage of loans is understated. Consolidated national accounts are not available for many of the countries in our sample, and we use the non-consolidated accounts throughout; where both exist, consolidated loans are on average about four fifths of non-consolidated loans. In the other direction, there is no counterpart of the nationality basis for loans, so that loans of groups' foreign subsidiaries appear in the firm-level data of the parent's country but not in its national accounts, which biases the coverage of loans upward.

We aggregate countries into groups by summing debt across countries in both sources, excluding the financial centres of Appendix A.1. Because countries enter and leave the sample at different dates, we chain the group ratios: the 2019 level is the ratio of sums over all countries in the group in 2019, and between consecutive years the ratio moves with the ratio of sums over the countries observed in both years. We show a group's line only in years with at least four countries, so that the emerging-economy lines start in 2003.

The firms in Capital IQ account for between 67 and 72 percent of nonfinancial corporate bonds in the United States and between 71 and 86 percent in advanced economies throughout 2002–2024. In emerging economies, coverage ranges from 67 to 112 percent and is most volatile in the early years, when the group includes few countries. Coverage of loans is much lower: between 30 and 46 percent in the United States, and between 13 and 23 percent in the other two groups. That is, the firm-level data capture most of the bond market but only a minority of bank and other loans, which are concentrated among the smaller and unlisted firms that Capital IQ does not cover.

A.4 Large bond issues, matched peers, and exposure measures

Large bond issues. A bond issue is new bonds in fiscal year t_0, measured at the previous year's exchange rates. Its size is relative to the firm's bonds plus loans at the end of $t_0 - 1$,

and the issue is large when its size is at least 15 percent. Events are firm-years in the bond-share sample in $t_0 - 1$ and t_0, in country-years with at least ten such firms, without a change of reporting currency, in which debt acquired with subsidiaries is at most 10 percent of the previous year's debt, and without a large bond issue in the three previous years; years in which the firm is not in the sample count as years without one. For the paths by issue size in Figure 6, the event tables of Section 4, and the exposure results of Section 5, events also have bonds plus loans of at least USD 1 million at the end of $t_0 - 1$. In Section 4, issues are in 2003–2019, so that every issue can be followed for five years; the paths by issue size also leave out issues whose debt falls below 10 percent of its level at the end of $t_0 - 1$. In Section 5, issues are in 2003–2024 and a firm may have several issues within the window, each an event. In the figures, each event year uses the issues observed in that year.

Matched peers. The matched peers of an issuer are the five firms (at least three) in its country, industry (SIC division), and asset tercile at the end of $t_0 - 1$ that make no bond issue in t_0, made no large bond issue in the three previous years (on the same convention) and pass the same screens as the issuers, and whose bond share at the end of $t_0 - 1$ is closest to the issuer's, within 5 percentage points. Firms as close as the fifth closest are all included, so an issuer can have more than five peers. Where fewer than three firms qualify, we match within the same country and asset tercile; this applies to about a quarter of matched issues. Peers are chosen on information up to t_0 only. The peers' average in each year is over the peers in the sample in that year. In the exposure results, each issue is weighted by the inverse of its country's number of issues in that year, so that countries have equal weights.

Exposure measures. The foreign-currency share is the share of instruments with a known currency that are not denominated in the home currency of the firm's ultimate parent. A country's foreign-currency share is the sum over its firms of foreign-currency amounts in U. S. dollars over the sum of amounts with a known currency. The fixed-rate share is the share of instruments with a known rate type that are fixed-rate, with zero-coupon instruments counted as fixed-rate. Maturity at issuance is the original term of the bonds and loans issued during the sample, each instrument counted once in its year of issue, weighted by its amount in U. S. dollars at issuance, over instruments with a term of up to 40 years. Remaining maturity is weighted by amount, over instruments with a remaining maturity of 0 to 30 years. The new bonds of an issuer in t_0 are instruments that appear in the data for the first time, are identified as new issues, and do not arrive with an acquired subsidiary. In the country decompositions, a firm without debt of known currency (or rate type, or maturity) in one of the two years takes the other year's values, and an instrument type that a firm does not hold in one year takes the other year's value. The country decompositions use country-years with at least ten firms in the sample and countries with at least ten annual changes, and order countries from the U. S. to advanced and emerging economies.

A.5 Additional results

Lumpiness of term loans. Table A.8 repeats Table 4 for term loans alone, leaving out revolving credit and mortgages. Outside the U. S., the contrast between bonds and loans

is unchanged: firms take out new term loans in about half of years, and the largest year accounts for less than half of their term-loan borrowing. In the U. S., term-loan borrowing is more concentrated than bond borrowing, with 59 percent of it in the largest year, so the U. S. contrast in Table 4 reflects revolving credit.

Lumpiness by firm size. Table A.9 reports the lumpiness measures for the bottom half and the top decile of firms by size. Bond borrowing is lumpiest among small firms: in the bottom half, the largest year accounts for most of a firm's bond borrowing in every group of countries. The largest U. S. firms borrow in the bond market in 52 percent of years, more often than through loans (42 percent).

Which transactions move the bond share. Table A.10 decomposes each firm's annual change in its bond share exactly by transaction. Bond issuance accounts for about two fifths of the variance of these changes, and new loans and draws on revolving credit for between a quarter and two fifths. Increases of 25 percentage points or more stem mostly from bond issuance, and decreases of that size mainly from new loans and credit-line drawdowns rather than from bond repayments.

How the gap closes. Table A.13 reports the bond and loan flows of issuers relative to their matched peers, and Table A.14 the contributions of these flows to the issuers' bond share relative to peers. Outside the U. S., over the five years after the issue, issuers' loans grow by 20 percent of debt more than those of their peers in advanced economies and by 23 percent in emerging economies, while their bonds fall by 12 and 13 percent of debt relative to peers. Together, these flows lower the issuers' bond share relative to peers by 17 and 21 percentage points. The gap thus closes mainly through new loans that finance subsequent needs rather than through the repayment of the issue. In the U. S., issuers' bonds change little relative to peers after the issue year, their loans grow by 6 percent of debt more, and the gap narrows by 7 percentage points.

Other contributions to the variance. Table 5a also reports the contributions of the other groups of firms. Across all countries, firms in the five years after a large bond issue account for 17 percent of the variance of annual changes in the debt-weighted bond share, with 25 percent of the debt, and other firms with bonds for 9 percent, with 15 percent of the debt. The between term accounts for 17 percent, and the entry and exit terms for 7 and 4 percent. Issue years account for 30 percent of the variance across all countries, and for 29 to 30 percent when countries are excluded one at a time. Over 2003–2024, U. S. issue years raise the debt-weighted bond share by 17 percentage points and the following five years reduce it by 7, against a total change of less than 1 percentage point. Table A.16 repeats the decomposition for the bond share of the average firm, with similar results.

Synchronization across countries. Table A.17 repeats the time-shift null for the average bond share of each group of countries, shifting either whole countries or individual firms. Shifting whole countries, which removes common timing across countries but keeps it within them, reduces the variance of the group's average to 47 percent of its actual value in advanced economies, 18 percent in emerging economies, and 15 percent across all countries. Issuance

is therefore also synchronized across countries, consistent with a global credit cycle that moves credit conditions across countries together (Boyarchenko and Elias, 2024c).

Issuance waves: other specifications. Table A.15 reports the response of the bond share to a wave year for the bond share of the average firm and with year fixed effects. The bond share of the average firm follows a similar path. With year fixed effects, the increase in both measures remains between 1.0 and 1.5 percentage points over the five years.

Table A.1: National accounts sample. This table lists the countries in the national accounts sample and the years for which each is included. Country comparison: the country is observed from 2012 or earlier through 2024 and enters the by-country comparison of the composition and credit-deepening components. Source: OECD financial accounts; Federal Reserve Financial Accounts (Z.1); IMF World Economic Outlook.

Country	Years	Country comparison
United States		
United States	2002–2024	✓
Advanced ex-U. S.		
Austria	2002–2024	✓
Belgium	2002–2024	✓
Canada	2002–2024	✓
Croatia	2002–2024	✓
Czechia	2002–2024	✓
Estonia	2002–2024	✓
Finland	2002–2024	✓
France	2002–2024	✓
Germany	2002–2024	✓
Greece	2002–2024	✓
Israel	2010–2024	✓
Italy	2002–2024	✓
Japan	2005–2024	✓
Korea	2009–2024	✓
Latvia	2002–2024	✓
Lithuania	2002–2024	✓
New Zealand	2007–2024	✓
Norway	2002–2024	✓
Portugal	2002–2024	✓
Slovakia	2002–2024	✓
Slovenia	2002–2024	✓
Spain	2002–2024	✓
Sweden	2002–2024	✓
United Kingdom	2002–2024	✓
Emerging economies		
Brazil	2009–2016	
Bulgaria	2002–2024	✓
Chile	2003–2024	✓
Colombia	2015–2024	
Hungary	2002–2024	✓
India	2011–2020	
Mexico	2003–2024	✓
Poland	2002–2024	✓
Romania	2002–2024 (excl. 2006)	✓
Russia	2011–2020	
Turkiye	2010–2024	✓

Table A.2: Construction of the firm sample. This table reports the size of the firm-level sample at each stage of its construction, for fiscal years 2002–2024. In the upper block, each row applies one stage to the sample in the row above; the last row is the bond-share sample. The lower block reports what each part of the sample selection removes from the 57 sample countries; a firm-year can fail several parts of the data-quality screen. "Firms" is the number of distinct firms, "Firm-years" the number of firm-fiscal year pairs, and "Years per firm" their ratio. "Debt" is the Capital IQ debt of these firm-years in billions of U. S. dollars, averaged over the 23 years (not reported for the first two rows, which count the debt of subsidiaries also in that of their parents and include financial firms), and "Share of debt" its share of the debt of all firm-years in the sample countries; in the upper block, these columns report the debt that remains after each stage, and in the lower block the debt that is removed. Firms are assigned to the country of their ultimate parent in the latest year in which they are in the sample. Source: S&P Capital IQ; Compustat; Worldscope.

	Firms	**Firm-years**	**Years per firm**	**Debt ($ bn a year)**	**Share of debt (%)**
Capital IQ Debt Capital Structure data					
Firm-years with debt records, 2002–2024	124,506	1,262,640	10.1		
Selecting firms and countries					
Positive debt	117,543	1,210,390	10.3		
Own ultimate parent, nonfinancial	70,584	742,628	10.5	22,262	
Annual filings, not government entities	64,445	708,765	11.0	21,769	
In the 128 sample countries	62,932	693,271	11.0	21,468	100.0
Checking against the balance sheet					
With a balance sheet	47,743	593,377	12.4	15,648	72.9
Passing the data-quality screen	44,307	558,819	12.6	15,269	71.1
With a bond share	39,759	512,715	12.9	15,221	70.9
Removed by	**Firms**	**Firm-years**		**Debt removed ($ bn a year)**	**Share of debt removed (%)**
No balance sheet	15,939	104,463		5,820	27.1
of which Chinese groups	3,525	29,668		4,131	19.2
Capital IQ debt above 133% of balance-sheet debt	1,646	17,535		280	1.3
Capital IQ debt below 75% of balance-sheet debt	830	7,918		82	0.4
Balance-sheet debt above three times assets	1,096	10,281		17	0.1
Assets or debt not positive	118	927		0	0.0

Table A.3: Countries in the firm-level sample. This table lists the 57 countries of the firm-level sample: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Years: the first and last fiscal year in which the country has at least ten firms in the sample; country-years with fewer firms are left out. Firms: distinct firms over 2002–2024. Firm-years: number of firm-years. Firms per year: average number of firms per year. Debt: Capital IQ debt of the country's firms in 2024, in billions of U. S. dollars at the fiscal-year exchange rate. Firms with bonds: percentage of the country's firms with bonds outstanding, averaged over years. Bond share: debt-weighted bond share of the country's firms, bonds over bonds plus loans (term loans, revolving credit, and mortgages), in percent, averaged over years. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years with a balance sheet that pass the data-quality screen. Source: S&P Capital IQ; total assets from Compustat and Worldscope.

	Years	Firms	Firm-years	Firms per year	Debt, 2024 (USD bn)	Firms with bonds (%)	Bond share (%)
United States							
United States	2002–2024	11,822	83,142	3,615	8,862.2	61.3	80.1
Advanced ex-U. S.							
Australia	2002–2024	2,585	19,664	855	264.6	21.1	49.6
Austria	2002–2024	89	1,014	44	41.4	43.8	42.5
Belgium	2002–2024	155	1,806	79	124.6	31.6	66.6
Canada	2002–2024	4,250	25,614	1,114	788.6	45.3	75.5
Croatia	2002–2024	79	856	37	3.4	13.7	8.0
Denmark	2002–2024	244	2,393	104	97.7	16.6	38.2
Finland	2002–2024	234	2,804	122	58.5	24.7	47.3
France	2002–2024	924	9,781	425	1,013.7	35.2	71.3
Germany	2002–2024	883	8,875	386	908.7	32.5	71.2
Greece	2002–2024	285	3,594	156	39.2	53.3	40.6
Hong Kong	2002–2024	1,432	15,423	671	371.7	24.1	31.0
Ireland	2002–2024	155	1,496	65	197.5	45.5	70.6
Israel	2002–2024	650	5,197	226	97.0	39.0	58.3
Italy	2002–2024	497	3,949	172	280.2	25.5	59.7
Japan	2002–2024	4,214	53,032	2,306	2,037.8	39.6	33.3
Korea	2002–2024	2,474	25,067	1,090	746.7	49.2	53.1
Netherlands	2002–2024	250	2,562	111	269.9	38.4	68.9
New Zealand	2002–2024	198	2,090	91	29.6	26.9	63.5
Norway	2002–2024	400	3,139	136	90.4	32.2	58.2
Portugal	2002–2024	57	660	29	43.4	55.3	59.6
Singapore	2002–2024	810	8,719	379	182.3	14.8	32.9
Spain	2002–2024	220	2,457	107	304.4	34.1	42.2
Sweden	2002–2024	1,043	9,491	413	171.1	20.2	50.3
Switzerland	2002–2024	300	3,545	154	388.4	41.3	71.1
Taiwan	2002–2024	2,373	29,658	1,289	363.2	39.7	22.2
United Kingdom	2002–2024	2,493	21,445	932	910.9	27.7	65.7
Emerging economies							
Argentina	2002–2024	84	877	38	17.9	38.2	63.3
Bangladesh	2006–2024	210	2,274	120	5.6	6.8	2.2
Brazil	2002–2024	441	5,034	219	333.8	50.6	44.7
Bulgaria	2005–2024	77	625	31	0.7	20.3	16.5
Chile	2002–2024	162	2,093	91	75.6	68.7	58.3
China	2002–2024	6,775	63,905	2,778	2,233.3	15.8	12.4
Colombia	2002–2024	68	622	27	40.3	38.8	51.2
Egypt	2003–2024	136	1,313	60	5.5	63.6	9.2
India	2002–2024	5,074	62,789	2,730	523.9	11.0	22.5
Indonesia	2002–2024	613	4,912	214	52.8	24.3	29.5
Jordan	2003–2024	117	1,106	50	2.9	27.5	7.3
Kuwait	2003–2024	81	858	39	22.2	15.3	3.1
Malaysia	2002–2024	1,246	14,832	645	99.9	13.8	40.3
Mexico	2002–2024	139	1,750	76	235.6	66.5	66.5
Nigeria	2002–2024	99	1,091	47	2.4	16.5	15.3
Oman	2002–2024	96	1,331	58	13.8	3.1	2.6
Pakistan	2002–2024	349	4,704	205	9.5	10.9	6.9
Peru	2002–2024	117	1,149	50	8.1	31.5	37.3
Philippines	2002–2024	164	1,787	78	95.4	23.3	29.6
Poland	2002–2024	812	7,988	347	37.9	16.5	26.6
Romania	2004–2024	221	1,888	90	4.4	3.3	2.1
Russia	2002–2024	336	2,589	113	207.5	38.8	37.7
Saudi Arabia	2002–2024	280	2,331	101	198.7	15.3	14.9
South Africa	2002–2024	354	3,744	163	95.9	18.9	42.6
Sri Lanka	2002–2024	144	1,661	72	5.2	16.5	5.4
Thailand	2002–2024	747	9,409	409	195.7	27.9	45.0
Tunisia	2005–2024	51	605	30	0.3	15.7	1.5
Turkiye	2002–2024	408	3,817	166	73.6	8.8	13.6
United Arab Emirates	2002–2024	103	923	40	69.7	19.1	35.7
Vietnam	2004–2024	611	3,723	177	18.0	10.4	10.8

Table A.4: Decomposition of the change in the debt-weighted bond share, 2002–2024: balanced panel. This table decomposes the change between 2002 and 2024 in the debt-weighted bond share of the balanced panel of firms that are in the sample in every year from 2002 to 2024, in the countries with at least ten such firms, in percentage points, into changes in firms' own bond shares (within firms), excluding the change due to exchange-rate movements beyond relative inflation on existing foreign-currency debt (exchange-rate revaluation), and shifts of debt across firms (between firms); there is no entry or exit of firms in a balanced panel. Each year's change in each country's bond share is decomposed exactly, with firms weighted by their average weight in the two years, each term is averaged with equal weights over the countries of the group, and the annual terms are summed over 2003–2024. Bootstrap standard errors in parentheses: 200 replications resampling firms, with their entire histories, within each country. Standard errors from leaving out one country at a time in brackets (not available for the United States). The last three rows report the number of countries, firms, and firm-years. Countries: the U. S., 23 advanced economies other than the U. S., and 9 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ.

	United States	Advanced ex-U. S.	Emerging
Change in the bond share, 2002–2024	-1.4	17.0	24.3
	(2.6)	(2.6)	(3.3)
		[4.6]	[10.0]
Within firms	1.8	21.3	26.2
	(1.6)	(2.3)	(3.0)
		[4.3]	[9.7]
Exchange-rate revaluation	-0.0	-0.0	0.3
	(0.0)	(0.1)	(0.2)
		[0.2]	[0.4]
Between firms	-3.2	-4.2	-2.1
	(2.0)	(1.8)	(2.5)
		[2.3]	[1.9]
Countries	1	23	9
Firms	542	1,282	733
Firm-years	12,466	29,486	16,859

Table A.5: The bond share by firm size and investment intensity, 2002–2024: balanced panel. This table reports, for groups of firms ranked by size and investment intensity, the debt-weighted bond share of the group and its share of its country's debt in 2002 and 2024, in percent, and the change in the group's bond share between 2002 and 2024, in percentage points, for the balanced panel of firms that are in the sample in every year from 2002 to 2024, in the countries with at least ten such firms. Firms are ranked within their country by total assets in each year (Panel a), and by capital expenditures over the previous year's total assets, assigned to a fixed group by their average percentile over 2002–2024 (Panel b). Groups: the bottom half, the 50th to 90th percentiles, and the top decile. Group bond shares, shares of debt, and the split of each country's change into changes within groups and shifts of debt across groups are averaged with equal weights over the countries of the region. Bootstrap standard errors in parentheses: 200 replications resampling firms, with their entire histories, within each country, and ranking firms again in each replication. Standard errors from leaving out one country at a time in brackets (not available for the United States). The last two rows of each panel report the number of firms ranked in 2002 and in 2024 and the number of countries. Countries: the U. S., 23 advanced economies other than the U. S., and 9 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ; capital expenditures and total assets from Compustat and Worldscope.

(a) By size

	United States	Advanced ex-U. S.	Emerging
Bottom half			
Bond share (%)	55.8 → 64.0	10.9 → 26.0	9.9 → 13.4
Share of debt (%)	4.1 → 6.1	4.1 → 4.5	4.5 → 3.9
Change (pp)	8.2	15.1	3.5
	(3.5)	(3.4)	(4.7)
		[4.6]	[3.7]
50th–90th percentile			
Bond share (%)	80.8 → 82.8	32.3 → 51.6	25.5 → 44.8
Share of debt (%)	29.4 → 39.1	35.7 → 37.2	36.3 → 35.6
Change (pp)	2.1	19.2	19.4
	(2.6)	(3.3)	(5.9)
		[4.3]	[8.0]
Top decile			
Bond share (%)	91.3 → 89.5	56.8 → 72.6	27.3 → 56.9
Share of debt (%)	66.5 → 54.8	60.2 → 58.3	59.2 → 60.5
Change (pp)	-1.8	15.8	29.6
	(3.5)	(4.3)	(6.6)
		[5.3]	[14.3]
Within groups (pp)	0.0	17.5	23.3
	(2.2)	(2.5)	(4.8)
		[4.1]	[9.9]
Between groups (pp)	-1.5	-0.4	1.0
	(0.8)	(1.0)	(0.9)
		[0.9]	[0.5]
Firms, 2002 → 2024	542 → 542	1,282 → 1,282	733 → 733
Countries	1	23	9

(b) By investment intensity

	United States	Advanced ex-U. S.	Emerging
Bottom half			
Bond share (%)	92.6 → 91.8	37.8 → 56.7	21.4 → 50.8
Share of debt (%)	48.2 → 40.4	36.5 → 33.9	35.7 → 35.9
Change (pp)	-0.8	18.9	29.4
	(3.0)	(4.1)	(7.0)
		[5.3]	[10.3]
50th–90th percentile			
Bond share (%)	81.1 → 81.4	39.8 → 61.4	31.1 → 48.4
Share of debt (%)	43.1 → 51.1	43.4 → 49.7	41.0 → 36.6
Change (pp)	0.3	21.6	17.3
	(3.3)	(3.8)	(6.4)
		[5.1]	[9.6]
Top decile			
Bond share (%)	82.5 → 78.1	45.4 → 55.0	35.1 → 51.2
Share of debt (%)	8.8 → 8.4	20.0 → 16.4	23.3 → 27.5
Change (pp)	-4.4	9.6	16.1
	(3.8)	(4.3)	(6.1)
		[4.6]	[12.6]
Within groups (pp)	-0.6	18.1	24.2
	(2.0)	(2.4)	(3.8)
		[4.4]	[9.3]
Between groups (pp)	-0.8	-1.0	0.1
	(1.0)	(0.9)	(1.3)
		[1.2]	[2.2]
Firms, 2002 → 2024	542 → 542	1,274 → 1,274	731 → 731
Countries	1	23	9

Table A.6: Decomposition of the change in the debt-weighted bond share, 2002–2024: national accounts' definition. This table decomposes the change between 2002 and 2024 in the debt-weighted bond share, with the firm-level bond share measured on the national accounts' definition (bonds and commercial paper over all debt except leases), in percentage points, into changes in firms' own bond shares (within firms), excluding the change due to exchange-rate movements beyond relative inflation on existing foreign-currency debt (exchange-rate revaluation); shifts of debt across surviving firms (between firms); and the entry and exit of firms. Each year's change in each country's bond share is decomposed exactly, with surviving firms weighted by their average weight in the two years and entry and exit as in Melitz and Polanec (2015), each term is averaged with equal weights over the countries of the group that are in the sample in both years, and the annual terms are summed over 2003–2024. Firms enter (exit) in their first (last) year in the sample; a firm missing from the sample between two of its sample years is kept in it, at the average of its bond share and debt in the years around the gap. Bootstrap standard errors in parentheses: 200 replications resampling firms, with their entire histories, within each country. Standard errors from leaving out one country at a time in brackets (not available for the United States). The last three rows report the number of countries, firms, and firm-years. Countries: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen. Source: S&P Capital IQ.

	United States	Advanced ex-U. S.	Emerging
Change in the bond share, 2002–2024	3.0	19.3	11.1
	(2.4)	(2.2)	(2.1)
		[3.0]	[3.5]
Within firms	6.3	25.9	17.8
	(2.4)	(1.9)	(2.3)
		[3.5]	[3.7]
Exchange-rate revaluation	-0.0	0.0	0.1
	(0.0)	(0.1)	(0.2)
		[0.1]	[0.1]
Between firms	-1.6	-6.8	-1.5
	(1.4)	(1.4)	(1.3)
		[1.5]	[1.9]
Entry	-8.3	-4.5	-5.8
	(0.9)	(1.1)	(1.6)
		[1.4]	[1.9]
Exit	6.6	4.7	0.5
	(0.9)	(0.8)	(1.5)
		[0.8]	[1.8]
Countries	1	26	30
Firms	11,277	26,337	19,700
Firm-years	75,496	246,257	202,537

Table A.7: The bond share by firm size and investment intensity, 2002–2024: national accounts' definition. This table reports, for groups of firms ranked by size and investment intensity, the debt-weighted bond share of the group and its share of its country's debt in 2002 and 2024, in percent, and the change in the group's bond share between 2002 and 2024, in percentage points, with the firm-level bond share measured on the national accounts' definition (bonds and commercial paper over all debt except leases). Firms are ranked within their country by total assets in each year (Panel a), and by capital expenditures over the previous year's total assets, assigned to a fixed group by their average percentile over 2002–2024 (Panel b). Groups: the bottom half, the 50th to 90th percentiles, and the top decile. Group bond shares, shares of debt, and the split of each country's change into changes within groups and shifts of debt across groups are averaged with equal weights over the countries of the region. Bootstrap standard errors in parentheses: 200 replications resampling firms, with their entire histories, within each country, and ranking firms again in each replication. Standard errors from leaving out one country at a time in brackets (not available for the United States). The last two rows of each panel report the number of firms ranked in 2002 and in 2024 and the number of countries. Countries: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen. Source: S&P Capital IQ; capital expenditures and total assets from Compustat and Worldscope.

(a) By size

	United States	Advanced ex-U. S.	Emerging
Bottom half			
Bond share (%)	46.0 → 39.0	9.4 → 18.4	8.2 → 12.4
Share of debt (%)	0.8 → 1.4	3.1 → 2.0	5.4 → 2.3
Change (pp)	-6.9	9.0	4.3
	(3.3)	(1.9)	(2.2)
		[2.9]	[2.8]
50th–90th percentile			
Bond share (%)	59.3 → 66.1	20.8 → 38.7	15.9 → 22.6
Share of debt (%)	16.2 → 24.9	24.8 → 21.6	32.1 → 22.0
Change (pp)	6.8	17.9	6.7
	(2.0)	(1.9)	(2.2)
		[3.5]	[2.9]
Top decile			
Bond share (%)	78.8 → 83.3	47.0 → 65.5	27.8 → 41.9
Share of debt (%)	83.0 → 73.6	72.1 → 76.4	62.5 → 75.6
Change (pp)	4.5	18.5	14.1
	(3.0)	(2.9)	(3.7)
		[3.1]	[5.7]
Within groups (pp)	4.8	17.9	11.3
	(2.3)	(2.0)	(2.3)
		[2.8]	[4.1]
Between groups (pp)	-1.8	1.5	2.8
	(0.5)	(0.5)	(0.8)
		[0.7]	[0.7]
Firms, 2002 → 2024	4,214 → 2,415	6,641 → 9,619	3,892 → 10,140
Countries	1	26	22

(b) By investment intensity

	United States	Advanced ex-U. S.	Emerging
Bottom half			
Bond share (%)	74.3 → 80.8	31.3 → 54.3	14.8 → 26.6
Share of debt (%)	30.0 → 26.2	27.7 → 24.2	38.7 → 24.0
Change (pp)	6.5	23.0	11.8
	(4.4)	(3.3)	(3.9)
		[4.7]	[5.7]
50th–90th percentile			
Bond share (%)	76.0 → 77.7	42.7 → 59.2	26.4 → 37.0
Share of debt (%)	66.7 → 68.0	62.0 → 64.6	52.2 → 59.0
Change (pp)	1.7	16.5	10.6
	(3.1)	(2.7)	(3.0)
		[2.8]	[4.5]
Top decile			
Bond share (%)	76.6 → 78.1	27.1 → 45.9	20.0 → 34.1
Share of debt (%)	3.3 → 5.7	10.3 → 11.2	9.2 → 17.0
Change (pp)	1.5	18.8	14.1
	(5.9)	(4.5)	(6.0)
		[5.9]	[8.1]
Within groups (pp)	3.0	19.5	12.0
	(2.3)	(2.1)	(2.7)
		[3.0]	[3.9]
Between groups (pp)	-0.0	-0.0	2.5
	(0.2)	(0.7)	(1.0)
		[0.9]	[1.0]
Firms, 2002 → 2024	4,187 → 2,384	6,525 → 9,388	3,724 → 9,849
Countries	1	26	19

Table A.8: Lumpiness of bond and term-loan flows. This table reports measures of lumpiness for bond flows and for term-loan flows. Bond borrowing is new bonds; term-loan borrowing is new term loans; bond (term-loan) repayment is bonds (term loans) retired early or at maturity plus partial repayments. Flows are relative to the firm's bonds plus loans (term loans, revolving credit, and mortgages) at the end of the previous year; flows of revolving credit and mortgages are left out. Lumpiness: the percentage of firm-years with a positive flow; the average, over firms in the sample for at least ten years with a positive total flow, of the share of the firm's total flow that occurs in its largest year, with the share if the flow were spread evenly over the firm's years ($1/T$) for comparison; and the median large flow. Concentration of the country's flow (Doms and Dunne, 1998): the percentage of firm-years with a large flow and their share of the country's flow, summed over its firms; and the share of the country's flow in the 10 percent of its firm-years with the largest flow relative to the previous year's bonds plus loans (including firm-years without a flow). Distribution: standard deviation, skewness, and kurtosis of the flow relative to the average of the firm's bonds plus loans in the previous and current years (bounded at 200 percent), over all firm-years including those without a flow. Flows are measured at the previous year's exchange rates. A flow is large when it is at least 15 percent of the firm's bonds plus loans at the end of the previous year. Each statistic is computed within a country and averaged with equal weights over countries with at least 50 firm-years. Sample: annual changes of firms in the bond-share sample in both years, 2003–2024, in country-years with at least ten such firms, excluding changes in which the firm's reporting currency changes. Countries: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ.

	United States				Advanced ex-U. S.				Emerging			
	Bond borrow.	Term loan borrow.	Bond repay.	Term loan repay.	Bond borrow.	Term loan borrow.	Bond repay.	Term loan repay.	Bond borrow.	Term loan borrow.	Bond repay.	Term loan repay.
Lumpiness												
Firm-years with a flow (%)	31.8	26.2	48.7	44.3	14.8	45.8	23.2	68.8	10.6	50.4	16.7	76.4
Largest year's share of a firm's flow (%)	51.5	58.6	45.9	49.2	61.3	43.4	55.2	36.8	72.6	45.1	60.5	35.1
Smooth flow, 1/T (%)	6.6	6.7	6.6	6.7	6.3	6.5	6.3	6.6	6.6	7.0	6.7	7.0
Median large flow (% of debt)	54.4	62.4	41.7	47.6	46.9	68.7	32.4	45.5	43.3	64.1	33.3	41.7
Concentration of the country's flow												
Firm-years with a large flow (%)	21.5	17.5	22.5	20.0	9.4	32.5	8.9	37.7	6.3	34.3	5.4	44.3
Their share of the country's flow (%)	84.5	85.7	60.4	73.3	80.9	88.9	58.8	73.7	73.3	88.7	47.5	78.5
Share of the country's flow in its top 10% of firm-years (%)	39.9	48.5	18.4	37.3	84.9	27.0	70.5	18.4	88.7	30.8	84.6	20.1
Distribution of the flow relative to average debt												
Standard deviation (% of average debt)	31.9	30.3	28.2	26.9	18.5	38.7	15.8	33.6	12.9	38.2	11.0	34.3
Skewness	3.0	3.1	3.2	3.1	5.5	1.8	6.1	2.1	9.2	1.9	9.5	2.1
Kurtosis	12.7	12.9	14.7	13.2	41.2	6.0	54.3	7.9	131.2	6.4	139.6	8.2
Countries	1	1	1	1	26	26	26	26	30	30	30	30
Firms	9,067	9,067	9,067	9,067	23,312	23,312	23,312	23,312	18,025	18,025	18,025	18,025
Firm-years	59,283	59,283	59,283	59,283	203,998	203,998	203,998	203,998	164,801	164,801	164,801	164,801

Table A.9: Lumpiness of bond and loan flows, by firm size. This table reports measures of lumpiness for four flows, for the firms in the bottom half (upper block) and in the top decile (lower block) of their country's firms by total assets, ranked in each year and assigned by their average percentile. Bond borrowing is new bonds; loan borrowing is new loans (term loans, revolving credit, and mortgages) plus draws on existing revolving credit; bond (loan) repayment is bonds (loans) retired early or at maturity plus partial repayments. Flows are measured at the previous year's exchange rates. A flow is large when it is at least 15 percent of the firm's bonds plus loans at the end of the previous year. Lumpiness: the percentage of firm-years with a positive flow; the average, over firms in the sample for at least ten years with a positive total flow, of the share of the firm's total flow that occurs in its largest year, with the share if the flow were spread evenly over the firm's years ($1/T$) for comparison; and the median large flow. Concentration of the country's flow (Doms and Dunne, 1998): the percentage of firm-years with a large flow and their share of the country's flow, summed over its firms; and the share of the country's flow in the 10 percent of its firm-years with the largest flow relative to the previous year's bonds plus loans (including firm-years without a flow). Kurtosis: of the flow relative to the average of the firm's bonds plus loans in the previous and current years (bounded at 200 percent), over all firm-years including those without a flow. Each statistic is computed within a country and averaged with equal weights over countries with at least 50 firm-years in the group. Sample: annual changes of firms in the bond-share sample in both years, 2003–2024, in country-years with at least ten such firms, excluding changes in which the firm's reporting currency changes. Countries: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ; total assets from Compustat and Worldscope.

	United States				Advanced ex-U. S.				Emerging			
	Bond borrow.	Loan borrow.	Bond repay.	Loan repay.	Bond borrow.	Loan borrow.	Bond repay.	Loan repay.	Bond borrow.	Loan borrow.	Bond repay.	Loan repay.
Bottom half of firms by assets												
Lumpiness												
Firm-years with a flow (%)	30.3	49.2	43.8	63.0	8.9	53.9	13.7	75.1	5.5	57.0	9.5	78.9
Largest year's share of a firm's flow (%)	62.9	43.0	53.9	37.2	73.6	38.7	68.0	33.1	82.7	40.8	68.8	33.1
Smooth flow, 1/T (%)	7.5	7.5	7.5	7.5	7.0	7.1	7.0	7.1	7.3	7.4	7.3	7.4
Median large flow (% of debt)	73.9	78.5	54.9	62.1	70.9	78.6	40.1	52.2	71.6	73.7	38.8	49.6
Concentration of the country's flow												
Firm-years with a large flow (%)	21.4	37.4	25.8	42.1	6.3	42.1	6.7	50.2	3.4	42.7	3.7	54.7
Their share of the country's flow (%)	98.1	95.7	94.1	92.5	89.5	96.2	80.5	92.1	85.4	95.9	67.3	92.2
Share of the country's flow in its top 10% of firm-years (%)	58.7	39.7	33.7	27.2	96.7	30.1	92.2	25.2	98.2	29.9	94.7	22.4
Kurtosis	10.0	4.6	10.1	5.1	63.8	3.8	74.6	5.2	236.9	4.5	219.2	5.5
Top decile of firms by assets												
Lumpiness												
Firm-years with a flow (%)	51.9	41.7	78.0	52.6	39.7	55.9	62.6	75.5	27.1	70.6	40.1	89.7
Largest year's share of a firm's flow (%)	33.0	44.2	26.5	39.4	39.6	35.6	32.9	31.9	61.2	33.5	46.8	28.5
Smooth flow, 1/T (%)	5.5	5.5	5.5	5.5	5.6	5.6	5.5	5.6	5.9	6.2	5.9	6.2
Median large flow (% of debt)	31.9	30.0	24.1	27.8	34.1	44.3	24.5	30.8	43.1	54.1	29.3	36.2
Concentration of the country's flow												
Firm-years with a large flow (%)	28.3	12.7	21.8	11.1	21.1	28.0	17.1	24.3	13.2	42.5	9.1	47.0
Their share of the country's flow (%)	80.9	66.6	51.6	54.4	77.6	82.7	54.2	64.2	74.2	87.4	45.2	75.1
Share of the country's flow in its top 10% of firm-years (%)	48.1	57.4	29.7	50.9	55.3	40.6	37.8	35.1	70.7	26.8	62.4	17.6
Kurtosis	15.1	35.0	24.0	33.0	15.9	10.4	26.3	16.6	32.4	5.6	33.7	8.0

Table A.10: Which transactions move the bond share. This table decomposes each firm's annual change in its bond share, in percentage points, exactly into the contributions of its transactions in bonds and in loans, of debt acquired or disposed of with subsidiaries, of changes not classified as any of these, and of exchange-rate revaluation of foreign-currency debt. A flow f of type j (bonds or loans) contributes $100\,(\mathbb{1}_{j=\text{bonds}} - s_{t-1})\,f/D_t$, with a negative sign for repayments, where s_{t-1} is last year's bond share and D_t this year's bonds plus loans at last year's exchange rates. New loans and draws are new loans plus draws on revolving credit; other increases are increases in outstanding term loans and mortgages; reopenings are increases in outstanding bonds; paydowns are partial repayments. For each group of countries, the first column reports each transaction's share of the variance of firms' annual changes, $\text{cov}(c_k, \Delta s)/\text{var}(\Delta s)$, in percent (the shares sum to 100), and the second and third columns its mean contribution, in percentage points, in large rises and large falls of the bond share (changes of at least 25 percentage points). Each statistic is computed within a country and averaged with equal weights over countries; the large-move columns include countries with at least ten such moves. Sample: annual changes of firms in the bond-share sample in both years, 2003–2024, in country-years with at least ten such firms, excluding changes in which the firm's reporting currency changes or in which debt falls by more than 90 percent (1.4 percent of changes in all). Countries: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ.

	United States			Advanced ex-U. S.			Emerging		
	Variance share (%)	Large up (pp)	Large down (pp)	Variance share (%)	Large up (pp)	Large down (pp)	Variance share (%)	Large up (pp)	Large down (pp)
Bonds									
Issuance	37.9	41.1	0.5	42.4	38.2	0.5	38.8	37.4	0.7
Reopenings	1.5	1.7	0.0	2.2	2.3	0.0	3.7	4.5	0.1
Early retirement	0.1	-1.8	-2.0	0.7	-0.9	-2.3	1.2	-0.4	-2.5
Maturities	0.5	-0.8	-1.6	1.6	-0.5	-2.7	1.4	-0.7	-2.3
Paydowns	3.9	-3.2	-8.3	7.1	-1.3	-11.3	11.2	-1.1	-9.7
Loans									
New loans and revolver draws	39.2	-1.0	-45.0	24.9	-0.8	-31.3	26.9	-0.7	-33.2
Other increases	1.1	-0.0	-1.3	4.1	-0.1	-4.7	3.7	-0.1	-4.6
Early retirement	0.3	3.2	2.9	-0.8	1.5	2.7	-0.3	1.5	2.2
Maturities	0.5	2.5	1.9	-0.5	1.3	2.5	-0.5	1.2	2.4
Paydowns	3.4	7.1	3.1	1.7	4.2	3.8	-1.2	4.2	3.8
Acquired and disposed debt	7.7	4.1	-4.8	10.2	4.9	-6.3	5.0	3.3	-3.2
Unclassified changes	3.9	2.8	-1.7	6.3	4.2	-2.1	10.0	5.0	-3.7
Exchange-rate revaluation	0.0	-0.0	0.0	0.0	0.0	-0.0	0.1	0.0	-0.1
Countries	1	1	1	26	25	24	30	25	24
Firm-year changes	58,541	3,605	3,424	201,644	7,589	6,419	162,490	3,548	2,596
Firms	9,028			23,227			17,974		

Table A.11: The jump in the bond share scales with the size of the bond issue. This table reports, by the size of the bond issue relative to the firm's bonds plus loans at the end of the previous year, the number of issues and of countries, the mechanical jump, the gap between the issuer's bond share and that of its matched peers in the issue year and five years later, and the share of the gap kept five years later (the gap five years later over the gap in the issue year, standard errors by the delta method; not reported for issues below 5 percent). The mechanical jump is the change in the issuer's bond share if the issue were added to its bonds and its debt and nothing else changed, $(s_0 + x)/(1 + x/100) - s_0$, where s_0 is the bond share at the end of $t_0 - 1$ and x the size of the issue, both in percent. A bond issue is new bonds in fiscal year t_0, at the previous year's exchange rates; its size is relative to the firm's bonds plus loans at the end of $t_0 - 1$, and it is large when at least 15 percent. Events: firm-years in the bond-share sample in $t_0 - 1$ and t_0, in country-years with at least ten such firms, without a change of reporting currency, without a large bond issue in the three previous years (years out of the sample count as without), with bonds plus loans of at least USD 1 million at the end of $t_0 - 1$, and in which debt acquired with subsidiaries is at most 10 percent of the previous year's debt. Matched peers: the five firms (at least three) with the bond share at the end of $t_0 - 1$ closest to the issuer's, and any equally close, within 5 percentage points, among the firms of the same country, industry (SIC division), and asset tercile at the end of $t_0 - 1$ (where fewer than three qualify, the same country and asset tercile) that have no bond issue in t_0, no large bond issue in the three previous years and pass the same debt screens; peers are chosen on information up to t_0 only, and their average in each year is over those in the sample that year. The gap is the issuer's bond share minus the peers' average, in percentage points. Issues in 2003–2019 whose debt does not fall below 10 percent of its level at the end of $t_0 - 1$; the gap five years later is over the issues in the sample then. In each year, each issue is weighted by one over the number of its country's issues in the cell observed that year, so that countries count equally, over countries with at least ten issues in the cell; standard errors clustered by firm in parentheses. Firm-level sample: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ.

	Bond borrowing, % of last year's bonds and loans				
	Below 5%	5–15%	15–35%	35–100%	100% or more
United States					
Events	1,303	987	1,198	1,762	1,099
Countries	1	1	1	1	1
Mechanical jump (pp)	1.0	4.3	8.5	14.4	34.3
Gap to matched peers at issue (pp)	-0.1	4.0	10.6	18.9	40.3
Gap five years later (pp)	1.4	4.2	7.3	11.5	23.4
Share of the gap kept			0.69	0.61	0.58
			(0.12)	(0.06)	(0.04)
Advanced ex-U. S.					
Events	3,192	2,616	1,906	1,833	1,248
Countries	16	14	17	19	17
Mechanical jump (pp)	1.5	7.0	16.5	31.7	62.1
Gap to matched peers at issue (pp)	1.8	8.9	19.9	41.2	65.2
Gap five years later (pp)	4.8	5.7	12.1	22.5	33.3
Share of the gap kept		0.64	0.61	0.55	0.51
		(0.16)	(0.07)	(0.04)	(0.03)
Emerging					
Events	826	707	640	758	473
Countries	16	11	7	10	9
Mechanical jump (pp)	1.6	7.8	18.2	35.3	67.7
Gap to matched peers at issue (pp)	1.7	7.4	19.4	41.8	70.4
Gap five years later (pp)	2.3	2.6	12.9	17.9	27.9
Share of the gap kept		0.35	0.67	0.43	0.40
		(0.29)	(0.10)	(0.05)	(0.04)

Table A.12: What happens to large bond issues five years later. This table reports the outcome five years after large bond issues (at least 15 percent of the previous year's bonds plus loans). Upper block: the percentage of issues whose issuer, five years later, has kept at least half of its gap to its matched peers, has given back more than half, has left the sample, has seen its debt fall below 10 percent of its level before the issue, is observed with gaps, or whose gap is not defined. Middle block: the share of the gap kept if the issuers that left the sample had given back their whole gap, or had kept it; issuers observed with gaps enter with their gap five years later. Lower block: the share of the gap kept by issuers observed in every year that make another large bond issue within the five years, and by those that do not (descriptive: conditions on the issuer's later behaviour). Issues in 2003–2019 that open a gap of at least 5 percentage points in the issue year. A bond issue is new bonds in fiscal year t_0, at the previous year's exchange rates; its size is relative to the firm's bonds plus loans at the end of $t_0 - 1$, and it is large when at least 15 percent. Events: firm-years in the bond-share sample in $t_0 - 1$ and t_0, in country-years with at least ten such firms, without a change of reporting currency, without a large bond issue in the three previous years (years out of the sample count as without), with bonds plus loans of at least USD 1 million at the end of $t_0 - 1$, and in which debt acquired with subsidiaries is at most 10 percent of the previous year's debt. Matched peers: the five firms (at least three) with the bond share at the end of $t_0 - 1$ closest to the issuer's, and any equally close, within 5 percentage points, among the firms of the same country, industry (SIC division), and asset tercile at the end of $t_0 - 1$ (where fewer than three qualify, the same country and asset tercile) that have no bond issue in t_0, no large bond issue in the three previous years and pass the same debt screens; peers are chosen on information up to t_0 only, and their average in each year is over those in the sample that year. The gap is the issuer's bond share minus the peers' average, in percentage points. Each issue is weighted by one over the number of its country's issues, so that countries count equally, over countries with at least ten issues. Firm-level sample: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ.

	United States	Advanced ex-U. S.	Emerging
Five years later (% of issues)			
Kept at least half of the gap	27.0	30.6	28.0
Gave back more than half	19.4	28.2	37.1
Left the sample	44.2	31.7	20.5
Debt collapsed	4.1	3.5	4.7
Observed with gaps	4.8	5.7	9.4
Gap not defined	0.6	0.2	0.2
Share of the gap kept			
Exits as fully given back	0.29	0.36	0.36
Exits as fully kept	0.79	0.74	0.62
Observed every year (descriptive)			
Large bond borrowing again within five years	0.78	0.80	0.67
No large bond borrowing again	0.18	0.31	0.22
Issues	2,819	4,630	2,010
Countries	1	22	18

Table A.13: How the jump is given back: issuers' bond and loan flows relative to their peers. This table reports the flows of firms making a large bond issue (at least 15 percent of the previous year's bonds plus loans) minus the average flows of their matched peers, in percent of debt: in the issue year, relative to the average of the firm's bonds plus loans at the end of $t_0 - 1$ and t_0, and summed over the five following years, relative to the average of its bonds plus loans over t_0 to $t_0 + 5$. Flows are at the previous year's exchange rates. New loans and draws: new loans plus draws on existing revolving credit; paydowns are partial repayments. The change in bonds (loans) is the change in the amount outstanding and includes debt acquired or disposed of with subsidiaries, revaluation, and changes not classified as flows, so the rows above it do not add up to it. Each ratio is trimmed at its 1st and 99th percentiles within the group of countries; peers' ratios are averaged over each issuer's matched peers for which they are defined. Events: firm-years in the bond-share sample in $t_0 - 1$ and t_0, in country-years with at least ten such firms, without a change of reporting currency, without a large bond issue in the three previous years (years out of the sample count as without), with bonds plus loans of at least USD 1 million at the end of $t_0 - 1$, and in which debt acquired with subsidiaries is at most 10 percent of the previous year's debt. Matched peers: the five firms (at least three) with the bond share at the end of $t_0 - 1$ closest to the issuer's, and any equally close, within 5 percentage points, among the firms of the same country, industry (SIC division), and asset tercile at the end of $t_0 - 1$ (where fewer than three qualify, the same country and asset tercile) that have no bond issue in t_0, no large bond issue in the three previous years and pass the same debt screens; peers are chosen on information up to t_0 only, and their average in each year is over those in the sample that year. The gap is the issuer's bond share minus the peers' average, in percentage points. Issues in 2003–2019 observed in every year from t_0 to $t_0 + 5$ and whose debt does not fall below 10 percent of its level at the end of $t_0 - 1$. Each issue is weighted by one over the number of its country's issues in the cell, so that countries count equally, over countries with at least ten issues in the cell; standard errors clustered by firm in parentheses. Firm-level sample: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ.

	United States		Advanced ex-U. S.		Emerging	
	Issue year	Next five years	Issue year	Next five years	Issue year	Next five years
Bonds						
New bonds	57.9	13.9	58.4	27.8	55.8	28.2
	(0.9)	(1.5)	(1.5)	(2.1)	(2.0)	(2.8)
Retired early or at maturity	-5.3	-9.7	-1.4	-17.7	-0.3	-16.8
	(0.4)	(0.9)	(0.2)	(1.1)	(0.1)	(1.5)
Paydowns	-5.5	-3.3	-0.5	-19.2	-0.1	-20.9
	(0.5)	(1.0)	(0.1)	(1.1)	(0.0)	(1.7)
Change in bonds	40.8	-0.4	53.7	-11.5	55.0	-12.6
	(1.0)	(1.4)	(1.6)	(1.6)	(2.1)	(2.3)
Loans						
New loans and revolver draws	-4.0	-28.1	-6.4	-39.1	-15.1	-41.6
	(0.7)	(2.0)	(1.3)	(3.4)	(1.8)	(5.5)
Retired early or at maturity	1.0	18.2	-0.5	23.5	5.0	35.3
	(0.4)	(1.3)	(1.1)	(2.3)	(1.7)	(4.2)
Paydowns	-1.7	16.5	-0.3	31.5	-1.7	31.7
	(0.4)	(0.9)	(0.7)	(1.5)	(1.3)	(2.7)
Change in loans	-5.8	5.7	-12.0	20.3	-14.3	23.0
	(0.8)	(1.2)	(1.6)	(2.5)	(2.5)	(4.0)
Issues	1,859		2,735		1,367	
Countries	1		21		11	

Table A.14: How the jump is given back: contributions to the bond share. This table decomposes the change in the bond share of firms making a large bond issue minus the average change of their matched peers, in percentage points, in the issue year and summed over the five following years, exactly into the contributions of transactions: a flow f of type j (bonds or loans) contributes $100\,(\mathbb{1}_{j=\text{bonds}} - s_{t-1})\,f/D_t$, with a negative sign for repayments, where s_{t-1} is last year's bond share and D_t this year's bonds plus loans at last year's exchange rates. Rows: transactions in bonds and in loans, debt acquired or disposed of with subsidiaries, unclassified changes, and exchange-rate revaluation. Peers' contributions are averaged over each issuer's peers (at least two with every year observed). Events: firm-years in the bond-share sample in $t_0 - 1$ and t_0, in country-years with at least ten such firms, without a change of reporting currency, without a large bond issue in the three previous years (years out of the sample count as without), with bonds plus loans of at least USD 1 million at the end of $t_0 - 1$, and in which debt acquired with subsidiaries is at most 10 percent of the previous year's debt. Matched peers: the five firms (at least three) with the bond share at the end of $t_0 - 1$ closest to the issuer's, and any equally close, within 5 percentage points, among the firms of the same country, industry (SIC division), and asset tercile at the end of $t_0 - 1$ (where fewer than three qualify, the same country and asset tercile) that have no bond issue in t_0, no large bond issue in the three previous years and pass the same debt screens; peers are chosen on information up to t_0 only, and their average in each year is over those in the sample that year. The gap is the issuer's bond share minus the peers' average, in percentage points. Issues in 2003–2019 observed in every year from t_0 to $t_0 + 5$ and whose debt does not fall below 10 percent of its level at the end of $t_0 - 1$. Each issue is weighted by one over the number of its country's issues in the cell, so that countries count equally, over countries with at least ten issues in the cell; standard errors clustered by firm in parentheses. Firm-level sample: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ.

	United States		Advanced ex-U. S.		Emerging	
	Issue year	Next five years	Issue year	Next five years	Issue year	Next five years
Bonds						
New bonds	20.9	-1.3	42.7	7.5	44.3	8.9
	(0.6)	(0.5)	(1.1)	(1.0)	(1.5)	(1.5)
Reopenings	-0.2	0.3	-0.1	1.2	-0.3	1.8
	(0.0)	(0.1)	(0.0)	(0.2)	(0.2)	(0.3)
Retired early or at maturity	-0.8	-2.5	-0.3	-6.9	-0.2	-8.8
	(0.1)	(0.3)	(0.0)	(0.5)	(0.1)	(0.8)
Paydowns	-0.8	-1.0	0.1	-8.4	0.2	-9.7
	(0.2)	(0.4)	(0.0)	(0.6)	(0.1)	(1.1)
Loans						
New loans and revolver draws	1.1	-9.4	-0.1	-26.3	0.1	-29.9
	(0.3)	(0.9)	(0.1)	(1.1)	(0.2)	(1.7)
Other increases	0.1	-0.1	0.1	-5.4	0.0	-6.1
	(0.0)	(0.1)	(0.0)	(0.5)	(0.0)	(0.8)
Retired early or at maturity	0.4	3.8	0.1	11.4	0.0	12.7
	(0.1)	(0.5)	(0.0)	(0.7)	(0.0)	(1.3)
Paydowns	-0.2	3.4	-0.1	9.7	-0.0	10.5
	(0.2)	(0.5)	(0.1)	(0.7)	(0.0)	(0.9)
Other						
Acquired and disposed debt	-0.2	-0.2	-0.0	-4.2	-0.1	-4.1
	(0.1)	(0.3)	(0.0)	(0.7)	(0.1)	(0.9)
Unclassified changes	-0.6	0.4	-0.1	4.3	-0.2	3.7
	(0.2)	(0.3)	(0.1)	(0.8)	(0.2)	(1.1)
Exchange-rate revaluation	0.0	-0.0	-0.0	0.0	-0.0	-0.1
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.1)
Change in the bond share	19.7	-6.6	42.3	-16.9	43.9	-21.1
	(0.7)	(0.8)	(1.1)	(1.3)	(1.5)	(2.0)
Issues	1,895		2,791		1,401	
Countries	1		21		12	

Table A.15: The bond share after an issuance wave: estimates. This table reports the coefficients β_h of local projections $S_{c,t+h} - S_{c,t-1} = \beta_h\, wave_{ct} + \gamma_1 wave_{c,t-1} + \gamma_2 wave_{c,t-2} + \alpha_c + \varepsilon_{ct}$ of the change in each country's bond share from the year before a wave year, in percentage points, by year relative to the wave year, for the debt-weighted and the equal-weighted average of firms' bond shares over firms in the sample in both years, without and with year fixed effects, with Driscoll–Kraay standard errors (Driscoll and Kraay, 1998) with a bandwidth of $\max(2, h+1)$ years in parentheses. A wave year is a year in which the percentage of the country's firms with a large bond issue (new bonds of at least 15 percent of the previous year's bonds plus loans) is above the 67th percentile of its values in the country's previous seven years (at least five observed), so that wave status starts in 2008. Country-years with at least 20 firms in the sample in both years; each horizon uses the country-years in which the change to $t+h$ is observed. Countries: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ.

	Years after the wave year				
	0	1	2	3	4
Equal-weighted	1.14	1.43	1.10	0.73	0.84
	(0.13)	(0.27)	(0.29)	(0.21)	(0.27)
Debt-weighted	1.27	1.16	1.06	0.48	0.89
	(0.34)	(0.51)	(0.32)	(0.21)	(0.31)
Equal-weighted, year effects	1.15	1.45	1.26	1.03	1.04
	(0.14)	(0.28)	(0.34)	(0.35)	(0.40)
Debt-weighted, year effects	1.20	1.20	1.54	1.09	1.31
	(0.34)	(0.57)	(0.47)	(0.36)	(0.42)
Country-years (h = 0)			780		
Countries			57		

Table A.16: Who moves the aggregate bond share: equal-weighted bond share. This table reports, for each piece of the annual change in the equal-weighted average of firms' bond shares in each country (every firm has the same weight, so the between-firm term is zero), its share of the variance of the annual changes (Variation), $\mathrm{cov}(c_k, \Delta S)/\mathrm{var}(\Delta S)$, and its share of the country's firms (Firms), computed within each country and averaged with equal weights over countries; standard errors clustered by country in parentheses (robust standard errors for the U. S.). Each year's change in each country's bond share is decomposed exactly following Melitz and Polanec (2015): surviving firms (in the sample in both years) contribute the change in their own bond share, excluding exchange-rate revaluation, at their average weight among surviving firms (within firm), the revaluation term, and the change in their weights (between firms); entering and exiting firms contribute the difference between their bond share and that of the surviving firms, times their share of debt. The within-firm term is split by each firm's status in the year, using information up to that year only: a large bond issue (new bonds of at least 15 percent of the previous year's bonds plus loans); no large issue this year but one in the previous five years; neither, with all five previous years observed, and bonds the previous year; the same without bonds the previous year; neither, with fewer than five previous years observed. Country-years 2003–2024 with at least 20 surviving firms, in countries with at least ten such years. Countries: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ.

	United States			Advanced ex-U. S.			Emerging			All countries		
	Variation	Firms	Cumulative (pp)	Variation	Firms	Cumulative (pp)	Variation	Firms	Cumulative (pp)	Variation	Firms	Cumulative (pp)
Surviving firms, within firm												
Large bond issue this year	0.26	0.15	41.1	0.32	0.08	29.3	0.27	0.05	20.1	0.29	0.06	24.7
	(0.06)			(0.03)			(0.03)			(0.02)		
One to five years after a large issue	0.23	0.21	-21.1	0.16	0.13	-13.3	0.16	0.08	-10.9	0.16	0.10	-12.1
	(0.06)			(0.02)			(0.03)			(0.02)		
Other firms with bonds	0.05	0.06	-3.8	0.04	0.06	-2.9	0.07	0.04	-1.9	0.06	0.05	-2.4
	(0.02)			(0.01)			(0.02)			(0.01)		
Firms without bonds last year	0.01	0.08	1.1	0.01	0.23	2.1	0.01	0.25	1.2	0.01	0.24	1.6
	(0.01)			(0.00)			(0.01)			(0.00)		
Fewer than five earlier years observed	0.04	0.22	-13.9	0.14	0.30	-4.8	0.14	0.34	-2.7	0.14	0.32	-3.9
	(0.03)			(0.02)			(0.03)			(0.02)		
Gap in the sample (bridged)	0.13	0.19	-2.0	0.06	0.15	0.1	0.08	0.17	-0.1	0.07	0.16	-0.0
	(0.03)			(0.01)			(0.01)			(0.01)		
Exchange-rate revaluation	-0.00		0.0	-0.00		-0.0	-0.00		0.0	-0.00		-0.0
	(0.00)			(0.00)			(0.00)			(0.00)		
Surviving firms, between firms												
Between firms (debt weights)	0.00		0.0	0.00		0.0	0.00		0.0	0.00		0.0
	(0.00)			(0.00)			(0.00)			(0.00)		
Coverage												
Entry into the sample	0.04	0.08	-5.8	0.13	0.07	-8.0	0.15	0.08	-5.9	0.14	0.08	-6.9
	(0.02)			(0.03)			(0.03)			(0.02)		
Exit from the sample	0.25	0.11	2.4	0.14	0.06	4.7	0.11	0.05	1.6	0.13	0.06	3.0
	(0.04)			(0.02)			(0.01)			(0.01)		
Change in the bond share			-1.9			7.2			1.5			4.1
Countries		1			26			30			57	
Country-years		22			572			642			1,236	

Table A.17: Firms' own jumps and their timing: the group's average. This table compares the within-firm part of the annual change in the group's bond share (the average with equal weights over the group's countries of each country's within-firm change in each year, excluding exchange-rate revaluation) with its counterfactuals if the timing of countries or of firms were independent. Rows: the variance of the within-firm part relative to the actual, and the shares of its variance due to firms in the year of a large bond issue (new bonds of at least 15 percent of the previous year's bonds plus loans) and in that year or the five following years; debt-weighted bond share within countries in the upper block, equal-weighted in the lower block. Countries shifted: each country's sequence of within-firm changes, with the parts due to firms in the year of a large bond issue and in the five following years, is shifted circularly by a random number of years within each spell of consecutive years, independently across countries; this removes common timing across countries but keeps it within countries. Firms shifted: each firm's sequence of within-firm terms is shifted circularly by a random number of years within each spell in the sample, independently across firms, which removes common timing both across firms within a country and across countries. Mean over 500 replications, 5th and 95th percentiles in brackets. Country-years 2003–2024 with at least 20 surviving firms, in countries with at least ten such years. Countries: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; bond share: bonds over bonds plus loans (term loans, revolving credit, and mortgages). Source: S&P Capital IQ.

	Advanced ex-U. S.			Emerging			All countries		
	Actual	Countries shifted	Firms shifted	Actual	Countries shifted	Firms shifted	Actual	Countries shifted	Firms shifted
Debt-weighted share within countries									
Variance of the aggregate, relative to actual	1.00	0.15	0.11	1.00	0.47	0.39	1.00	0.18	0.14
		[0.08, 0.23]	[0.06, 0.17]		[0.28, 0.75]	[0.23, 0.61]		[0.10, 0.28]	[0.08, 0.22]
Share of its variation: large bond issue this year	0.40	0.42	0.42	0.60	0.47	0.46	0.48	0.45	0.45
		[0.27, 0.58]	[0.24, 0.61]		[0.30, 0.64]	[0.26, 0.65]		[0.28, 0.62]	[0.25, 0.64]
Share of its variation: issue year and five years after	0.60	0.65	0.68	0.71	0.67	0.66	0.64	0.66	0.67
		[0.50, 0.79]	[0.50, 0.86]		[0.48, 0.84]	[0.49, 0.83]		[0.50, 0.83]	[0.49, 0.83]
Equal-weighted share within countries									
Variance of the aggregate, relative to actual	1.00	0.58	0.29	1.00	0.65	0.51	1.00	0.38	0.25
		[0.32, 0.90]	[0.16, 0.46]		[0.38, 0.99]	[0.29, 0.81]		[0.21, 0.57]	[0.14, 0.40]
Share of its variation: large bond issue this year	0.45	0.45	0.44	0.56	0.44	0.37	0.51	0.45	0.38
		[0.32, 0.59]	[0.20, 0.65]		[0.28, 0.59]	[0.19, 0.57]		[0.30, 0.60]	[0.19, 0.59]
Share of its variation: issue year and five years after	0.77	0.64	0.64	0.89	0.69	0.58	0.86	0.67	0.60
		[0.51, 0.78]	[0.46, 0.82]		[0.54, 0.83]	[0.40, 0.74]		[0.53, 0.81]	[0.43, 0.79]

Table A.18: The foreign-currency share of firms with bonds and loans and of loan-only firms. This table compares, for each group of countries, the foreign-currency share of the debt and of the loans of firms that hold both bonds and loans with that of firms that hold only loans, in percent, and their difference, in percentage points. The foreign-currency share is the share of debt with a known currency not denominated in the home currency of the firm's ultimate parent; firms with bonds and loans hold both with a known currency, loan-only firms hold loans but no bonds with a known currency. Each share is computed within a country, weighting firm-years by their debt in U. S. dollars, and averaged with equal weights over countries with at least 50 firm-years in each group. The lower block reports the difference in the foreign-currency share of debt within thirds of the country-year's firms by total assets, averaged over country-thirds with at least 30 firm-years in each group; the number of these with a positive difference and their total in parentheses. Sample: firm-years in the bond-share sample, in country-years with at least ten such firms, 2002–2024. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, assigned to the country of the ultimate parent, fiscal years 2002–2024, firm-years passing the data-quality screen; loans: term loans, revolving credit, and mortgages. Source: S&P Capital IQ; total assets from Compustat and Worldscope.

	United States	Advanced ex-U. S.	Emerging
Foreign-currency share of debt (%)			
Firms with bonds and loans	4.8	38.2	39.8
Loan-only firms	2.7	23.6	30.5
Difference (pp)	2.1	14.6	9.3
Countries with a positive difference	1	22	22
Foreign-currency share of loans (%)			
Firms with bonds and loans	3.8	31.3	37.6
Loan-only firms	2.7	23.6	30.5
Difference (pp)	1.1	7.7	7.0
Countries with a positive difference	1	20	20
Difference in the foreign-currency share of debt, by firm size (pp)			
Bottom third	-0.0 (0/1)	5.5 (13/25)	4.6 (9/19)
Middle third	-0.7 (0/1)	1.3 (14/26)	0.2 (10/26)
Top third	1.7 (1/1)	13.6 (21/25)	7.3 (19/27)
Countries	1	26	29
Firm-years: with bonds and loans / loan-only	33,803 / 23,212	76,817 / 152,447	33,447 / 157,321

Figure A.1. Coverage of the firm-level data relative to the national accounts. This figure plots the debt of the firms in Capital IQ as a percentage of the corresponding debt of nonfinancial corporations in the national accounts, for the United States (solid line), advanced economies (dashed line), and emerging economies (dashed line with crosses). Panel (a) plots bonds: firms' bonds and commercial paper relative to the national accounts' debt securities on a nationality basis, that is, the debt securities of resident nonfinancial corporations less their international debt securities (floored at zero), plus the international debt securities of all issuers whose ultimate parent is a nonfinancial corporation in the country (residence basis where no nationality series is available: Poland before 2011, Romania 2007–2019, and Croatia 2022–2024). Panel (b) plots loans: firms' term loans, revolving credit, mortgages, and other borrowings, excluding leases, relative to the national accounts' loans of nonfinancial corporations, non-consolidated (for the United States, the loans of nonfinancial corporate business in the Federal Reserve's Financial Accounts). Group lines are ratios of sums over countries, chained so that countries entering or leaving the sample do not move the lines: the 2019 level is the ratio over all countries in the group in 2019, and between consecutive years the line moves with the ratio over the countries observed in both. Lines are shown for years with at least four countries in the group. Countries: the U. S., 18 advanced economies other than the U. S., and 10 emerging economies; the emerging-economy line starts in 2003. Firm data: nonfinancial groups in Capital IQ that are their own ultimate parent, with or without balance-sheet data, consolidated and assigned to the country of the ultimate parent, plus subsidiaries not consolidated by their parent, assigned to their own country, excluding apparent unit errors and nonprofit institutions; face value, in U. S. dollars at the period-end exchange rate. Each firm-year is compared with the national accounts at the quarter of its period end (annual stocks moved with quarterly growth), converted at that quarter's end-of-period exchange rate. Source: S&P Capital IQ; OECD financial accounts; BIS debt securities statistics; Federal Reserve Financial Accounts (Z.1); IMF World Economic Outlook.

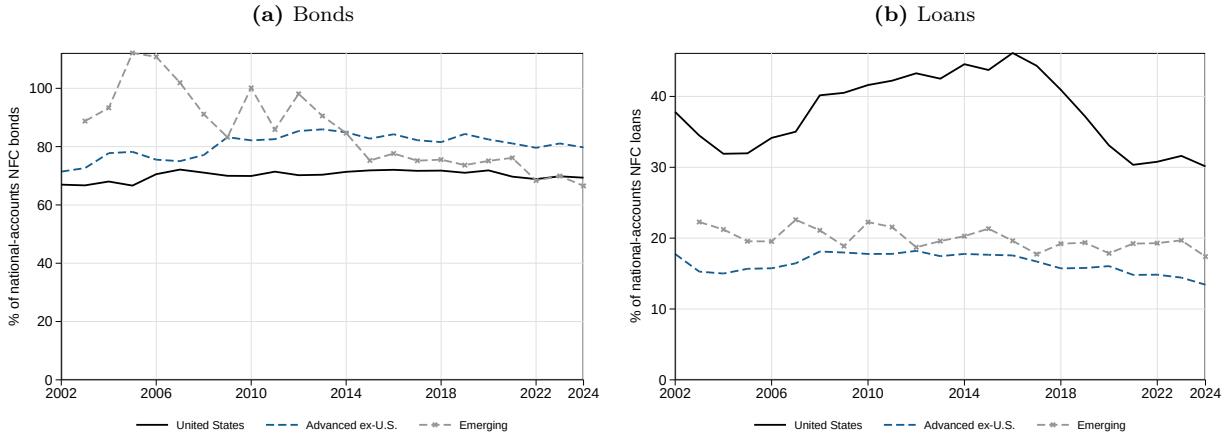


Figure A.2. Firm-level bond shares on the national accounts' definition, countries in both sources. This figure plots the bond share of the debt of the firms in our sample, weighted by each firm's debt (solid line) and with equal weights across firms (dashed line), measured on the national accounts' definition (bonds and commercial paper over all debt except leases), and the bond share of nonfinancial corporations in the national accounts (dashed line with crosses), in percent, for the U. S. (Panel a), advanced economies (Panel b), and emerging economies (Panel c), over the country-years in both sources. All three lines average the countries of the group with equal weights and are chained in the same way: the 2019 level is the average over all countries of the group in 2019, and between consecutive years each line moves with the average change over the countries observed in both years; lines are shown for years with at least four countries. Countries: the U. S., 18 advanced economies other than the U. S., and 10 emerging economies; the emerging-economy line starts in 2004; financial centres are left out. Source: S&P Capital IQ; OECD financial accounts; Federal Reserve Financial Accounts (Z.1).

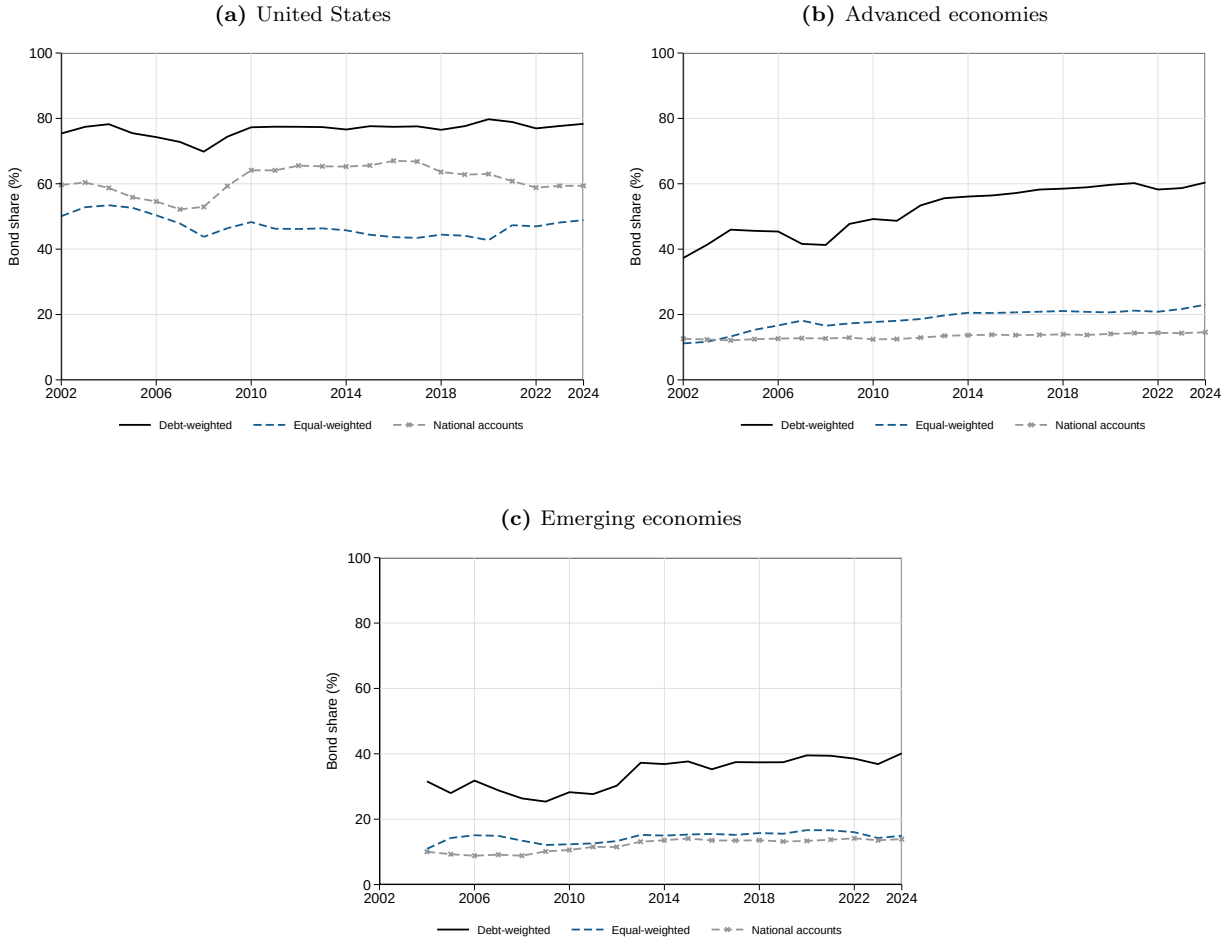


Figure A.3. The bond share of firms making a large bond issue relative to three targets. This figure plots the bond share of firms making a large bond issue minus three targets, in percentage points, by year relative to the issue. The targets are the matched peers' average, the average of all peers with bonds at the end of $t_0 - 1$ in the issuer's country, industry, and asset tercile (at least five), and the issuer's own average bond share over its sample years up to two years before the issue (at least three years). Each comparison uses the issues for which its target exists. Issues are in 2003–2019, and each point averages the issues observed in that year. Appendix A.4 defines the events and the matched peers. Each point is the average over countries, with equal weights, of the country's average, over countries with at least ten issues in the year. Firm-level sample: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Source: S&P Capital IQ.

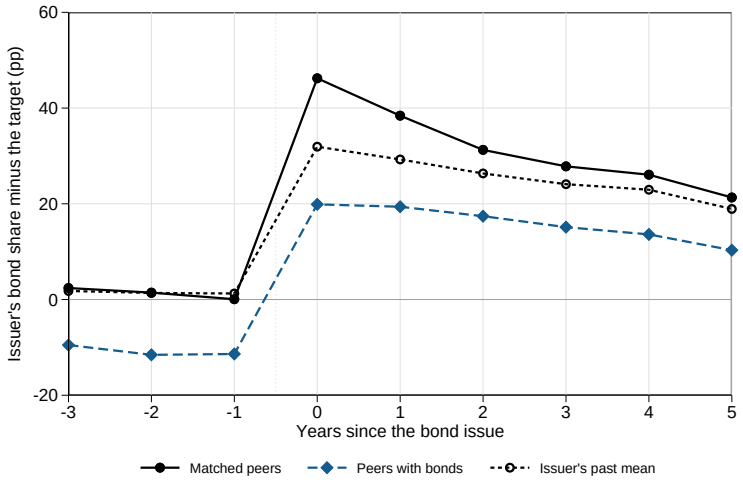
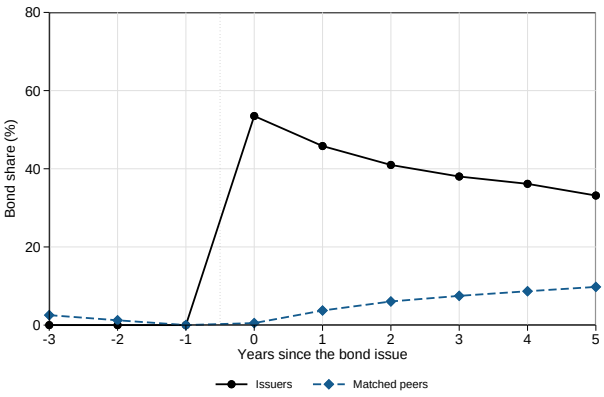


Figure A.4. The bond share of first-time and continuing bond issuers and of their peers. This figure plots the bond share of firms making a large bond issue and the average bond share of their matched peers, in percent, by year relative to the issue, for issuers without bonds in any earlier sample year (Panel a) and for issuers with bonds in an earlier year (Panel b). Issues are in 2003–2019, and each point averages the issues observed in that year. Appendix A.4 defines the events and the matched peers. Each point is the average over countries, with equal weights, of the country's average, over countries with at least ten issues in the year. Firm-level sample: the U. S., 26 advanced economies other than the U. S., and 30 emerging economies. Source: S&P Capital IQ.

(a) First-time issuers



(b) Continuing issuers

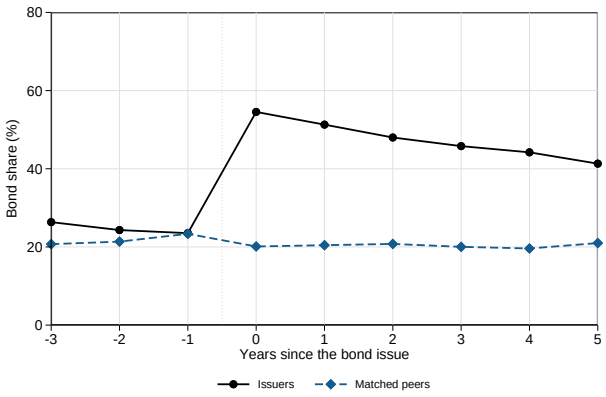
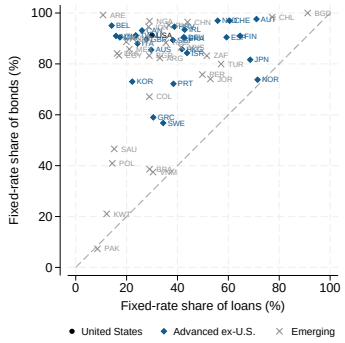
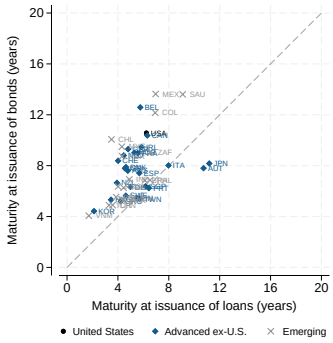


Figure A.5. Fixed rates and maturity of bonds and loans, and around a large bond issue. Panels (a) and (b) plot, for each country, the fixed-rate share (percent) and the maturity at issuance (years) of firms' bonds (vertical axis) against those of the same firms' loans (horizontal axis). The dashed line is the 45-degree line. The sample is firm-years holding both bonds and loans, 2002–2024. In Panel (a), firm-years are weighted by their bonds plus loans in U. S. dollars, for countries with at least 50 firm-years. In Panel (b), each country's new bonds and new loans are pooled, for countries with at least 50 firm-years with new bonds and 50 with new loans. Panels (c) and (d) plot the change since the year before a large bond issue in the fixed-rate share (percentage points) and the remaining maturity (years) of issuers' bonds plus loans relative to their matched peers, by year relative to the issue, with countries weighted equally; issues are in 2003–2024 and may follow an earlier large issue within three years, and each point averages the issues observed in that year. Appendix A.4 defines the events, the matched peers, the fixed-rate share, and the maturity measures. Source: S&P Capital IQ.

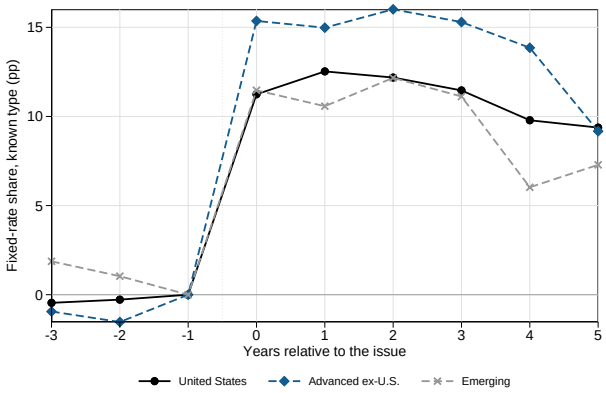
(a) Fixed-rate share, bonds vs loans



(b) Maturity at issuance, bonds vs loans



(c) Fixed-rate share around a large issue



(d) Remaining maturity around a large issue

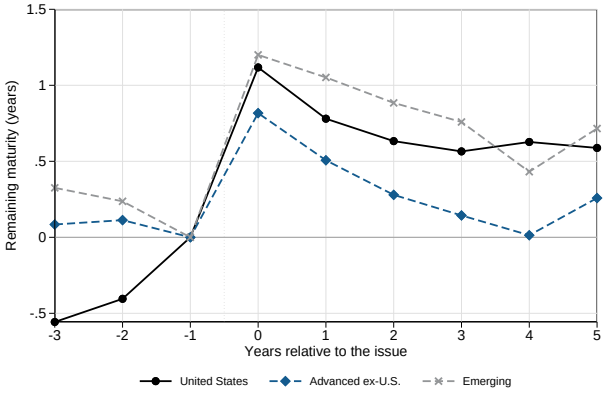


Figure A.6. The fixed-rate share and the remaining maturity of corporate debt, country by country. This figure plots, for each country, the change over 2003–2024 (or the country's years in the sample) in the fixed-rate share of firms' bonds plus loans, in percentage points (Panel (a)), and in their remaining maturity, in years (Panel (b)), as dots, and its parts as bars. Panel (a) decomposes each annual change exactly into the instrument mix (the change in the bonds' part of debt times the difference between the fixed-rate shares of bonds and loans), changes within bonds and within loans, exchange-rate revaluation, and firm entry and exit. All parts except entry and exit are computed over firms in the sample in both years, at the previous year's real exchange rates (adjusted for relative inflation). Panel (b) uses the firm-level decomposition of Figure 10, with x_i firm i's remaining maturity and x_i^b and x_i^l the remaining maturities of its bonds and loans. Remaining maturity includes the shortening of existing instruments as they age. Positive and negative parts are stacked separately. Countries are ordered by group and, within group, by the change. Appendix A.4 defines the fixed-rate share and remaining maturity. Source: S&P Capital IQ.

