

Chapter 2

RESILIENCE IN A TIME OF HIGH DEBT

Indebtedness of households and non-financial corporations in many advanced and emerging market economies is high. In many countries, it is continuing to rise. Highly indebted countries may be vulnerable to financial and real shocks, and such indebtedness may undermine the sustainability of growth in the medium term. Finance supports economic activity and innovation, but it can also increase risks, lower growth, and raise inequality. Whilst indebtedness does not necessarily imply financial distress, it is prudent to scrutinise high indebtedness and changes in the composition of financial portfolios, particularly at a time of exceptionally low, but likely rising, interest rates.

Household and non-financial corporation debt ratios have trended up in many countries from the late 1990s, mostly peaking around 2007/08 and remaining high thereafter with increasing cross-country variation:

- Corporate debt-to-GDP ratios are high in advanced economies relative to historical levels, although they vary considerably across countries. Indebtedness of non-financial firms is particularly high in China, while in other emerging market economies (EMEs), corporate debt-to-GDP ratios are lower than in advanced economies, but catching up. External financing since the financial crisis has seen a switch from bank to bond finance and declining credit quality for new bond issuance. International bond markets have expanded and the share of foreign currency in total bond issuance has increased.
- In advanced economies, household debt remains high relative to income, although a deleveraging has taken place in some countries since the financial crisis. Debt dynamics have increasingly diverged in recent years. In countries with rising household indebtedness, house prices have also increased at a faster pace than incomes and rents, raising sustainability concerns. While household borrowing is generally more modest in EMEs, it has reached a share of GDP comparable to that of advanced economies in a number of East Asian economies.

High indebtedness and the ongoing changes in corporate financing structures may not necessarily lead to financial instability, but they can create vulnerabilities to domestic and external shocks and erode medium-term growth:

- Higher debt ratios increase the sensitivity of balance sheets to increases in interest rates. As central banks in major advanced economies curtail their asset purchase programmes, corporates' increasing reliance on debt securities entails rollover and liquidity risks. Higher cross-border borrowing exacerbates potential international spillovers.
- The deepening of bond markets can be beneficial for firms – increasing funding diversification and lengthening debt maturity – but the post-crisis surge in bond finance has been accompanied by a decrease in credit quality. This makes debt markets more fragile and exposes bond holders to significant risks.

- Risks have migrated from the banking system to other financial institutions and credit intermediaries. This development warrants vigilance, as risks stemming from non-bank financial intermediaries are subject to ongoing debate.
- The efficiency of capital allocation is critical to ensure that corporate debt is sustainable and does not weigh on medium-term growth. However, weak investment since the crisis raises concerns that debt is not being used to enhance long-term productive capacity.
- A number of countries have experienced strong and continuing increases in house prices with a concomitant rise in household debt. High household debt, alongside slow growth of real disposable incomes, raises concerns about the impact of debt service costs on medium-term consumption growth, particularly for lower-income households.

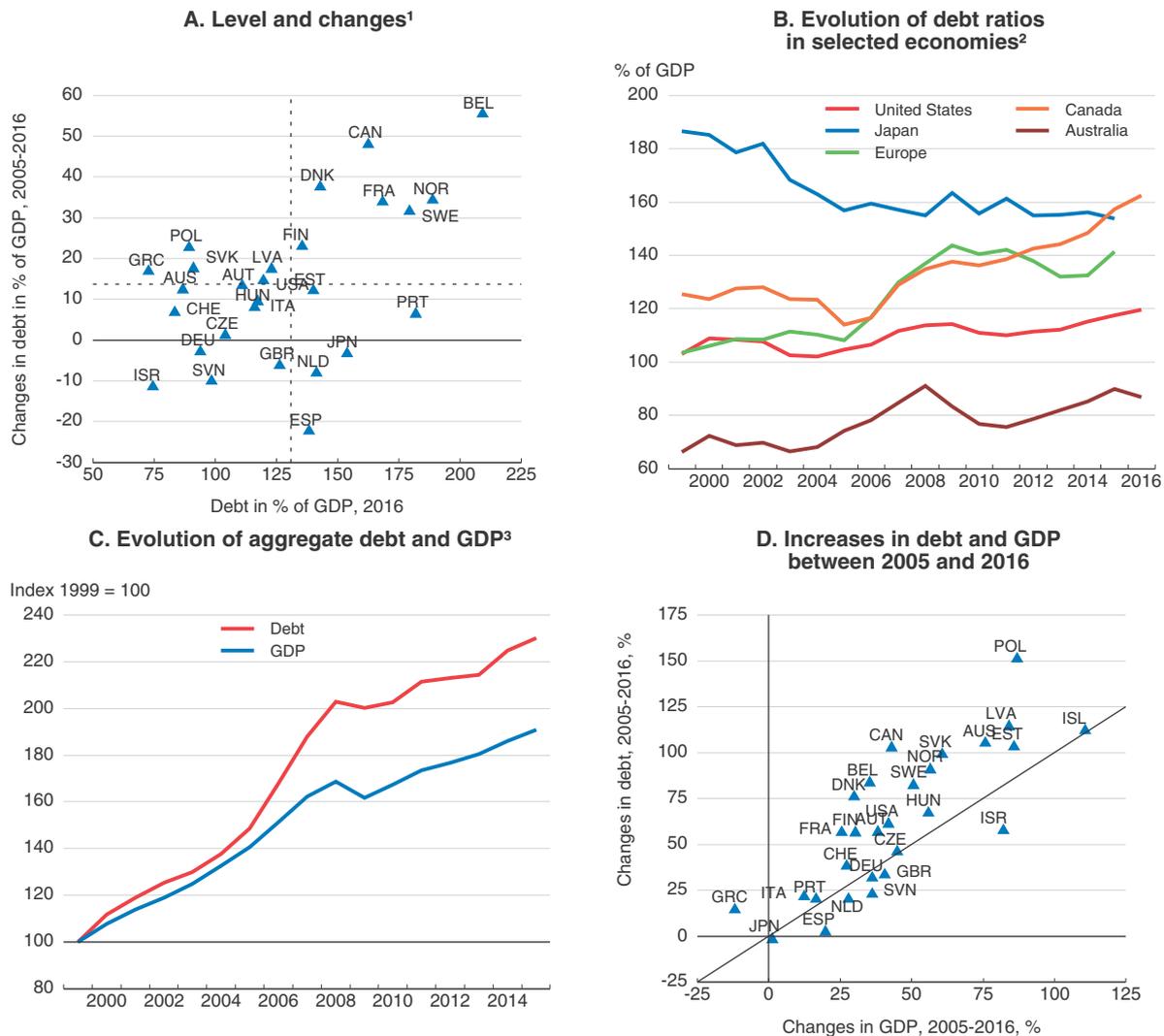
These vulnerabilities require an integrated response to enhance the resilience of economies in the advent of adverse shocks and minimise the risk of sub-par growth in the medium run:

- Enhance use and co-ordination of prudential policies to prevent unsustainable credit dynamics, without penalising growth.
- Step up coordinated monitoring and supervision of non-bank activities, including capital structures of shadow banks and the use of off-balance sheet instruments.
- Reduce implicit home ownership subsidies and mortgage interest deductibility. Evaluate whether expanding housing supply would attenuate pressures on house prices.
- Strengthen the incentives to develop equity finance by reducing the debt bias in corporate taxation and fostering competition in equity markets (venture capital, IPO).
- Enhance the efficiency of capital re-allocation by improving insolvency regimes and ensuring that state-owned enterprises do not benefit from undue competitive advantages.
- Improve the quality of institutions to enhance growth and resilience. Foster financial literacy to allow more households to assess the costs and benefits of financial exposure.

This chapter focusses on the household and non-financial corporate sectors, leaving aside the rise of the government debt-to-GDP ratio in most advanced economies. While all sectors are interdependent and high public debt can be an important source of vulnerability, the non-financial private sector most closely corresponds to economic productive activity, and households are the ultimate recipients of income streams and the main drivers of consumption in the economy.

Debt ratios in the household and non-financial corporation sectors rose in the late 1990s, stabilising at historically high levels at the onset of the crisis

Household and non-financial corporation (NFC) debt ratios in the OECD economies have risen since the late 1990s, although with considerable differences across countries. Despite some deleveraging in recent years, the indebtedness of households and non-financial businesses remains at historically high levels in many countries, and continues to increase in some. Aggregate figures mask significant differences in cross-country trajectories (Figure 2.1, Panels A and B). Corporate and household debt ratios are positively correlated, suggesting that, in some economies, such as Canada and the Scandinavian countries, risks from high borrowing span both sectors (Figure 2.1, Panel C).

Figure 2.2. **Non-financial corporation debt in advanced countries**

Note: Luxembourg (410; 217), Ireland (351; 203) and Iceland (257; 3) are not displayed in Panel A. Chile (142; 216), Ireland (56, 271), Luxembourg (80; 284) and Mexico (93; 214) are not displayed in Panel D.

1. Dotted lines are for medians.

2. The countries included for Europe are: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden and Switzerland.

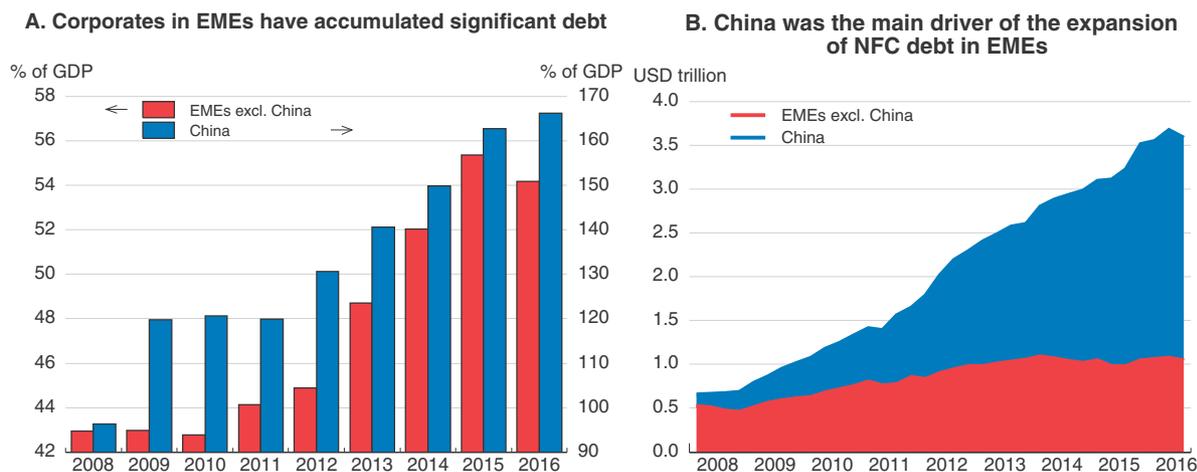
3. Simple average of Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Japan, Netherlands, Norway, Portugal, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom and the United States.

Source: OECD calculations.

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Debt-to-GDP ratios of NFCs in EMEs have increased strongly since the crisis, albeit mostly from low levels compared to advanced economies (Figure 2.3). The aggregate debt accumulation in EMEs was primarily driven by China, where debt rose from less than 100% of GDP at the end of 2008 to 170% by early 2016, partly due to state-owned enterprises (OECD, 2017d). The rise of EME corporate debt has occurred amid a significant monetary expansion in advanced economies, a deepening of international debt markets and higher appetite for risk reflected in lower risk spreads.

Figure 2.3. Credit and bond issuance in EMEs



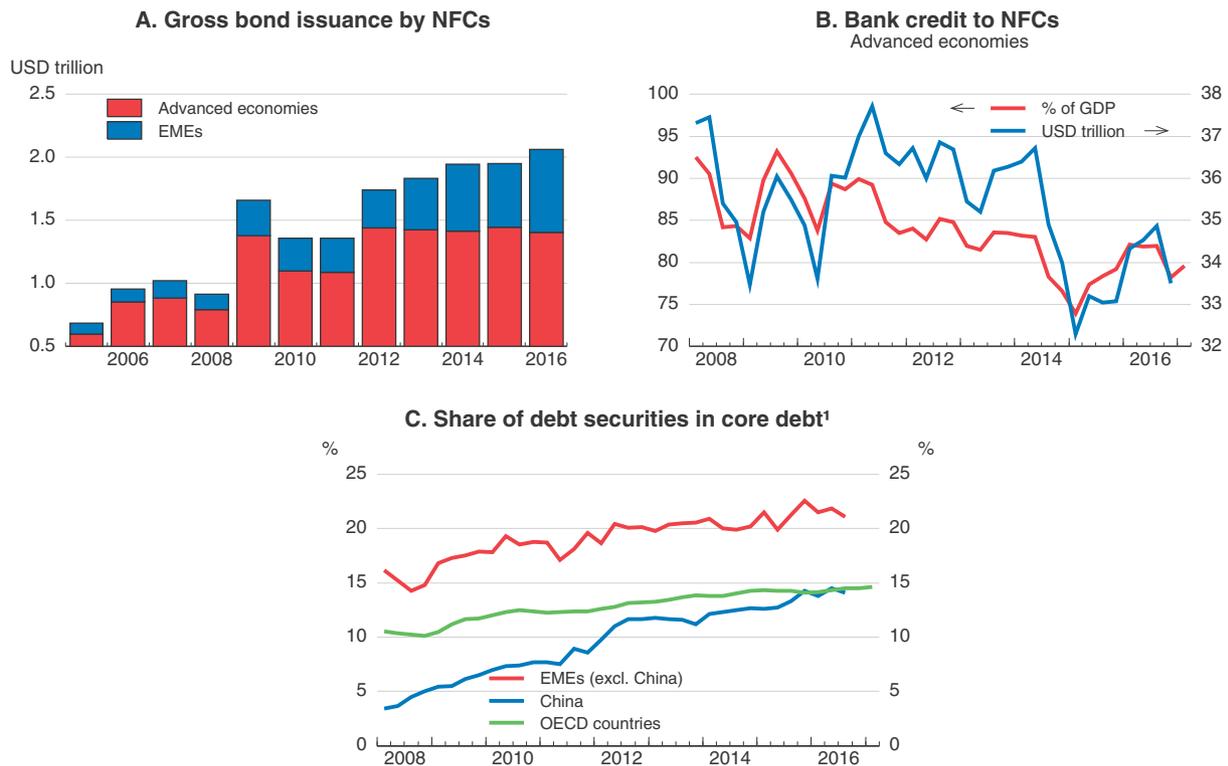
Note: Corporate debt for major EMEs. Countries included are Brazil, Chile, China, Colombia, Hong-Kong - China, Hungary, Indonesia, India, Mexico, Malaysia, Poland, Russia, Singapore, South Africa, Thailand and Turkey. Debt includes total credit to non-financial corporations issued by all sectors and outstanding debt securities.

Source: Bank for International Settlements.

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Accommodative monetary policy in the major advanced economies has lowered interest rates, providing firms in both advanced and emerging market economies with greater incentives and opportunities to increase leverage. To different extents, corporations in EMEs also benefitted from loose financial conditions in advanced economies via international investors' portfolio rebalancing decisions, leading to strong capital inflows. The post-crisis expansion of corporate debt has been characterised by three distinctive features: a surge in bond finance, an increase in international bond issuance – in large part denominated in foreign currency – and a deterioration of credit quality:

- **A surge in bond issuance led to a reduction in the share of bank finance:** A steady upsurge in net bond issuance is observable in all advanced economies, including countries like Italy where external finance has historically been based largely on bank credit. In the United States, new bond issuance by non-financial firms accelerated following the crisis: the amount of outstanding debt securities doubled between 2008 and 2016. The rise in NFC bond issuance in EMEs over the same period was even more dramatic, increasing from 120 to 650 USD billion in nominal terms. EMEs net issuance was primarily driven by the Chinese corporate sector. While bank financing still remains the dominant source of external funding for firms in both advanced and emerging market economies, the surge in bond finance has led to a fall in the share of bank lending in total external financing by around 5 percentage points in advanced countries since 2008. The shift to bond finance has been substantial in China, but more modest in other EMEs, where bank lending still accounts for about 80% of core debt and bond finance is only accessible by a limited number of large firms (Figure 2.4).
- **An increase in international issuance and a rise in foreign currency denominated bonds:** After the global financial crisis, bond issuance in foreign markets has become more common practice, even for corporates in advanced economies (Figure 2.5). The recent

Figure 2.4. **The role of bond financing has increased**

Note: Advanced economies comprise Australia, Canada, Czech Republic, Denmark, euro area, Japan, Korea, New Zealand, Norway, Sweden, Switzerland, United Kingdom and United States. EMEs comprise Argentina, Brazil, Chile, China, Colombia, Hong Kong - China, Hungary, India, Indonesia, Israel, Malaysia, Mexico, Poland, Russia, Saudi Arabia, Singapore, South Africa, Thailand and Turkey.

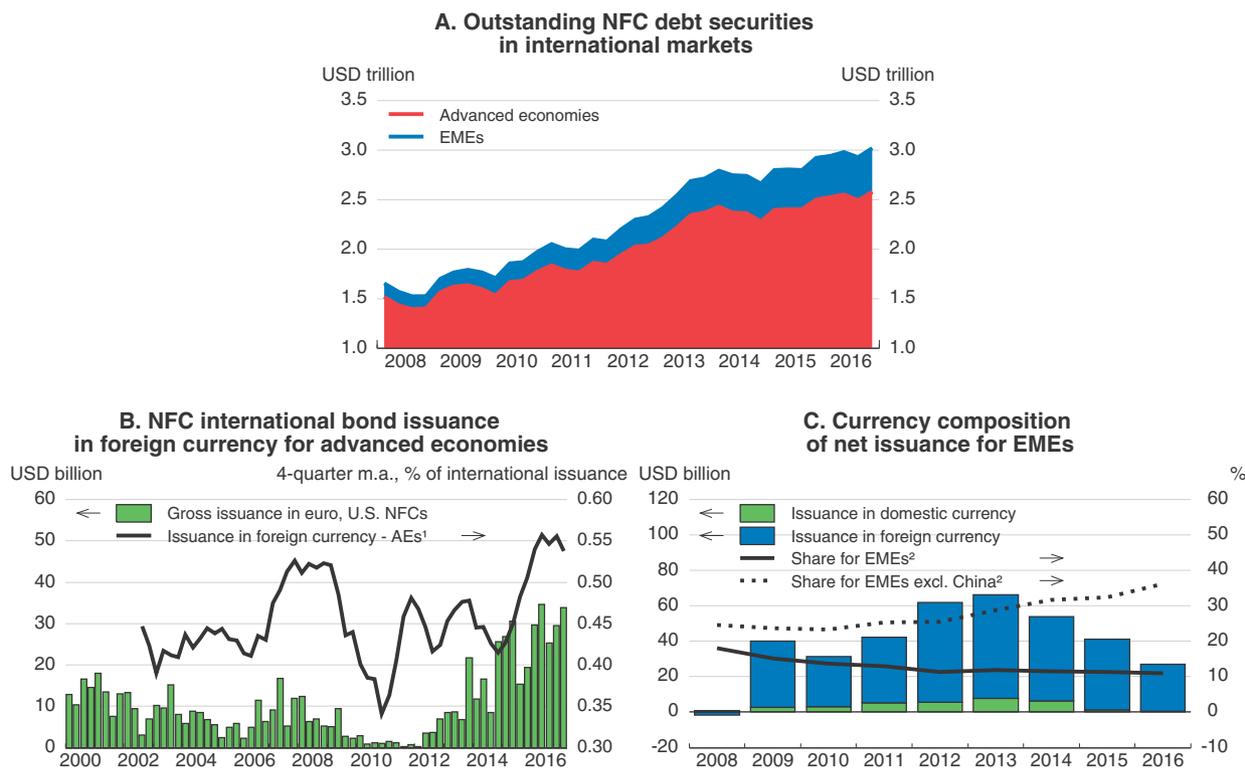
1. Core debt comprises loans, debt securities, and currency and deposits.

Source: OECD Business and Finance Scoreboard; Bank for International Settlements; and OECD calculations.

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rise in international issuance by firms located in countries with relatively stable exchange rates suggests that their primary motivation is to lower funding costs. For example, the increase in euro-denominated foreign currency issuance by US corporates has enabled these companies to take advantage of the relatively low financing cost in European debt markets. International bond issuance also remains relatively common for large EME firms due to the limited development of domestic financial markets. The development and internationalisation of bond markets differs amongst EMEs. The amount of foreign currency denominated bonds outstanding rose significantly in recent years in all EMEs except for China, where corporate bond issues are still primarily in yuan. China's bond issuance has grown exponentially since the financial crisis, but, until recently, has targeted primarily domestic investors.

- **A substantial deterioration in credit quality:** In the context of the protracted period of low interest rates, the post-crisis surge in corporate bond issuance has been accompanied by a substantial increase in risk-taking by bond investors. A strong appetite for risk has encouraged the proliferation of high-risk debt security issuance, such as non-investment grade bonds, and a weakening of covenants (Figure 2.6; BIS, 2017). This deterioration of credit quality has been combined with more favourable conditions for issuers, as shown by the increase in the share of fixed interest rate and callable bonds (Çelik et al., 2015).

Figure 2.5. **International and foreign currency issuance has increased**

Note: Euro includes sum of ECU and legacy currencies now included in the euro for issuances preceding the introduction of the euro. International debt securities are on nationality basis. Advanced economies comprise Australia, Canada, Czech Republic, Denmark, euro area, Japan, Korea, New Zealand, Norway, Sweden, Switzerland, United Kingdom and United States. EMEs comprise Argentina, Brazil, Chile, China, Colombia, Hong Kong - China, Hungary, India, Indonesia, Israel, Malaysia, Mexico, Poland, Russia, Saudi Arabia, Singapore, South Africa, Thailand and Turkey.

1. Share of international issuance in foreign currency.

2. Share of international debt outstanding in foreign currency.

Source: Bank for International Settlements; and OECD calculations.

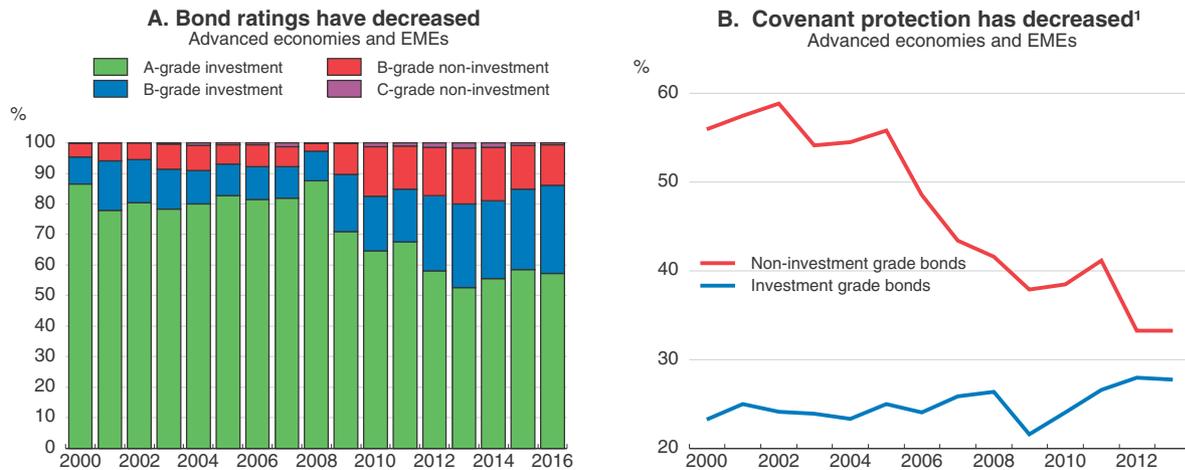
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Stronger investor risk appetite is also reflected in the steady rise in duration risk for traded securities, as newly issued bonds have longer maturities and lower coupon rates, implying a shift forward of the cash flow.²

The broad expansion in debt security markets after the global financial crisis reflects the combination of two factors: a steady retrenchment in bank lending and historically low interest rates. Banks weakened by trading losses and credit provisions during the crisis, as well as affected by stricter prudential regulation and higher capital requirements in its aftermath, trimmed their lending, especially to risky borrowers. In contrast, demand for corporate debt securities expanded considerably in a low interest rate environment, offering NFCs ample alternative financing opportunities.

2. Duration is a measure of the sensitivity of the price of a fixed-income asset to a change in interest rates. Measured in years, the duration corresponds to the average time it takes to receive all the cash flow of the asset. It is therefore affected by the time to maturity and the coupon rate.

Figure 2.6. **Credit quality has deteriorated in advanced economies and EMEs, risks for bond investors have increased**



1. The covenant index is constructed considering a list of 15 covenants which are coded in a binary variable reporting 1 if the covenant type is available in the bond indenture. The sum of the binary variables, divided by 15 and multiplied by 100 generates an index that ranges from 0 to 100, with 100 denoting the highest possible protection for bondholders. It should be noted that this index provides only a rough measure of covenant quality, since the measure changes based only on the existence or non-existence of a given covenant.

Source: OECD Business and Finance Scoreboard; and Çelik et al. (2015), "Corporate Bonds, Bondholders and Corporate Governance", OECD Corporate Governance Working Papers, No. 16, OECD Publishing, Paris.

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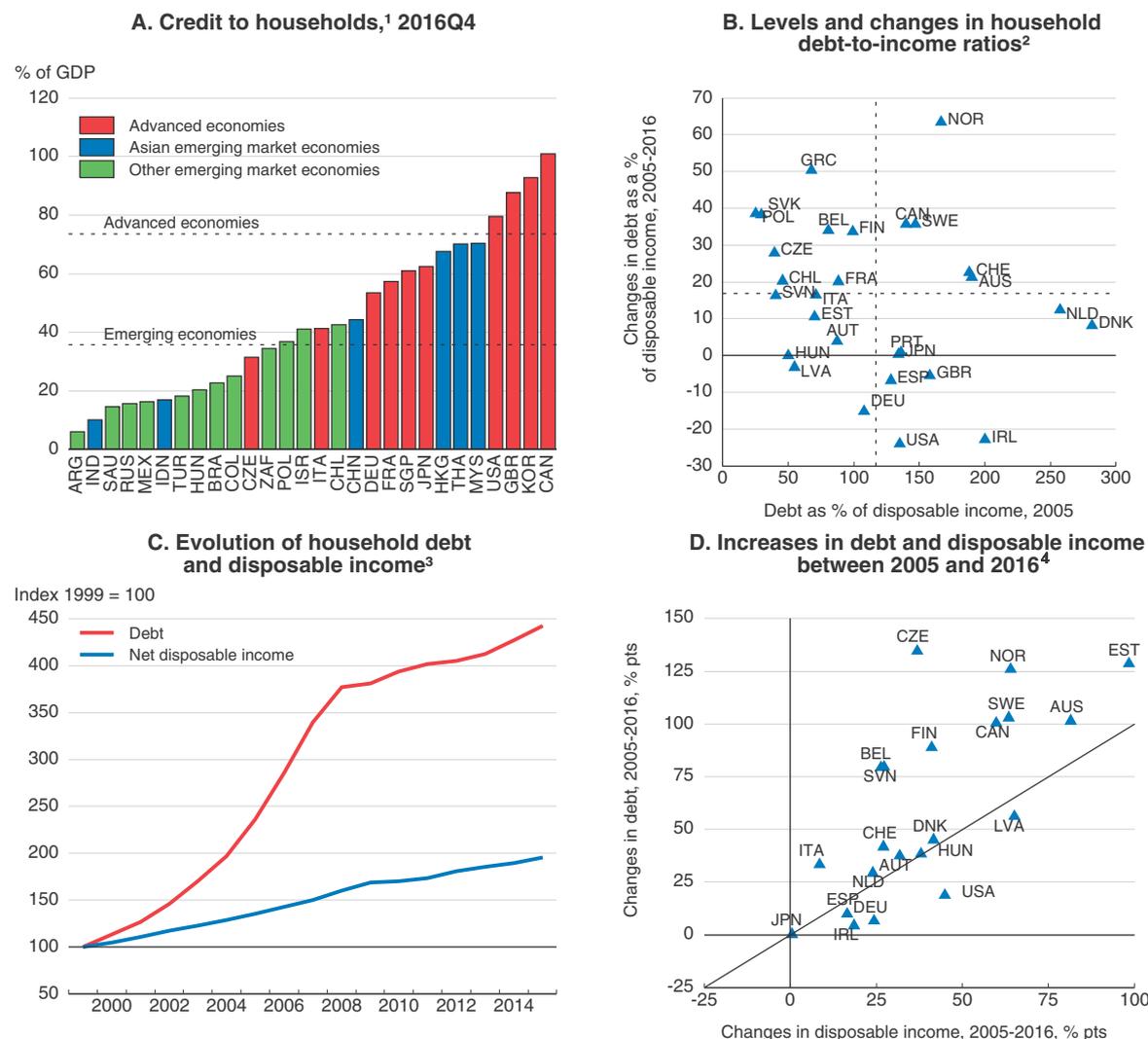
Household debt ratios are high in many advanced economies and have soared in some EMEs

Household debt-to-income ratios rose significantly until 2007 and stabilised thereafter at historically high levels in most advanced economies (Figure 2.7). The rise in the debt-to-income ratio was driven by the acceleration in debt accumulation prior to the crisis, with subdued household income growth impeding deleveraging thereafter. Household debt dynamics over the past decade nevertheless exhibit significant cross-country variation. Indebtedness has continued to rise from high levels in the Scandinavian countries, Australia and Canada, whereas some deleveraging has occurred in a few countries. In EMEs, household credit to GDP remains below advanced economy standards, but it has been buoyant over the last years, particularly in some Asian economies.

In both advanced economies and EMEs, household debt surged in an environment of loose financial conditions and low interest rates. This added to a longer-term trend towards higher household indebtedness due to the development of financial systems and demographic shifts that raise the demand for housing. In EMEs, lower interest rates compared to pre-crisis standards have contributed to the build-up in household debt. The substantial liberalisation and deepening of financial markets since the 1990s, including the increased presence of retail lending-oriented foreign banks, has also facilitated household borrowing.

While mortgages account for the largest share of household debt, consumer loans have expanded rapidly in Korea, the United Kingdom and the United States, creating pockets of risk that warrant vigilance (Figure 2.8). As consumer credit typically consists of

Figure 2.7. Household debt is high in many advanced economies



1. Selected G-20 countries and selected middle-income countries.

2. Dotted lines are for medians.

3. Simple average of Australia, Austria, Belgium, Canada, Czech Republic, Germany, Denmark, Estonia, Finland, Hungary, Italy, Japan, Netherlands, Norway, Slovak Republic, Spain, Sweden, Switzerland and United States.

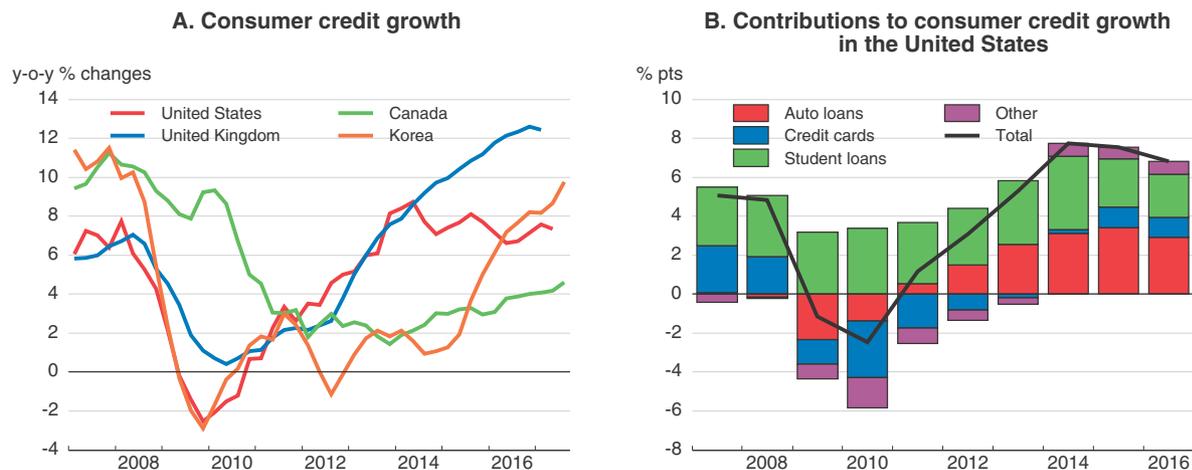
4. Chile (97; 186), Poland (67; 327) and Slovak Republic (55; 257) are not displayed in the chart.

Source: Bank of International Settlements; and OECD calculations.

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unsecured products, lenders are directly exposed to non-repayment risk; as a result, borrowers are charged higher interest rates. Furthermore, the short maturity of consumer credit means that the credit quality of outstanding loans can deteriorate quickly (Bank of England, 2017).

Household indebtedness is uneven across the income distribution. Many highly indebted households tend to have relatively high incomes and wealth. However, low-income indebted households tend to be more leveraged, have a higher debt service cost relative to income and have lower liquidity buffers than more affluent ones (André, 2016). At the same time, lower-income households also tend to have a higher propensity to consume, rendering private consumption expenditure particularly vulnerable to income and wealth shocks (O'Farrell et al., 2016).

Figure 2.8. **Consumer credit is rising in some countries**

Source: Thomson Reuters; Bloomberg; and Federal Reserve.

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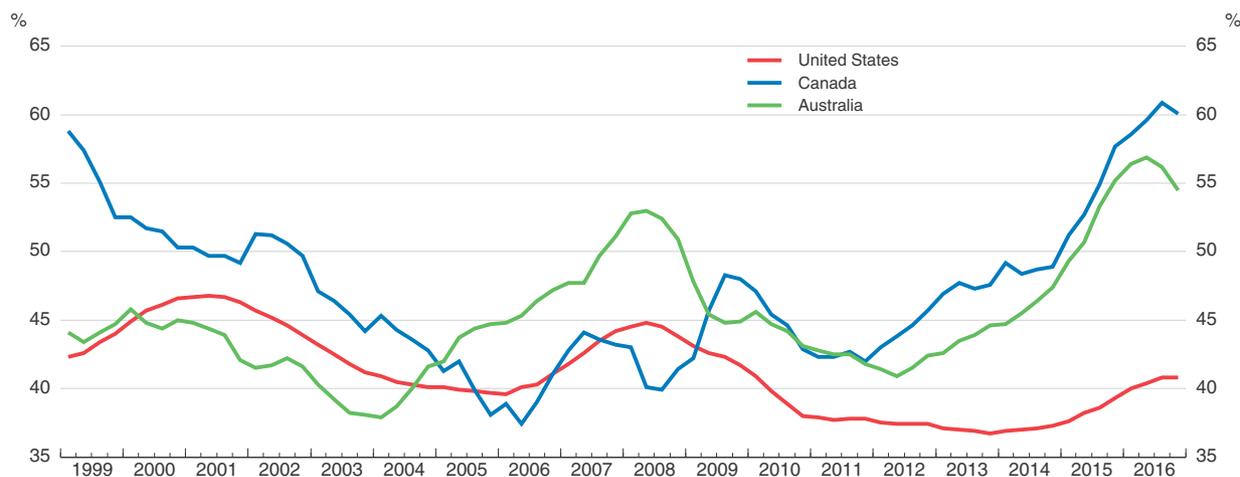
High and rising debt creates vulnerabilities

High debt increases corporate sector vulnerability to financial tightening

The current high levels of debt may not represent an imminent threat to corporates' solvency, but it weakens their ability to withstand demand fluctuations and increases their vulnerability to funding shocks. Further financial tightening could compromise the ability of firms to service debt, if it is not accompanied by a corresponding increase in earnings. Abrupt changes in market risk appetite and liquidity shocks also hamper the safe management of the debt stock. Highly indebted corporates are exposed via a number of channels:

- Higher sensitivity to monetary policy tightening:** for a given maturity structure, higher debt increases the sensitivity of debt servicing costs to any interest rate rises. After having increased in the post-crisis period, the average maturity of corporate debt is likely to decrease in the near term, as the gradual phasing out of central banks' asset purchase programmes is expected to result in a reversal of corporate term premia due to portfolio rebalancing effects (Greenwood et al. 2010; Gagnon et al., 2011; Joyce et al., 2012).³ In some countries, like Australia, Canada and the United States, debt servicing ratios have started to rise, possibly reflecting expectations of future financial tightening (Figure 2.9).

- Even if most central banks have asset purchase programmes primarily focused on the acquisition of sovereign bonds, this also impacts corporate term premia via portfolio rebalancing effects. From a theoretical stand point, central bank purchases of long-maturity assets, like medium-to-long-term government bonds, reduce the average maturity of the stock of bonds held by the private sector causing a fall in the premium required to hold maturity risk (Gagnon et al., 2011). A pre-condition of this formulation is some level of segmentation in bond markets, where investors have a preference for a particular segment of the yield curve (Modigliani and Sutch, 1996). For example, a pension fund or an insurance company that has a preference for long-term assets will buy other assets with a similar maturity, such as corporate bonds, if the relative availability of long-term sovereign bonds is reduced by central bank asset purchase programmes (Joyce et al., 2010).

Figure 2.9. **NFC debt servicing costs are rising in some countries**

Note: The debt service ratio is defined as the ratio of interest payments plus amortisations to income.

Source: Bank for International Settlements.

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- Rollover risks:** with the phasing out of central bank asset purchase programmes, the demand for corporate debt securities in primary markets is expected to decrease, as a consequence of the reversal of the crowding-out effects from market segments where central banks intervened (Duca et al., 2016). Similar effects may occur in EMEs, via the rebalancing of investors' portfolios towards advanced economies and expected rises in risk premia (Neely, 2010; McCauley et al., 2015). For non-bank corporates in EMEs, the rollover risk associated with a decrease in gross issuance can be high; redemptions amounted to about half of the gross issuance of international debt securities in 2016.⁴ Should rollover risk materialise, the ability of NFCs to refinance large proportions of outstanding debt in both advanced and emerging market economies may rely on their ability to switch back to bank credit. Rollover risk is particularly significant for outstanding non-investment grade securities, as demand for this type of asset is more sensitive to a reversal in investor risk appetite. In addition to liquidity risk, corporates willing to roll over existing debt securities in international markets may face exchange rate risk as their currency hedging of principal redemptions may be incomplete (Gruić et al., 2014).

Rising international bond issuance heightens concerns about spillovers and currency mismatch

The expansion of international bond markets may improve access to finance in countries with shallow domestic financial markets, but it can also increase the cross-border transmission of financial conditions and credit risk. For instance, credit risks from highly leveraged Chinese corporates can increasingly spill over to foreign investors following the recent opening up of China's debt market.⁵ International debt markets can help corporate financing costs converge across countries, but they also limit the ability of

4. Bank for International Settlements debt securities statistics.

5. Following the establishment of the so-called bond connect on July 2017, international investors are allowed to trade in Chinese fixed-income securities via Hong Kong.

national authorities to control domestic financial conditions. These effects are likely to have uneven impacts across corporations, as only larger firms typically have access to international financial markets.

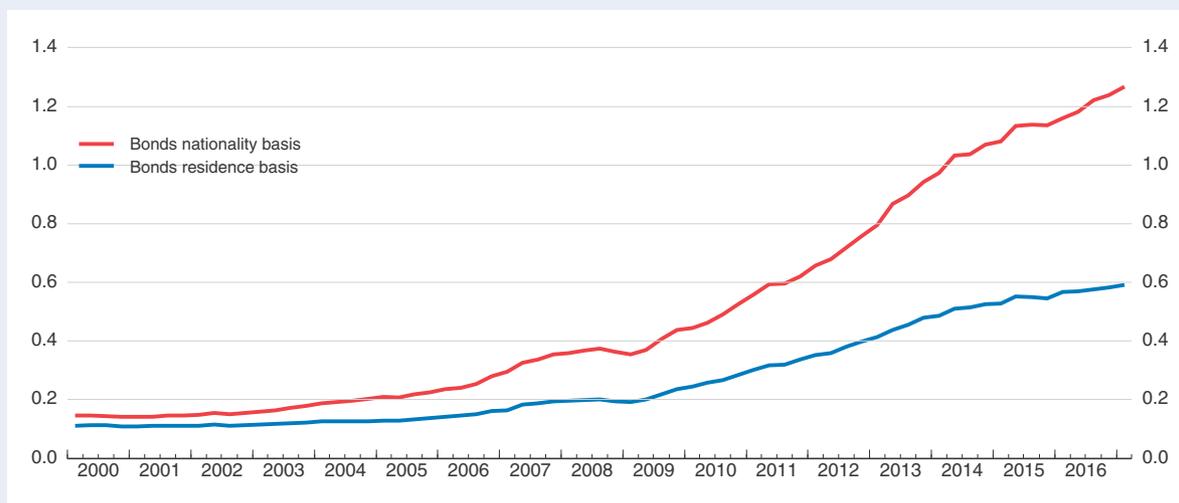
The rise in foreign-currency denominated bond issuance – much of which occurs via foreign subsidiaries⁶ (Box 2.1) – can expose borrowers to currency fluctuations, as a depreciation of the local currency raises borrowing costs relative to domestic revenues. The exchange rate exposure depends on the extent to which financial costs in foreign currency

Box 2.1. The rise of intermediation activities by non-financial firms

NFCs are increasingly issuing debt overseas through foreign affiliates. It is estimated that almost half of international debt securities issuance by non-financial firms of EMEs between 2009 and 2013 was done through foreign affiliates, and since 2013 this type of financing has dominated. The increasing role of foreign affiliates in international bond issuance can be observed in the growing gap between the outstanding bonds of NFCs on a nationality and residence basis. A growing literature has pointed to strong links between NFC issuance via foreign affiliates and carry trades (Bruno and Shin, 2017; Caballero et al., 2015). These activities closely resemble those of banks and may reflect the increased regulation of domestic banks since the global financial crisis. Restrictions on the cross-border activities of banks and other financial transactions create an incentive for regulatory arbitrage. Cross-country studies at both the country and firm-level have found evidence that this type of activity is more prevalent in countries where capital controls are in place (Caballero et al., 2015). This suggests that capital controls should be discussed within the context of a multilateral platform, such as the OECD Codes of Liberalisation.

Difference in non-financial corporations' issuance on a nationality and residence basis, EMEs

Outstanding bonds



Note: EMEs comprise Argentina, Brazil, Chile, China, Colombia, Hong-Kong – China, Hungary, India, Indonesia, Israel, Malaysia, Mexico, Poland, Russia, Saudi Arabia, Singapore, South Africa, Thailand and Turkey.

Source: Bank for International Settlements.

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6. Between 2009 and 2013, almost half of the international debt securities issued by emerging market non-bank private corporations were issued through foreign affiliates (Chui et al., 2014).

Box 2.1. **The rise of intermediation activities by non-financial firms** (cont.)

Carry trade-like operations can occur when foreign affiliates issue bonds in a host country and then use the proceeds to “lend” back to the parent. The parent can use the proceeds to purchase domestic bonds yielding a higher interest rate than the one paid on its international bonds. Overseas funding by NFCs often re-enters the domestic economy as foreign direct investment (FDI), being classified as loans from subsidiaries to their parent. The Banco Central de Brazil estimates that these transactions account for almost 20% of total FDI inflows to Brazil. The possibility of capturing proceeds from international bond issuance by foreign affiliates as FDI (debt) represents a statistical distortion that makes it more difficult to assess the related risks to financial stability. These flows may in fact conceal significant vulnerabilities for NFCs in the form of high rollover and foreign currency risk.

For NFCs engaging in carry trade operations, unhedged exposures in foreign currency are a primary concern. Carry trades associated with credit extensions to non-related companies – if proceeds are held as a financial claim on an unrelated home resident – also involves counterparty risk. From the perspective of bond investors, NFCs carry trades conceal the international dimension of the investment and the additional risks that this entails. Such risk may not be appropriately reflected in bond yields and covenants. From a macroeconomic standpoint, intra-NFC financial intermediation via foreign subsidiaries can be destabilising by allowing the circumvention of capital-flow management measures. From a fiscal standpoint, it can be damaging as it leaves ample room for tax arbitrage, allowing transfer pricing and intentional profit relocation.

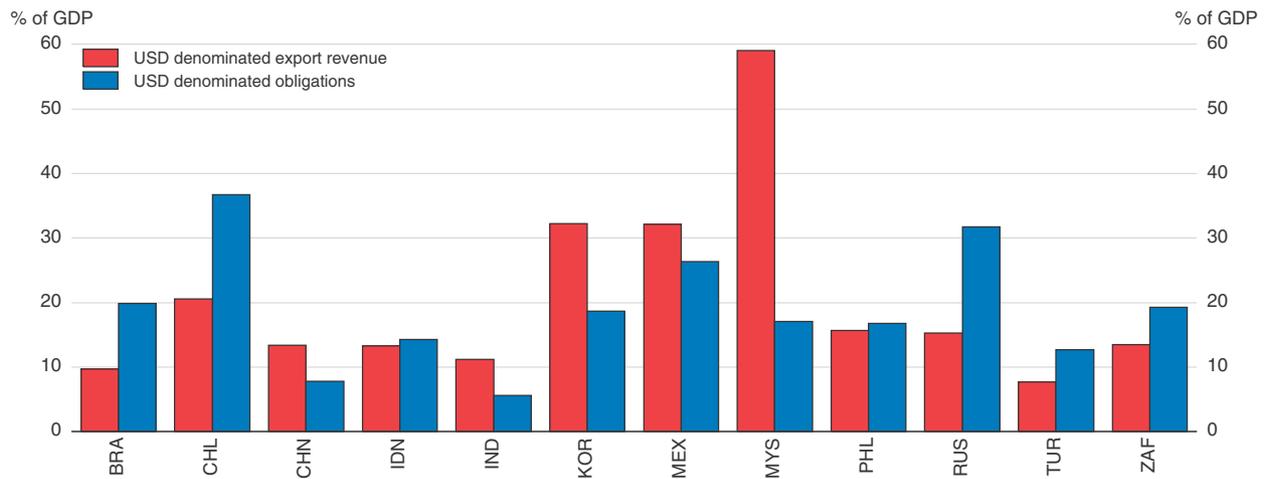
are matched with foreign currency revenues or hedged via financial instruments. Evidence on currency mismatches between NFC revenues and financial costs is scarce, requiring detailed information on the invoicing currency of individual transactions (BIS, 2014). At the country level, there is a gap between dollar-denominated obligations and estimated export revenues in Brazil, Chile, Russia and Turkey (Figure 2.10). Moreover, the use of financial hedging typically rises with the depth of the relevant hedging market, suggesting a more widespread use in advanced economies and in a few EMEs, such as Brazil or Mexico. The rising cost of cross-currency swaps, and thus hedging against the US dollar, might have further pushed corporates into unhedged trades. Finally, even (imperfectly) hedged positions may be exposed to basis risk due to wedges between the underlying positions – for example as a consequence of the standardised maturity of ordinary hedging tools – and to liquidity risk due to mismatches between the hedging costs and revenues received.⁷

Risks have shifted from banks to non-bank financial intermediaries

The development of debt markets improves firms’ access to finance via a diversification of funding sources. This is particularly valuable when bank intermediation weakens, as happened at the onset of the financial crisis.⁸ It also contributes to the deepening of asset markets, resulting in higher diversification possibilities for investors. However, the rising role of market debt finance in corporate funding implies that the risks have increasingly shifted from banking intermediaries to non-bank financial corporates.

7. The ‘basis’ is the difference between the spot price of the underlying asset and the price of a contract (i.e. a future) used for hedging. In foreign currency hedging with standardised instruments (like futures) the difference between the future and spot price can be substantial. Liquidity risks can arise because the two offsetting payments from the underlying asset and the hedge can be staggered.

8. In the context of SME financing, see for example Nassr and Wehinger (2015).

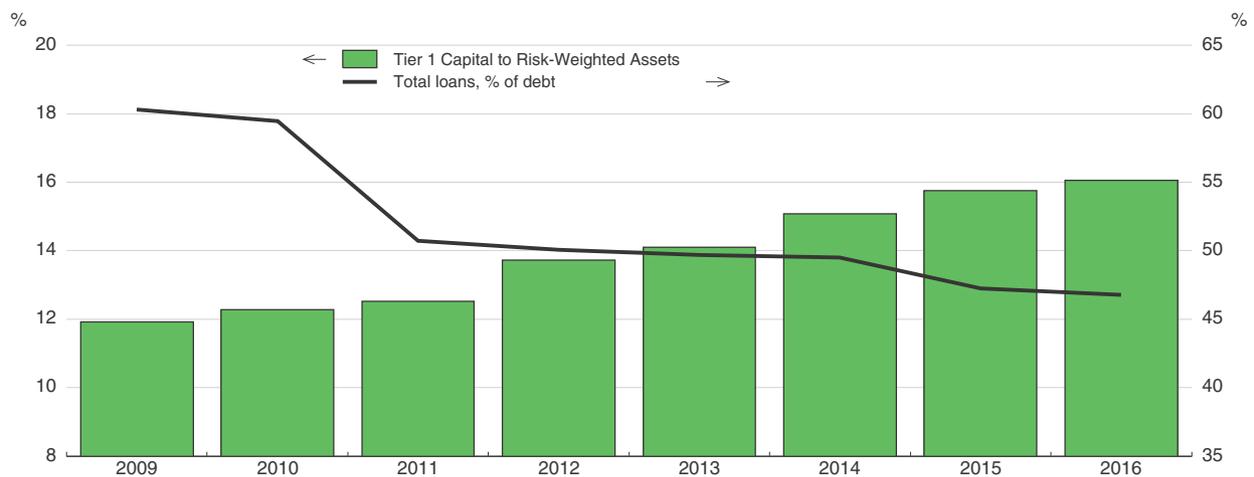
Figure 2.10. **International debt and currency mismatches**

Note: 2016Q4 estimate of the US dollar (USD) denominated debt of non-bank borrowers. This includes international bonds issued by non-banks (by nationality i.e. including bonds issued by offshore affiliates of domestic non-banks); foreign bank cross-border USD claims (loans and debt securities) on domestic non-banks; local USD claims of domestic banks on domestic non-banks; and cross-border USD claims of domestic banks on foreign non-banks. The latter is a proxy for USD loans to non-bank offshore affiliates, and may thus overstate the ultimate USD debt of domestic non-banks. The value of local and cross-border non-bank USD debt is approximated using bank claims on non-banks as a share of total bank claims and total bank USD claims on banks and non-banks. In China, the USD component of local bank cross-border claims on non-banks is assumed to be 50% of the total cross-border USD claims of local banks. Estimates for Indonesia, India, and Turkey do not include domestic bank USD claims on local and cross-border non-banks. US-dollar denominated export revenue is given by merchandise exports invoiced in USD in 2016. Estimates of the USD share of exports are based on Gopinath (2016) for all countries, except Chile (based on Cravino, 2014) and China and Russia (national sources).

Source: OECD (2017b), *OECD Economic Outlook*, Volume 2017 Issue 1, OECD Publishing Paris.

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This shift may mitigate the efforts made since the global financial crisis to make the financial system more resilient by strengthening bank intermediaries – for example by raising bank capital requirements (Figure 2.11). Evidence from the major advanced economies suggests that non-bank financial intermediaries (including pension funds,

Figure 2.11. **Bank capital and the shift to debt securities**

Note: Figures refer to simple averages among OECD countries for which the series are available.

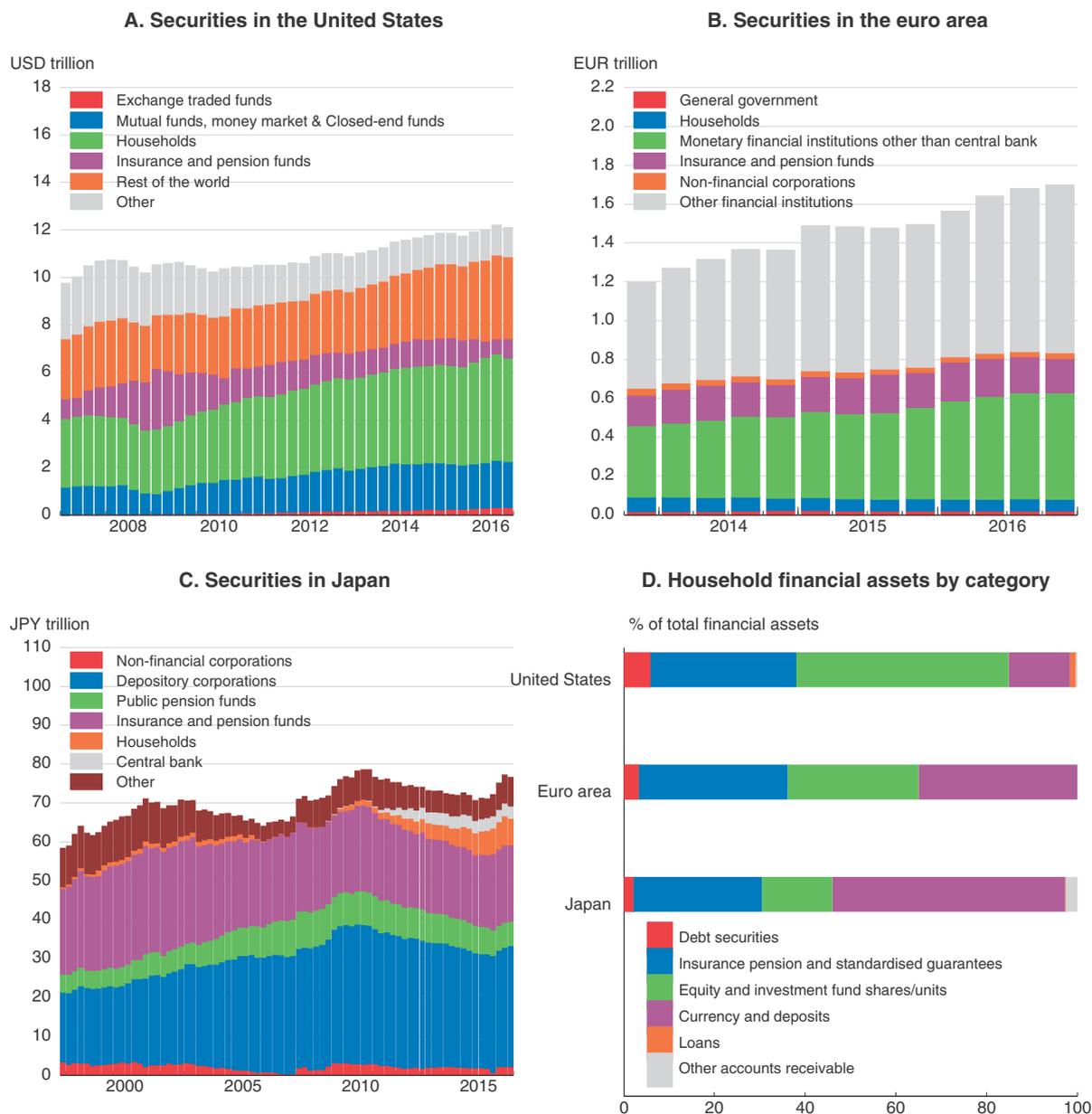
Source: IMF Financial Soundness indicators; and OECD financial accounts.

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mutual funds and insurance companies) bear the largest exposure to corporate bond markets, although households are ultimately exposed through these intermediaries (Figure 2.12).

The extent to which this shift creates vulnerabilities for financial stability and macro-prudential risks is subject to ongoing research and debate. On the one hand, non-bank intermediaries, such as investment funds, can be less exposed to liquidity risks as they are less reliant on short-term liabilities than banks, and their failure is less likely to

Figure 2.12. **Households and non-bank financial intermediaries are exposed to NFC debt**



Note: Panels A, B and C depict the holders of corporate bonds. In the first panel the data refer to bonds issued by domestic corporations and foreign bonds held by US residents. Financial accounts of the United States, table L.213.

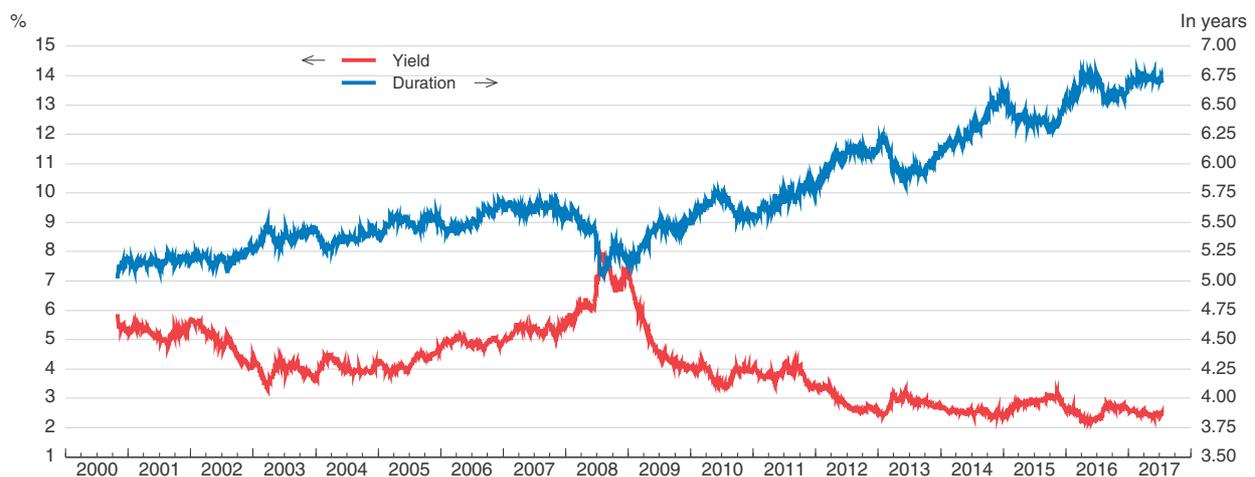
Source: US Federal Reserve Board; European Central Bank; Bank of Japan; and OECD Financial Accounts.

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have systemic consequences than in the case of bank intermediaries (IMF, 2015). On the other hand, some bond investment vehicles (such as mutual funds or ETFs) engage in liquidity transformation, by offering liquid claims on illiquid underlying assets. In heavy outflow scenarios – triggered, for instance, by interest rate hikes (Banegas et al., 2016) – the illiquid nature of the underlying claims may expose these financial intermediaries to risks comparable to bank runs (Chen, 2010; IMF, 2015).

In addition to solvency risk and unlike banks extending loans, bond investors also bear price risks. In the current context of likely rising interest rates, these could be substantial as duration has now reached historically high levels and the prices of higher duration assets are more sensitive to interest rate fluctuations (Figure 2.13). The risks of negative price externalities stemming from the asset management industry could be systemic and are therefore a source of concern for macro-financial stability (IMF, 2015). Indeed, price movements in financial markets can trigger fire sales of assets held by other players in the financial sector or used as collateral, with potentially significant consequences for the stability of the financial sector as a whole. These movements are exacerbated by trading practices and first-mover advantage effects in fund management (OECD, 2015c). Systemic credit risk and abrupt downward corrections in collateral valuations, as the ones generated by fire sales, can also affect the stability of Central Counterparties (CCPs) and, through them, spread shocks across investors and asset classes (BIS, 2012).⁹ Concentration in the

Figure 2.13. **Duration risk has never been higher**



Note: Duration and average yield refer to the Bloomberg Barclays Global Aggregate Corporate Index. This is a flagship measure of global investment grade, fixed-rate corporate debt. This multi-currency benchmark includes bonds from developed and emerging markets issuers within the industrial, utility and financial sectors.

Source: Bloomberg; and Barclays.

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9. Central counterparties (CCPs) are a fundamental component of the infrastructure of modern financial markets. In normal times, CCPs eliminate counterparty risk by inserting themselves between the buyer and the seller of an agreed-upon trade and potentially reduce the overall exposure in the market (multilateral netting). However while they are able to mutualise idiosyncratic counterparty risk in normal times, they remain vulnerable to systemic shocks (Boissel et al., 2016).

asset management industry can be another source of systemic risk. Depending on its size, complexity, and the interconnectedness among its various investment management strategies and activities, distress at a large asset manager could amplify or transmit risks to other parts of the financial system (Office of Financial Research, 2013).

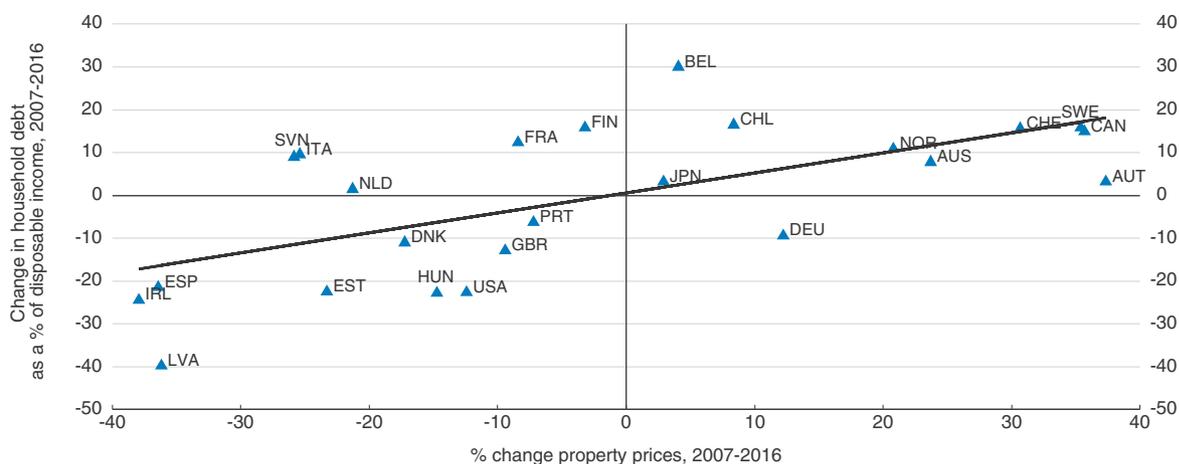
Elevated house prices increase risks related to household debt

Household debt ratios are closely linked to house prices and the credit cycle in mortgages can have strong effects on the price of dwellings. Among OECD countries, those that experienced the strongest increase in household debt since the crisis have also seen the steepest rise in house prices (Figure 2.14). During booms, the relationship between household credit and real estate valuations is typically strong because the supply of housing in local markets is inelastic in the short run. Second-round effects also play a role: a rise in house prices increases collateral valuations, augmenting household borrowing capacity. The herding behaviour of buy-to-let investors, often financed through credit, can further intensify these movements (André, 2016).

The close relationship between the evolution of real estate markets and household debt suggests that measures of leverage based on debt-to-asset ratios can remain broadly stable even during phases of sharp debt accumulation. However, these indicators mask households' growing exposure to a sharp fall in real estate prices. Housing booms often lead to busts which cause severe economic downturns and banking difficulties, as during the recent global financial crisis. Significant downward house price corrections negatively affect economic activity through self-reinforcing contractionary spirals, fuelled by adverse wealth effects, a reduction in collateral value, a negative impact on bank balance sheets, and a credit crunch. Empirical evidence suggests that rapid growth in household debt is typically associated with negative economic outcomes such as severe recessions (Sutherland and Hoeller, 2012; Hermansen and Röhn, 2017).

House prices have increased in many advanced economies since the global financial crisis. The rise in price-to-rent ratios has been particularly steep in the Scandinavian

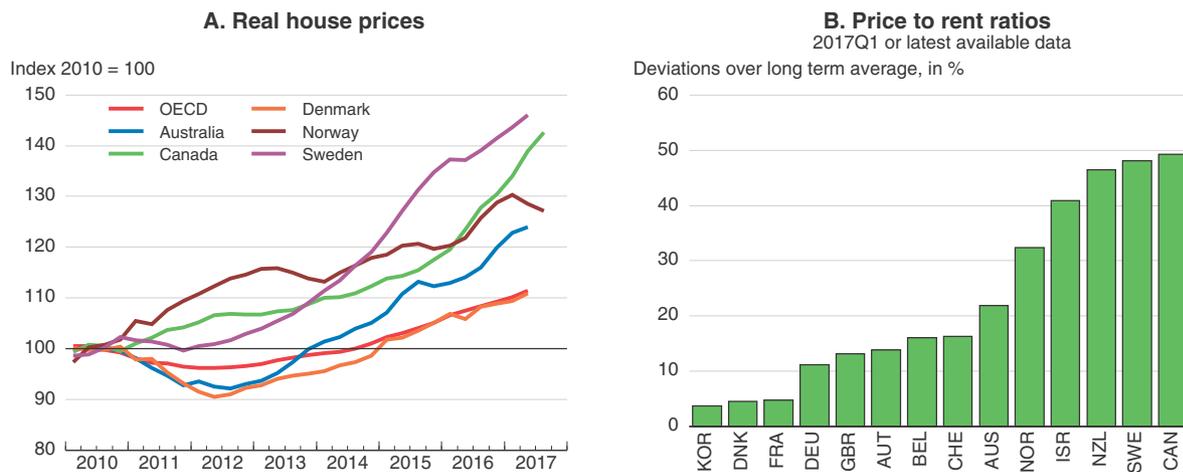
Figure 2.14. **Changes in house prices and household debt are positively correlated**



Source: OECD Analytical House Price database; and OECD calculations.

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Figure 2.15. House prices in OECD countries



Note: Long-term average calculated over the period 2000-2016 or last available date.

Source: OECD Analytical House Price database.

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countries, Australia and Canada (Figure 2.15). Although in part this reflects strong population growth, these developments may entail significant risk to financial stability, given the direct exposure of the financial system to the housing market, mortgages being one of the largest asset classes on bank balance sheets.

High household debt-to-income ratios can be detrimental for the economy, even if they do not lead to a crisis. For instance, high indebtedness can impede consumption smoothing during downturns, or amplify the negative effects on aggregate demand of economic shocks, even if they are small. Also, for given levels of borrowing costs, higher debt can reduce household disposable income and consumption. Some evidence also suggests that large run-ups in household debt, as occurred prior to the global financial crisis, appear to be followed by deleveraging phases characterised by prolonged contractions in economic activity (Mian et al, 2013).

High debt has longer term implications for growth

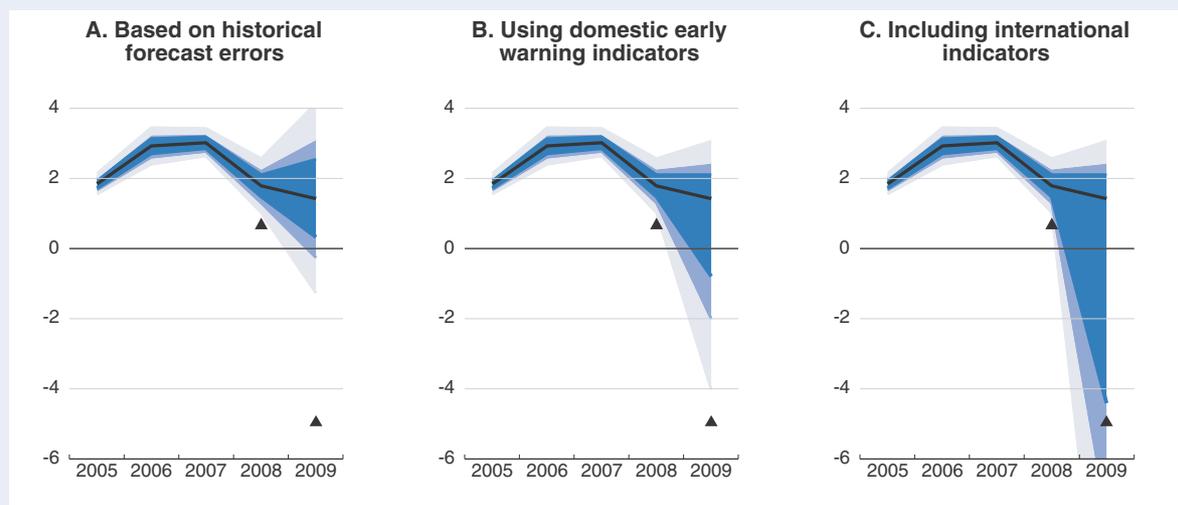
High indebtedness may create near-term vulnerabilities to financial and real shocks, but may also undermine growth and inclusiveness in the longer term. While finance and debt can support activity and innovation, there are potential trade-offs between growth and financial stability. Recent OECD research points to a number of links between high indebtedness and the risks of severe recessions. Among a set of more than 70 indicators, the variables measuring excessive developments in credit are the most useful for providing an early warning of severe recessions in OECD countries (Hermansen and Röhn, 2017). Indications of asset market misalignments, including those related to house prices, are also useful in signalling upcoming banking crises (Caldera Sánchez, et al., 2017). Taken together, these results indicate that among factors creating an environment prone to severe recessions and financial crises, excess leverage requires particular vigilance, in particular if it comes from rapid growth of private credit. Excessive credit dynamics can also be used as means of incorporating negative tail risk in economic projections (Box 2.2). Finally, global risk indicators such as the global credit-to-GDP ratio or global house prices are

Box 2.2. Using early warning indicators to parameterise GDP growth forecast fan charts

Macroeconomic forecasters have a poor track record of predicting future downturns as documented in numerous studies of many forecasters for different countries over various time periods (see for example: Fildes and Steckler, 2002; Loungani, 2001; Abreu, 2011; Pain et al., 2014). However, recent OECD research has found that housing-market and credit-related variables can be useful as early warning indicators to predict severe downturns in OECD economies (Hermansen and Röhn, 2017). Moreover, subsequent analysis finds that for G7 countries these early warning indicators are also strongly correlated with large forecast errors of GDP growth related to (a failure to predict) downturns and so can be used to calibrate the distribution of uncertainty surrounding a central forecast (Turner, 2017). In particular, such indicators can be used to distinguish a “safe” regime and a “downturn-risk” regime, with each regime having its own risk distribution and associated fan chart. The risk distribution associated with the downturn-risk regime is skewed to the downside and is assumed to be characterised by a two-piece normal distribution, which is a form commonly used by some central banks to convey uncertainties around inflation forecasts. In addition to domestic early warning indicators, a sum of similar indicators in other countries can be used to assess the risk of international contagion risks from other countries, and can substantially increase the negative skew in the fan chart.

Currently none of the early warning indicators used to calibrate the fan charts are ‘flashing’ for the G7 economies, which is because such indicators mostly relate to rapid growth in credit or house prices rather than a high level of such variables. Instead, the fan charts are illustrated here for an *Economic Outlook* projection published in May 2008, just prior to the global financial crisis, for the United Kingdom, one of the G7 economies most severely impacted by the crisis. A first fan chart is constructed as a ‘straw man’, being based on historical forecast errors assuming symmetry and ignoring the early warning indicators. On this basis the outcome for 2009 GDP growth at almost -5% is well outside even a 90% prediction interval on the fan chart (see panel A of the figure below), even though this interval for growth between -1% and 4%,

Alternative fan charts for the May 2008 Economic Outlook growth forecast for the United Kingdom



Note: Shaded blue areas show successively the 50%, 70% and 90% prediction intervals. The solid black line is the outturn up to 2007 and the projection for 2008 and 2009, as reported in the May 2008 Economic Outlook. The black triangles show the outturn according to the Economic Outlook published in the year following the first outturn data. The prediction intervals around the historical growth path reflect the extent to which historical estimates of GDP growth are subsequently revised.

Source: Turner, D. (2017), “Designing Charts for GDP Growth Forecasts to Better Reflect Downturn Risks”, OECD Economics Department Working Papers, No. 1428, OECD Publishing, Paris.

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Box 2.2. Using early warning indicators to parameterise GDP growth forecast fan charts (cont.)

around the central forecast of 1.4%, might seem quite wide. An alternative asymmetric fan chart (panel B), whereby the skew is calculated on the basis of a domestic early warning alarm for previous rapid growth in private credit, implies the outturn is closer to, but still outside, the lower 90% prediction limit of -4%. Thus, perhaps unsurprisingly, to encompass the extreme negative outturn, it is essential to take account of the international dimension of the crisis. Indeed, in the first half of 2008 early warning alarms were flashing for all G7 countries except Japan and Germany. A third fan chart, whereby the skew is calculated on the basis of both the domestic and international early warning alarms, encapsulates the outturn, which falls within the 50-70% prediction interval (panel C).

A similar set of fan charts can be computed for the forecasts of GDP growth for other G7 countries published in May 2008, with the position of the outturn for GDP growth in 2009 in each fan chart summarised in the table below:

- Calibrating the fan chart on the basis of historical errors, assuming symmetry (the ‘straw man’), implies the outturn for 2009 is below, and usually far below, the 90% prediction interval for all G7 countries (as represented by the “S” in the table).
- Taking into account warnings from domestic early warning indicators brings the outturn for 2009 (the “W” in the table): within the 50-70% prediction interval for the United States; within the 70-90% interval for Canada and Italy; and for France and the United Kingdom is closer to, the 2009 outturn but still below, the lower limit of the 90% prediction interval. However, the position of the outturn for Japan and Germany remains unchanged and well outside the lower limits of the fan chart, simply because domestic early warning indicators were not flashing in these countries just prior to the crisis.
- Finally, allowing for the international dimension of the crisis, by taking into account the early warning indicators flashing in other G7 countries as well domestic indicators (the “G” in the table), brings the outturn for 2009 within the 50% prediction interval for the United States, Japan and Canada, and within the 50-70% prediction interval for all other G7 countries.

Position of the 2009 GDP growth outturn under alternative fan charts

Fan chart interval	United States	Japan	Germany	France	United Kingdom	Italy	Canada
0-50%	G	G					G
50-70%	W		G	G	G	G	
70-90%						W	W
90-99%	S			W	W		S
99%+		SW	SW	S	S	S	

Note: The table shows the prediction interval in which the outturn for GDP growth in 2009 is located in alternative fan charts constructed around the forecast made in the May 2008 Economic Outlook. The parameterisation of each fan chart is in some way grounded on the track record of historical forecast errors: “S” denotes the position of the outturn in a fan chart parameterised from all historical errors, assuming that underlying distribution is symmetrical (as per panel A in the chart for the United Kingdom above); “W” denotes the position in a fan chart parameterised using forecast errors during “downturn-risk” periods when domestic early warning indicators are flashing, recognising errors are not only larger but skewed to the downside (as per the chart in panel B above); and “G” denotes the position in a fan chart constructed when the global dimension of the crisis is taken into account by parameterising the fan chart from forecast errors when both domestic and international early warning indicators are flashing (as per panel C above).

Source: Turner, D. (2017), “Designing Charts for GDP Growth Forecasts to Better Reflect Downturn Risks”, *OECD Economics Department Working Papers*, No. 1428, OECD Publishing, Paris.

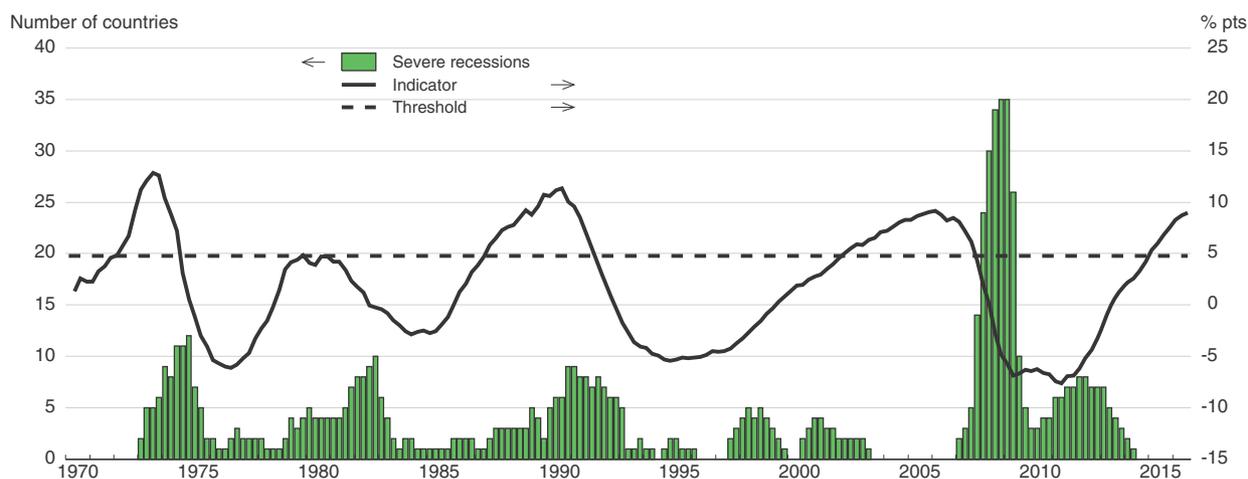
Box 2.2. Using early warning indicators to parameterise GDP growth forecast fan charts (cont.)

While these examples illustrate the potential usefulness of using the early warning indicators to calculate fan charts which correctly identify future downturn risks, there will also inevitably be false alarms when an early warning indicator flashes but a downturn does not occur within the immediate forecast horizon. The historical pattern suggests that on many of these occasions there will be a series of further alarms from the indicators as tensions in the housing market or credit growth continue to build until the bubble bursts and there is an eventual downturn in a manner consistent with Dornbusch's observation that "The crisis takes a much longer time coming than you think, and then it happens much faster than you would have thought". Indeed, this pattern and the difficulty of precisely predicting the timing of any downturn suggest that the early warning indicators are better employed in designing fan charts that identify potential risks rather than in adjusting the baseline forecast.

predictive signals of future recessions (Figure 2.16).¹⁰ This highlights the importance of the global environment as a source of vulnerabilities for individual countries.

In the medium term, research shows that a marginal expansion in private credit is associated with lower long-term growth and rising inequality in advanced economies where credit provision is already high (Arcand et al., 2015; Cournède and Denk, 2015; Cournède et al., 2017). Among the different sources of debt financing, bank lending, particularly mortgage lending to households, is negatively associated with economic performance. An overextension of housing finance not only potentially fuels house price bubbles, but may also misallocate capital that would otherwise be channelled towards corporate investment, thereby slowing GDP growth (Figure 2.17). Conversely, the development of stock markets has a positive effect on growth, but is associated with higher inequality.

Figure 2.16. Real estate dynamics and severe recessions



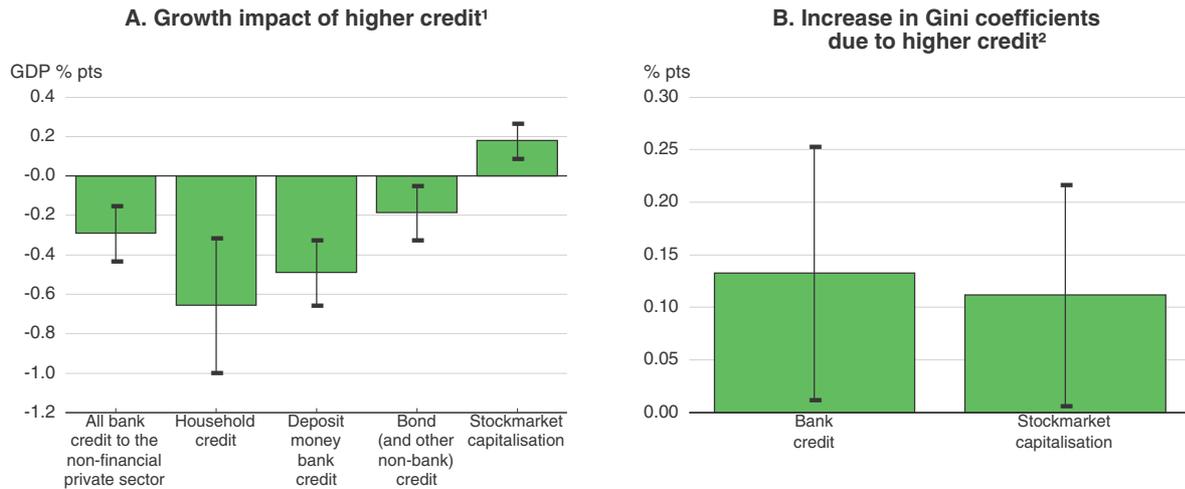
Note: Green areas represent the number of countries identified as being in a severe recession. The global real house price index is constructed as a GDP-weighted average across OECD countries and is measured as deviation from trend.

Source: Hermansen, M. and O. Röhn (2017), "Economic Resilience: The Usefulness of Early Warning Indicators in OECD Countries", *OECD Journal: Economic Studies*, 2016/1, 9-35, OECD Publishing, Paris.

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10. Global indicators are defined by Hermansen and Röhn (2017) as GDP weighted aggregates of individual country indicators used in the sample.

Figure 2.17. **Too much, or the wrong kind, of finance is negatively associated with growth and equality**



Note: The error bars show 90% confidence intervals.

1. For an increase in credit or stock market capitalisation equivalent to 10% of GDP.

2. Impact on the Gini coefficient, for an increase equivalent to 10% of GDP.

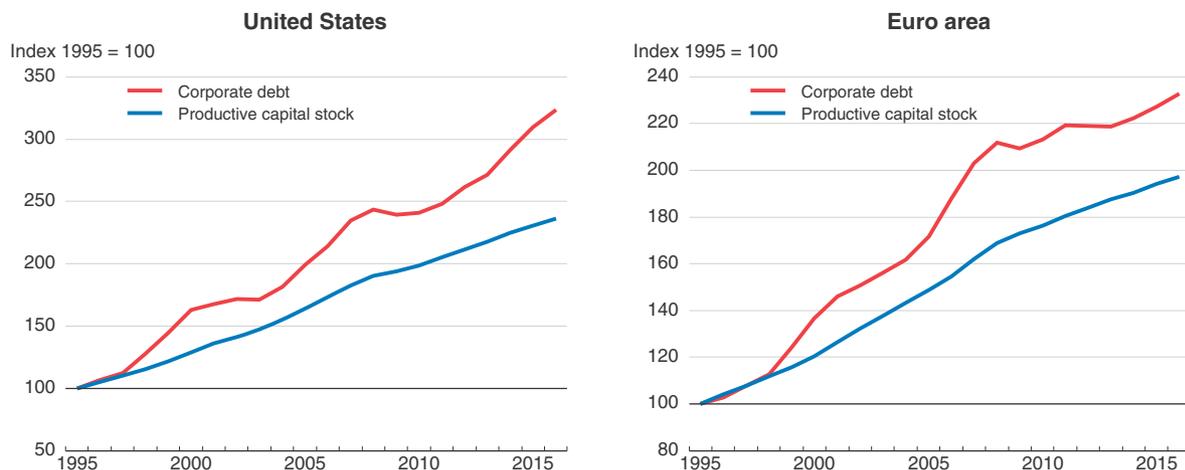
Source: Cournède, B. and O. Denk (2015), "Finance and Economic Growth in OECD and G20 Countries", OECD Economics Department Working Papers, No. 1223, OECD Publishing.

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The disconnect between corporate debt and investment raises concerns about the allocation of capital

Rapid growth of corporate debt raises questions about what the funds are used for. If borrowing is well used, higher indebtedness contributes to economic growth by raising productive capacity or augmenting productivity. However, in many advanced economies, the post-crisis build-up of corporate debt has not translated into a rise in corporate capital expenditure (Figure 2.18). The divergence between corporate debt and investment is evident both in the euro area and the United States.

Figure 2.18. **The disconnect between debt and investment**



Note: Non-financial corporate debt and productive capital stocks are nominal series.

Source: OECD calculations.

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The post-crisis combination of rising corporate debt and historically high share buybacks may suggest that, rather than financing investment, firms took on debt to return funds to shareholders. A number of studies even suggest that corporations actively reduced investment in order to finance share repurchases and dividend payments (Gutierrez and Philippon, 2016; Almeida et al., 2016; Lee et al., 2016). However, the coincident rise in share buybacks and corporate debt could also reflect pessimism about future demand and economic growth, leading corporations to defer capital spending (OECD, 2015a) and return cash to their shareholders for want of attractive investment opportunities (Brav et al., 2005). Alternatively, firms' decisions to buy back shares can be driven by a change in their financing structure, with a move from equity to debt financing motivated by the gap between the cost of equity and debt (Blundell-Wignall and Roulet, 2015).

High levels of debt may hamper the efficient allocation of capital

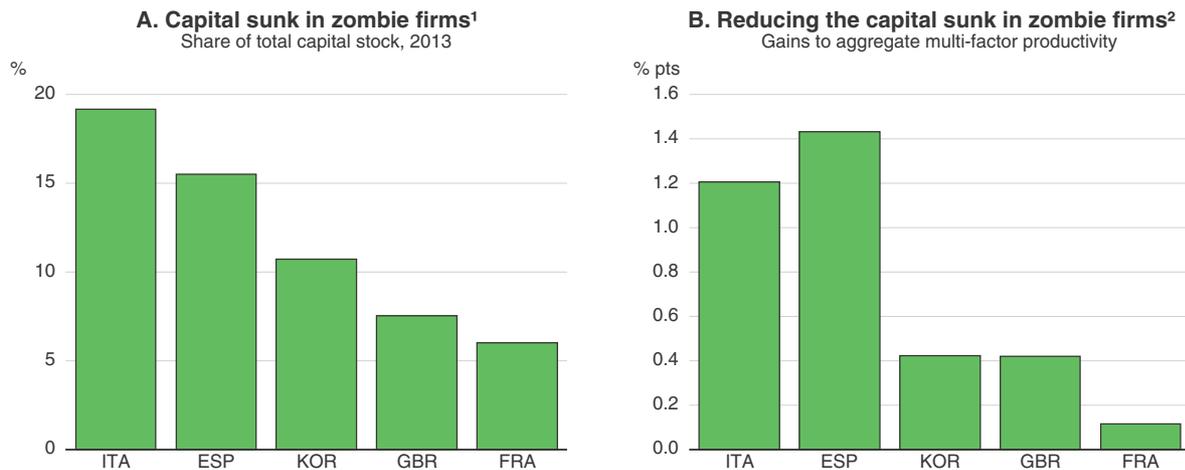
While finance is necessary to sustain corporate investment and productivity, too much debt relative to investment can also undermine the allocative efficiency of productive capital. High levels of debt, even when not resulting in default, can hamper the ability of corporates to undertake new borrowing to finance productive investments. Over-indebted firms tend to lose competitiveness, failing to keep up with the required investment to remain competitive. As a result, firms with persistently high level of indebtedness and low profits can become chronically unable to grow and become “zombie” firms.¹¹

Zombie firms not only affect investment directly, but can also crowd out investment by non-zombie firms, hindering the efficient allocation of resources and slowing multi-factor productivity (MFP) growth by preventing more productive firms from gaining market share. Zombie “congestion” may thus reduce potential output growth by hampering the productivity-enhancing reallocation of resources towards more dynamic higher productivity firms (Figure 2.19).¹² Estimates of zombie congestion effects in OECD countries suggest that the prevalence of persistently weak firms that do not exit the market could be one factor behind the post-crisis weakness in business investment (Adalet McGowan et al., 2017a). The speed and efficiency of capital and labour reallocation is particularly important during economic expansions, to the extent that production factors tend to be scarcer.

High leverage and a bias toward debt financing, even in healthy firms, favours safer investment projects with a high component of tangible assets and a stable and predictable payout schedule. As such, debt financing may be less suited for investment in knowledge-based capital (KBC), which potentially help to explain currently low levels of productivity growth. KBC investments and business dynamism are instead favoured by seed capital and, more generally, by equity financing, raising concerns about the receding number of initial public offerings in all major OECD countries (Figure 2.20).

11. Adalet McGowan et al. (2017a) define zombie firms as firms older than ten years and with an interest coverage ratio below 1 over three consecutive years.

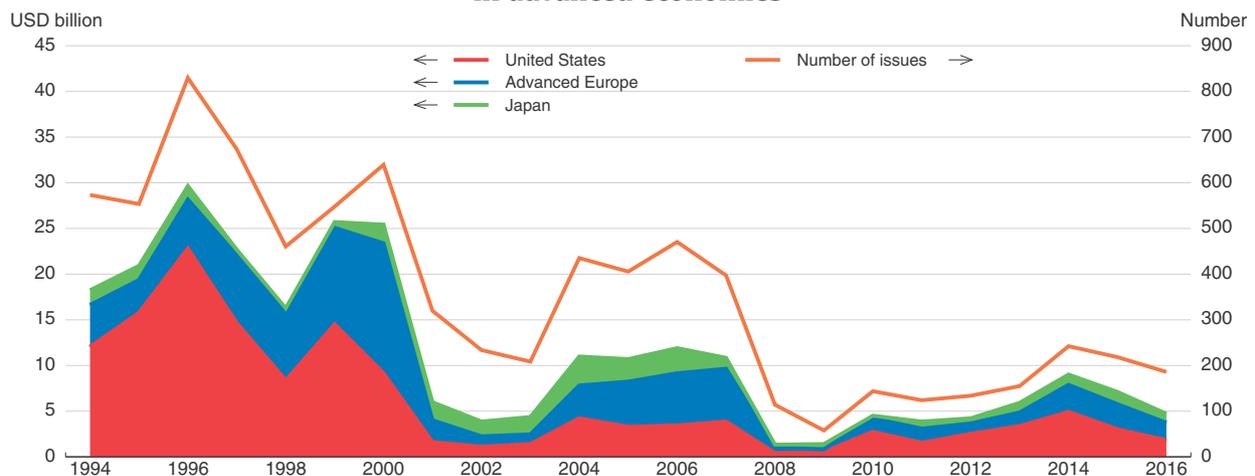
12. Intuitively, zombie congestion can adversely affect the growth opportunities of healthier firms via two possible channels. First, zombie congestion could reduce the return on potential investment projects and thus make expansion less attractive for healthy firms by inflating wages relative to productivity, depressing market prices and undermining profitability. Second, the economic consequences of zombie congestion could also materialise due to the crowding out of credit, whereby banks direct less credit to healthy firms than otherwise to the extent that their balance sheets are weakened due to zombie exposure (Adalet McGowan et al., 2017a, b).

Figure 2.19. **Zombie firms capture capital and reduce dynamism**

1. Firms aged 10 years or more and with profits not covering interest payments over three consecutive years. The sample excludes firms that are larger than 100 times the 99th percentile of the size distribution in terms of capital stock or number of employees.
2. Counterfactual gains to aggregate MFP from reducing zombie capital shares to industry best practice level.

Source: Adalet McGowan, M., D. Andrews and V. Millot (2017a), "Insolvency Regimes, Zombie Firms and Capital Reallocation", *OECD Economics Department Working Papers*, No. 1399, OECD Publishing, Paris; Adalet McGowan, M., D. Andrews and V. Millot (2017b), "Confronting the Zombies: Insolvency and Financial Reform, Corporate Restructuring and Productivity Growth", *OECD Economics Department Working Papers* (forthcoming); and OECD calculations.

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Figure 2.20. **Declining initial public offerings of smaller growth company listings in advanced economies**

Source: OECD Business and Finance Scoreboard 2017, OECD Publishing, Paris.

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Integrated policies to reduce financial vulnerabilities and enhance economic resilience

Reducing financial vulnerabilities and enhancing economic resilience in times of high private debt requires an integrated policy approach. The recent accommodative monetary policies in advanced economies have created very favourable conditions for borrowers and incited investors to take more risk. Against this backdrop, prudential policies can help to keep secure the sustainability of borrowing, alleviate the risk of currency and maturity mismatches, and curtail credit risk. Housing policies can attenuate pressures on house

prices by fostering supply and residential mobility. Finally, financial regulation needs to find a balance between addressing risk concerns, ensuring that finance flows to the most productive uses and, at the same time, avoiding distorted incentives to move undue risks from banks to non-banks. OECD Economic Country surveys consistently recommend policies in this direction (see Annex A2.1 for an overview of recent policy recommendations).

Using and coordinating prudential policies to prevent unsustainable credit dynamics

Bank regulation has strengthened since the global financial crisis, including a growing use of macro-prudential policies, but risk has moved to other intermediaries and instruments. Basel III has set standards for countercyclical capital buffers (CCB) that are being phased in across Basel committee countries and Norway between 2016 and 2018, with the aim of reducing fluctuations in credit-to-GDP ratios. In addition, systemic risk buffers (SRB) have been imposed to limit leverage for a subset of other banks, to address systemic risks of a long-term, non-cyclical nature (Austria, Czech Republic and the Slovak Republic). Even with sufficient capital buffers, an apparently solvent institution could encounter difficulties due to risks arising from liquidity mismatches between assets and liabilities. To attenuate liquidity risks arising from excessive short-term debt, following the example of Sweden, the option of imposing liquidity coverage ratio caps should be considered.

Macro-prudential measures targeting individual borrowers include loan-to-value (LTV) and debt-to-income (DTI) caps. LTVs have been recently introduced or tightened in a number of countries (see Annex A2.2 for recently introduced measures). Fewer countries have opted for DTIs, while OECD research suggests that DTIs may be more efficient than LTVs in reducing the risk of negative GDP tail events (Caldera Sánchez and Röhn, 2016). Further instruments include loan amortisation requirements, increased risk weights for mortgage and consumer loans or mandatory interest rate stress tests. In the aftermath of the financial crisis, many Central and Eastern European countries experienced substantial depreciations of their currencies resulting in adverse balance sheet effects. In response, many of these countries implemented several measures to curb the share of loans denominated in foreign currency (Box 2.3).

Box 2.3. Risks from leveraging in foreign currency loans – policy experiences from Central and Eastern Europe

From the mid-2000s, households in Central and Eastern European countries (CEECs) borrowed extensively in foreign currencies, primarily euro and the Swiss Franc (CHF), from both foreign and domestic intermediaries. This was driven by substantial interest rate differentials. As a result, the share of foreign currency loans to the non-financial private sector reached high levels in some CEECs.

While this expansion of “cheap” lending had positive effects on growth (Rancièrè et al., 2010), foreign-currency denominated loans involved significant exchange rate risk. Households typically lack assets or income in foreign currencies that would serve as a natural hedge. Moreover, they do not have access to financial hedging instruments and lack sufficient understanding of exchange rate risks. At the onset of the global financial crisis in 2008, many CEEC currencies suffered sharp depreciations, leading to considerable increases in households’ monthly re-payments. The inability of many households to cope with higher debt servicing costs affected consumption and spilled over to the financial sector through a sizeable rise in credit provisioning and non-performing loans.

Box 2.3. Risks from leveraging in foreign currency loans – policy experiences from Central and Eastern Europe (cont.)

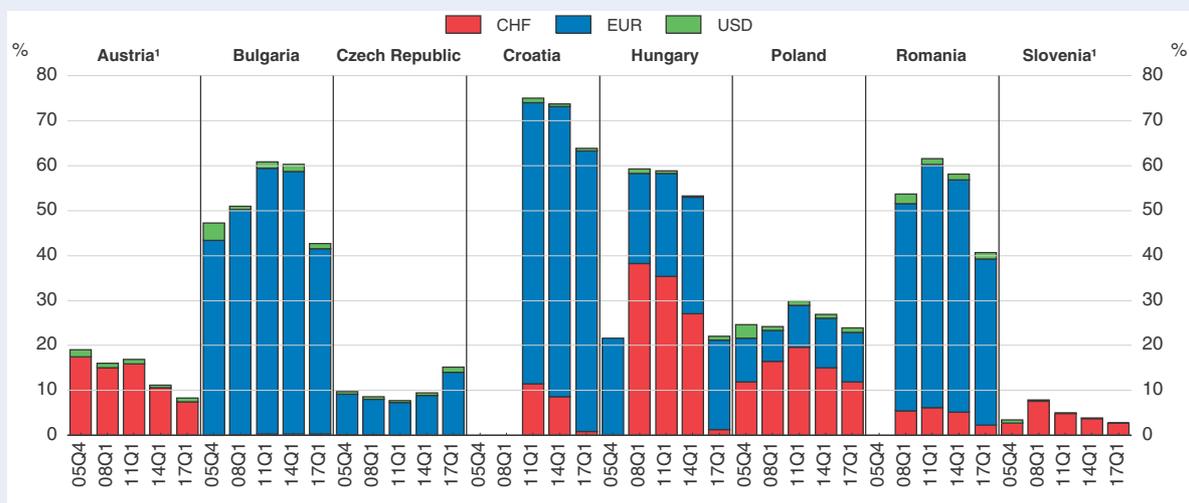
CEECs have subsequently implemented a wide range of policies to progressively curb the use of loans denominated in foreign currencies and to mitigate the associated risks (see Annex A2.2). Many of these policies lie in the macro-prudential domain¹ and are targeted at bank and household foreign exchange exposures. These new types of measures, so-called “currency-based measures”, have recently proliferated globally (De Crescenzo et al., 2015, 2017; OECD, 2017e) and are being analysed within the Advisory Task Force on the OECD Codes of Liberalisation.

Measures taken in CEECs range from soft recommendations to legal obligations and target different sectors (i.e. borrower based or supply side; covering non-bank financial sector or bank intermediaries). More direct legislative actions have also been taken or attempted. Foreign currency lending was temporarily prohibited in Hungary in 2010 and in Poland in 2013. Laws forcing all banks to convert CHF loans into domestic currency or euro were adopted in Hungary (conversion into forint at current market rates in 2014), in Croatia (into euro at historical rates in 2015), and in Romania (into leu at historical rates in 2016).

The implementation of currency-based measures in CEECs has been effective. The share of foreign currency loans, especially to households, has constantly decreased since 2011.

Foreign currency lending to the non-financial private sector

Per cent of total loans



Note: Lending in selected foreign currencies by resident financial institutions to the non-financial private sector as percentage of total loans to the sector. Data unavailable for Croatia in 2005Q4/2008Q1 and Romania in 2005Q4.

1. Countries part of the euro area.

Source: ECB Balance Sheet Items.

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1. The use of such measures as macro-prudential tools has been most clearly spelled out in the ESRB Recommendation on Foreign Currency lending (ESRB, 2011).

The effective implementation of prudential policy depends on the availability and timeliness of data to accurately observe financial conditions. The degree of responsiveness of macro-prudential tools will depend on the quality and lag of incoming data. Rubio and Unsal (2017) find that optimal macro-prudential policy should be less aggressive, in other words less reactive, in countries with poorer data. Experience with macro-prudential

policies in the financial system as it now stands remains limited and this conditions their use.

Most macro-prudential measures are implemented in a country-specific manner, which creates possibilities of cross-border leakages and regulatory arbitrage across jurisdictions. It is therefore important to reinforce coordination between countries and reach reciprocity agreements if necessary. The *OECD Codes of Liberalisation of Capital Movements* provides an established and tested process of transparent international dialogue and co-operation (OECD, 2017e), but typically-used macroprudential rules fall outside the scope of its mandate. The Review of the Codes and their opening to adherence by non-members further raises opportunities for greater international co-operation including reciprocity agreements regarding macroprudential rules.

In addition, more specific regulation can help to reduce the risk of cross-border spillovers. For instance, Austria has implemented loan-to-local-stable-funding-ratios (LLSFR) to strengthen the resilience of subsidiaries of Austrian banks operating abroad, notably in Eastern and South-Eastern European countries. While this measure reduces vulnerabilities, it may also impede the efficiency of international debt markets and create geographic fragmentation (FSB, 2017a).

Monitoring and supervising non-bank credit intermediaries

The shift from bank loans to debt securities, combined with the increasing prevalence of non-bank credit intermediaries, calls for better coordinated monitoring and, as appropriate, more supervision of non-bank intermediaries. Avoiding regulatory arbitrage between bank and non-bank intermediaries, while recognising important differences in their activities, may be necessary to prevent unwarranted and difficult to observe shifts of risks to the shadow banking system.

Interconnectedness between banks and other financial intermediaries (OFIs) can exacerbate contagion in the financial system, in particular in EMEs (FSB, 2017b). In Brazil, Chile and South Africa, OFI funding as a share of bank assets exceeded 10% at the end of 2015, implying rollover-funding risks for banks. Also, banks claims on OFIs exceeded 10% of bank assets in Ireland, the United Kingdom and Belgium, exposing banks to credit risk spillovers from OFIs.¹³ Insurance companies and pension funds are also heavily exposed to OFIs (FSB, 2017b). For instance, as of end-2015, close to 50% of Dutch pension funds' assets were claims on OFIs. Similarly, Australian insurance corporations' claims on OFIs exceed 50% of total assets. These investments are motivated, among other factors, by regulatory requirements restricting or penalising other types of investment.

The interconnectedness between banks and non-banks raises concerns over the potential adverse effects of sudden redemptions. Some measures have been proposed to mitigate liquidity risks for OFIs, several of which focus on the ease with which investments can be withdrawn (e.g. exit fees, redemption gates, side-pockets). Others focus on improving market functioning, including by making the underlying risks more transparent or by conducting stress tests. Some of these measures, in particular those penalising withdrawals, might create new distortions. Hence, their overall effect on market

13. While the record and measurement (according to the 2008 SNA) of OFIs and shadow banking financial activities presents significant challenges, recently efforts have been made to increase the availability of international comparable data, including through the OECD Working Party on Financial Statistics.

functioning and financial stability partly depends on their design and implementation, and should be assessed thoroughly. Further concerns arise from potential credit risk mispricing of OFIs, due to bundling and implicit or explicit enhancements and guarantees, offered partly by involved banks. The lack of granular and harmonised data often impedes the identification of specific risk and vulnerabilities. The rising importance of OFI activities in emerging market economies heralds strong international cooperation in the monitoring and supervision of non-bank credit intermediation activities.

Expanding housing supply

The growing importance of real estate as a source of wealth in most advanced economies raises the potential sensitivity of aggregate consumption and investment to changes in house prices. Low interest rates have stimulated the demand for mortgages, and restrictive regulations have often constrained housing supply. Macro-prudential measures that target the demand side of the housing market should be complemented by measures that address distortions on the supply side. Easing relatively strict rent controls and tenant-landlord regulations that are found in some countries (for example Denmark, Sweden and the Netherlands) could increase the supply of rental housing (OECD, 2011). The Netherlands has recently taken steps in this direction (OECD, 2016). In some continental European countries, reducing the high costs involved with buying a residence could also enhance residential mobility. This would include tax restructuring and removing or curbing regulations that limit competition among intermediaries involved in housing transactions (e.g. notaries and real estate agencies).

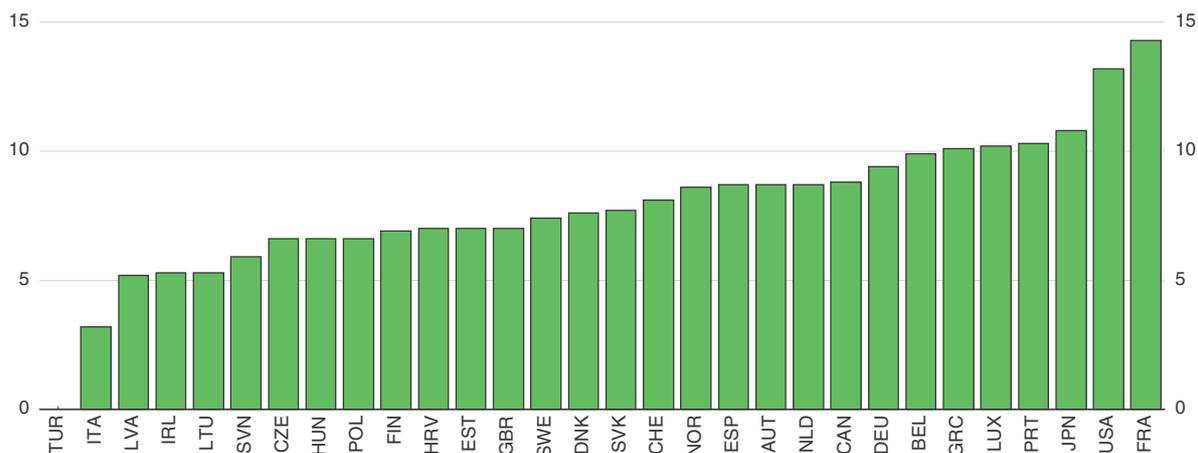
Housing supply is also heavily affected by land-use regulations and, in most OECD countries land use regulations provide binding restrictions to housing supply, predominantly in large cities.¹⁴ Recent OECD Economic Surveys have recommended a thorough review of regulations in several countries (Australia, Canada, Chile, Luxembourg and United Kingdom), while recognising that some planning constraints are necessary for environmental and social reasons. Rigid planning systems, such as in the United Kingdom or Canada, restrict the supply of available and affordable housing, whereas more flexible systems such as in Switzerland seem to be associated with more elastic housing supply and smaller demand-supply imbalances (Blöchliger et al., 2017). Finally, since land-use planning in virtually all OECD countries is the purview of local governments (OECD, 2017h), it is important for national governments to provide incentives to local governments to promote greater housing supply. This could be done through fiscal systems that generate greater tax revenues for local governments that increase housing supply or through transfer payments to local governments that are linked to housing supply (OECD, 2017g).

Strengthening equity finance and improving capital allocation

Strengthening equity funding would help reduce corporate leverage, curb insolvency risks and increase resilience. Agency costs and asymmetric information give firms a preference for debt (Myers and Majluf, 1984), and most corporate tax systems exacerbate this by favouring debt over equity, primarily through the deductibility of interest payments (Figure 2.21). Debt shifting, as part of the profit shifting strategies of multinational groups,

14. To the extent large parts of urban land is built-up at low densities, reforms of land-use regulations should encourage densification. In particular, maximum density restrictions and single-use requirements in land-regulations should be gradually relaxed (OECD, 2017g).

Figure 2.21. **Debt bias in corporate tax systems**
Differences in effective average tax rates (new equity minus debt), 2016



Source: ZEW (2016), *The Effects of Tax Reforms to Address the Debt-Equity Bias on the Cost of Capital and on Effective Tax Rates*, Europäische Kommission, Mannheim.

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can compound the debt-equity bias (Sorbe et al., 2017). Eliminating the tax bias would rebalance financing incentives and reduce the benefits of share buybacks.

A number of tax systems also contain biases towards mortgage debt and owner-occupied housing. Examples include: property taxes that do not appropriately reflect house price valuations (e.g. Denmark and Sweden); mortgage interest payment deductibility (e.g. Denmark, Luxembourg, Norway, Sweden and the United States); and tax credits for administrative costs of buying property for personal use (Luxembourg). Some countries have recently reduced mortgage interest rate deductibility (Finland and the Netherlands). Others have introduced incentives to reduce the preference for debt investment through allowances for corporate equity (Belgium, Italy and Turkey).

Removing barriers to the availability of equity financing would offer stronger potential for diversifying funding sources. This is particularly important for young and innovative firms with restricted access to bank financing or bond markets. The continuing decline in initial public offerings (IPOs) since the global financial crisis is reflected in a reduced depth of equity markets in many countries. Subdued competition amid the rising importance of bank consortiums controlling the IPO market seems to have triggered cost increases for IPOs, especially for small- and medium-sized businesses (OECD, 2017c). Strengthening competitive conditions by countering bank restrictive practices could help reinvigorate the IPO market.

Private equity markets remain relatively underdeveloped in many countries. In the vast majority of countries, venture capital represents less than 0.05% of GDP.¹⁵ Exceptions are the United States (0.2%) and Israel (0.5%). Recent OECD research suggests that firms benefiting from venture capital financing, particularly in the early stages of development, exhibit higher productivity growth (Heil, 2017). Other alternative financing measures, such as peer-to-peer lending or crowdfunding, should also be developed further, subject to appropriate regulation, to foster business dynamism and innovation. Most OECD and EMEs

15. OECD Entrepreneurship Financing database.

have recently enacted legal frameworks for equity crowdfunding platforms, with quite differentiated success, suggesting potentially important benefits from exchanging and learning from best practices.

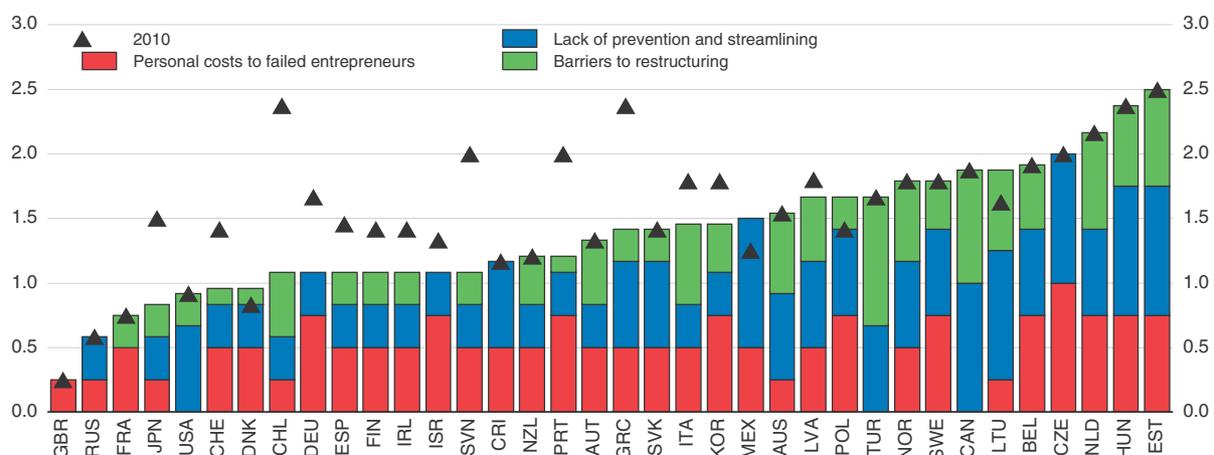
The relative importance of state-owned enterprises (SOE) in EMEs has also contributed to the increase in corporate debt, in particular in China. SOEs often benefit from preferential access to financial markets, including implicit government guarantees, and exhibit higher debt and higher leverage than other non-state owned companies (OECD, 2017c). The *OECD Guidelines on Corporate Governance of State-Owned Enterprises* provide concrete guidance on how to ensure that SOEs are appropriately governed and do not benefit from undue competitive advantages when they operate in markets, and establish good practices for financial and non-financial disclosures (OECD, 2015b).

Implicit guarantees have also distorted the allocation of capital in most advanced countries. German and Austrian banks, for instance, benefitted from *Länder* guarantees that were assumed to be backed by the central government in event of insolvency or liquidity crises. The resulting cheap money, coupled with the externalisation of bankruptcy risks, led to excessive risk taking by banks. As the risks materialised, many major banks collapsed and needed to be bailed out by the central government. Efficient bank resolution mechanisms, notably including burden-sharing by senior and sub-ordinated creditors, are key to reduce implicit guarantees and the associated market frictions (Denk et al., 2015).

Analysis suggests that the efficient allocation of capital depends on the efficiency of insolvency regimes in terms of i) low personal costs for failed entrepreneurs, ii) prevention and streamlining tools, and iii) tools for facilitating corporate restructuring. Results of a dedicated questionnaire addressed to OECD member countries reveal considerable differences across countries in the design of insolvency regimes. This suggests that there is substantial potential to benchmark and improve insolvency procedures, thereby making the restructuring and rehabilitation of distressed assets more efficient (Figure 2.22).

Figure 2.22. **The design of insolvency regimes across countries**

Indicator increasing in the extent to which the insolvency regime delays the initiation and resolution of proceedings



Note: The stacked bars correspond to three subcomponents of the insolvency indicator in 2016. The triangle corresponds to the value of the aggregate insolvency indicator based on these three subcomponents in 2010. Only countries for which data are available for the three sub-components in 2016 are included.

Source: Adalet McGowan, M., D. Andrews and V. Millot (2017b), "Confronting the Zombies: Insolvency and Financial Reform, Corporate Restructuring and Productivity Growth", *OECD Economics Department Working Papers*, (forthcoming).

StatLink  <http://dx.doi.org/10.1787/888933627314>

Facilitating the liquidation or restructuring of firms would reduce the share of capital sunk in zombie firms, revitalise non-productive companies and facilitate technological diffusion (Adalet McGowan et al., 2017b). The prevalence of zombie firms is negatively correlated with the health of banks, as measured by a composite index of banks' balance sheet indicators (Andrews and Petroulakis, 2017).

Addressing potential trade-offs between risk mitigation and growth-enhancing objectives

Fostering financial stability is only one objective of policy makers and may conflict with other goals. Recent research has shed light on potential trade-offs between the objectives of risk mitigation and growth maximisation (Figure 2.23). Financial market liberalisation, for instance, boosts growth but also leads to more frequent and deeper recessions, notably through its effect on credit dynamics. Similar effects are observed for capital account openness, in particular for EMEs operating under flexible exchange rate regimes, as they are exposed to volatile capital flows. There is broad consensus that foreign

Figure 2.23. **Growth-fragility trade-offs**



Note: The X axis plots the effect of policies on fragility; fragility is defined as higher likelihood of a financial crisis (policies with red outline) or a higher GDP (negative) tail risk. Three types of financial crises are considered: currency, banking and twin crises. Tail risk is defined as the effect of a policy variable on the bottom 10% of the distribution for quarterly GDP growth. The chart reports coefficients corresponding either to elasticities or marginal effects, depending on the policy considered. Institutional quality indicators are associated with both growth and lower fragility; labour and product market policies generally affect growth, with little or no impact economic risk. Growth fragility trade-offs exist when considering macro prudential and financial markets policies. The yellow dot under the green area (Quality of institutions) represents the effect on growth and fragility of a free-floating exchange rate, while the one under the light blue area (Labour market) represents automatic stabilisers.

Source: Caldera Sánchez, A., et al. (2017), "Strengthening Economic Resilience: Insights from the Post-1970 Record of Severe Recessions and Financial Crises", OECD Economic Policy Papers, No. 20, OECD Publishing, Paris.

direct investment (FDI) produces fewer vulnerabilities than portfolio flows, as the latter are more volatile and typically of shorter maturity (e.g. Guichard, 2017).

A key driver of FDI is the quality of institutions, which is particularly relevant for EMEs (Economou et al., 2017). Reducing informality and strengthening the rule of law could help rebalance international capital flows towards inward FDI, thereby reducing vulnerabilities, enhancing resilience and fostering technology transfers, investments and potential growth. Indeed, countries with higher-quality institutions are found to experience both higher growth and a lower risk of severe recessions (Caldera Sánchez et al., 2017).

Macro-prudential policies reduce vulnerabilities by curtailing systemic threats to financial stability arising, for example, from excessive credit, leverage and asset price growth. Limits on debt-to-income and loan-to-value ratios and limits on credit growth and foreign currency lending can be effective in reducing leverage during boom times. Some macro-prudential policies also increase the shock absorption capacity of the financial sector. For instance, capital and liquidity buffers increase the distance to default in the case of an adverse shock. However, prudential measures can also be associated with lower growth, by distorting incentives or reducing the efficiency of financial markets (Caldera Sánchez et al., 2017). The adoption of prudential measures should therefore be mindful of potential costs in terms of lower growth, and aim at striking the right balance between reducing fragilities and insuring strong economic performance.

Structural reforms of product and labour markets can help offset the growth-curbing effect of prudential policies insofar as they lead to higher growth without increasing the frequency of severe recessions. Some structural reforms such as active labour market programmes or reducing barriers to trade actually come with the double dividend of higher growth and lower risk of recession (Caldera Sánchez and Gori, 2016). Against this background, and given the fact the responsiveness rate of OECD Going for Growth recommendations has lately declined to pre-crisis level (OECD, 2017a), policymakers should step up efforts to unlock skills, boost business dynamism and allow workers and institutions to adapt to rapidly changing labour markets (Chapter 1).

Strengthening financial literacy stands out as a cross-cutting policy objective amid increasing digital transformation of societies, labour and financial markets. Improving households' understanding of financial concepts not only serves inclusiveness by broadening access to economic opportunities; it also helps mitigate risks, for instance by allowing households to better understand the long-term impacts of consumer loans. Recent evidence suggests that more than half of the adult population in G20 countries lacks the basic financial knowledge to make informed financial decisions (OECD, 2017f). Ongoing efforts to design and improve national strategies to overcome gaps in financial education should be pursued.

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ANNEX A2.1

Recent OECD Economic Survey recommendations to address vulnerabilities arising from private debt

Table A2.1.1. Household debt

Key recommendation	Survey
Macro- and micro-prudential measures	
Maintain tight macro-prudential measures.	Australia, March 2017
Continue to tighten macro-prudential measures and target them regionally, including through increasing capital requirements in regions with high house price-to-income ratios, as planned.	Canada, June 2016
Encourage mortgage institutions to strengthen the use of debt-service-to-income ratios.	Denmark, May 2016
Give consideration to extending some of the locally targeted “Best practices” introduced by the regulator for granting a mortgage in hotspot areas to the whole country.	Denmark, May 2016
Introduce additional macro-prudential measures, such as limits to loan-to-value or loan-to-income ratios.	Luxembourg, June 2017
Add a debt-to-income limit to the Reserve Bank’s macro-prudential instruments to increase the resilience of bank balance sheets, with attention to benefits exceeding costs.	New Zealand, June 2017
Should house-price growth remain uncomfortably high, consider tightening macro-prudential measures while closely monitoring and reviewing their effectiveness.	Norway, January 2016
Stand ready to further tighten macro-prudential policy settings if financial sector risks do not diminish.	Slovak Republic, June 2017
Introduce a cap on household debt-to-income ratios.	Sweden, February 2017
Establish a framework for explicitly addressing affordability risk, to be used if needed to contain financial stability risks related to imbalances in the housing and mortgage markets.	Switzerland, December 2015
Monitor closely mortgage lending to firms or households for rental properties, which may not be as responsive as the owner-occupied segment to recent regulatory measures.	Switzerland, December 2015
Continue to uphold underwriting standards in mortgage lending.	United Kingdom, February 2015
Enhance prudential regulation by requiring lenders to take into account borrowers’ repayment ability when extending loans.	China, March 2017
Implement further macro-prudential measures if risks to the financial system (from housing prices) rise.	Israel, January 2016
Develop macro-prudential instruments to rein in excessive growth of consumer loans as part of regulatory and supervisory reforms. Improve monitoring and processing of non-performing loans. Resolve the potential conflict of interest at the central bank, which is the majority owner and supervisor of the largest Russian commercial banks.	Russia, January 2014
Housing Policies	
Facilitate housing supply increases through improved planning regulations.	Austria, March 2017
Support a bigger private rental housing market by easing rent regulation while striking a balance between landlord and tenant protection.	Denmark, May 2016
Continue to improve the responsiveness of housing supply including in the rental market and avoid home buyer subsidies.	Ireland, September 2015
Reform land planning and introduce time-limited building permits.	Luxembourg, June 2017
Support the supply of rental housing by further limiting strict rent regulation in the private market.	Netherlands, March 2016
Enhance co-operation between central and local government in land-use planning and increase incentives for municipalities to facilitate the timely release of development land. Simplify land-use planning procedures, balancing economic, environmental and social considerations.	Sweden, February 2017
Ease rental regulations to incentivise rental housing supply, mobility and better utilisation of the housing stock, while maintaining tenant protection against abuse.	Sweden, February 2017

Table A2.1.1. **Household debt (cont.)**

Key recommendation	Survey
Review spatial planning regulations to make it easier to build denser housing.	Switzerland, December 2015
Further relax regulatory constraints to boost housing supply, in particular by thoroughly reviewing the boundaries of protected areas of the Green Belt.	United Kingdom, February 2015
Tax Policies	
Reform property taxation, including by decreasing mortgage interest rate deductibility and regularly updating valuations in order to establish neutrality across different asset classes.	Denmark, May 2016
Increase taxation of non-used constructible land.	Luxembourg, June 2017
Limit further mortgage interest deductibility to reduce housing demand.	Luxembourg, June 2017
Reform the recurrent property tax to better align tax charges with property values. Phase out the deductibility of mortgage interest rate payments.	Sweden, February 2017
Limit the tax deductibility of mortgage interest so that, combined with maintenance outlays, it does not exceed the amount of declared imputed rent. Update the imputed rent calculations more frequently to better reflect market values.	Switzerland, December 2015

Note: The table includes key recommendations only. Surveys may contain other recommendations. The sample includes 48 Economic Surveys in total, for each country the most recent Survey is considered.

Table A2.1.2. **Corporate debt**

Key recommendation	Survey
Insolvency/Restructuring	
Use debt-equity swaps more frequently by forcing creditors to share the burden of firm restructuring.	Italy, February 2017
Improve the workings of insolvency rules by: <ul style="list-style-type: none"> ● Reconsidering the privileged treatment of public creditors. ● Enlarging the scope for simple-majority decisions among creditors. ● Shortening out-of-court settlement procedures. 	Portugal, February 2017
<ul style="list-style-type: none"> ● Enhance the leading role of the Bank Asset Management Company to ensure swift restructuring of companies and effective liquidation of assets. ● For the most important firms to be restructured, ensure that all assets in a company group are transferred to the Bank Asset Management Company. ● The Bank Asset Management Company should maintain its independence and ability to attract highly professional staff, while adhering to the highest standards of corporate governance and transparency. ● Monitor the implementation of the new insolvency regulation and improve institutional capacity by training judges and insolvency administrators. Make out-of-court restructuring faster and more attractive. 	Slovenia, May 2015
Tax policies	
Broaden the tax base by reforming exemptions that facilitate tax avoidance such as the notional interest rate deduction.	Belgium, June 2017
Other	
Gradually remove implicit guarantees to SOEs and other public entities to reduce contingent liabilities.	China, March 2017
Reduce state ownership in commercially oriented, non-strategic sectors. Let unviable SOEs go bankrupt, notably in sectors suffering from over-capacity.	China, March 2017
Resolution of non-performing loans	
<ul style="list-style-type: none"> ● When NPLs create a serious economic risk, speed up and facilitate the resolution of NPLs by not triggering bail-in procedures within the existing rules. ● Consider establishing asset management companies where needed, and possibly at the European level. ● Take supervisory measures to encourage banks to resolve NPLs, which might include raising capital surcharges for long-standing NPLs. 	Euro area, June 2016
Continue improving the bankruptcy framework to speed up resolution of non-performing loans. Introduce effective incentives and performance targets for banks to monitor their progress in reducing non-performing loans.	Greece, March 2016
<ul style="list-style-type: none"> ● Implement a strategy for the asset management company to step-up offloading of non-performing assets. ● Expand capital surcharges on nonperforming loans detained by banks beyond a certain period. ● (Bolster competition in the banking sector by selling stakes in state-owned banks.) 	Hungary, May 2016
Accelerate through the court system the resolution of non-performing loans that require repossessions.	Ireland, September 2015

Table A2.1.2. **Corporate debt** (cont.)

Key recommendation	Survey
<ul style="list-style-type: none"> ● Continue to develop the secondary market for NPLs. ● As envisaged by the European Supervisory Mechanism, set gradual and bank-specific targets to reduce non-performing loans, backed up by sanctions such as additional provisions, asset sales, suspension of dividend payments and restructuring banks operations. ● (If public funds are needed to recapitalise distressed banks, take full advantage of EU regulations, imposing losses on equity and bondholders, and restructuring banks' operations. Compensate retail bondholders for the losses they will incur). 	Italy, February 2017
<ul style="list-style-type: none"> ● Strengthen current regulatory incentives for reducing NPLs, including through write-offs and sales. ● Support the development of a market for distressed debt, notably through the creation of asset management companies. 	Portugal, February 2017

Note: The table includes key recommendations only. Surveys may contain other recommendations. The sample includes 48 Economic Surveys in total, for each country the most recent Survey is considered.

ANNEX A2.2

Recently introduced prudential measures

	Creditworthiness: borrower-based measures	Resilience of financial sector: capital-based measures (% of risk-weighted assets)	Maturity and currency mismatches and liquidity risk
Austria	<ul style="list-style-type: none"> • Sector-specific LTVs (e.g. 80% for building societies). 	<ul style="list-style-type: none"> • Systemic risk buffer of up to 2% for 12 banks (from 2016, fully phased in in 2018). • O-SII buffer, 1-2% (phased in 2016-2018). • The capital conservation buffer being gradually introduced between 2016 and 2019; when fully phased in it is at 2.5%. 	
Belgium		<ul style="list-style-type: none"> • 5 percentage point risk weight add-on for internal rating-based banks' residential real estate exposures since 2014. • O-SII buffer of 0.75-1.5% phased in from 2016. • CCyB at 0% from January 2016. 	
Denmark	<ul style="list-style-type: none"> • LTV limit of 95% (2015). • Cap on LTI ratio (Effective as of Jan 1, 2018). • Cap on LTI ratio: additional restrictions on mortgage products available to homeowners with a (total) DTI ratio above 400 per cent (before tax) (Effective as of Jan 1, 2018). • Minimum 5% down-payment when purchasing a home from November 1, 2015. 	<ul style="list-style-type: none"> • Systemic risk buffer at 1-3% by 2019 (0.4-1.2% in 2016). • CCyB at 0% from January 2016. • Capital conservation buffer being phased in between 2016 and 2019 (0.625% in 2016 and 2.5% in 2019). • LCR of a least 100% for all institutions by 1 January 2018. 	<ul style="list-style-type: none"> • Core funding ratios (the lending divided by the sum of deposits, issuances with more than 12 months to duration, subordinated debt and equity should be less than 1).
Estonia	<ul style="list-style-type: none"> • Requirements for new housing loans (as of 1 March 2015): at least 85% of new housing loans issued. • LTV limit of 85% (90% if guaranteed by KredEx), DSTI limit of 50% and a maturity limit of 30 years. 	<ul style="list-style-type: none"> • Systemic risk buffer requirement of 1% from 1 August 2016. • O-SII buffer of 2% from 1 August 2016 for the two largest banks; CCyB requirement to be maintained at 0%. 	
Finland	<ul style="list-style-type: none"> • LTV limit of 90% (95% for first-time buyers) in effect since July 2016. 	<ul style="list-style-type: none"> • Capital conservation buffer 2.5% since January 2015. • O-SII buffers of 0.5-2.0% since January 2016. • Initiated process to introduce an average risk weight floor of 10% for internal rating-based banks' mortgage exposures. 	
Hungary	<ul style="list-style-type: none"> • Specific LTV cap for foreign currency loans (2010, 2015). • Specific DTI and DSTI caps for foreign currency loans (2010, 2015). 		<ul style="list-style-type: none"> • Foreign Exchange Funding Adequacy Ratio (FFAR) (2012). • Foreign Exchange Coverage Ratio (FECR)¹ (2015).
Japan	<ul style="list-style-type: none"> • DSTI decreased to 30% from 40% in "overheated speculation areas". • DSTI's will be mandatory for all banks from the second half of 2018 onwards. 		

2. RESILIENCE IN A TIME OF HIGH DEBT

	Creditworthiness: borrower-based measures	Resilience of financial sector: capital-based measures (% of risk-weighted assets)	Maturity and currency mismatches and liquidity risk
Netherlands	<ul style="list-style-type: none"> • LTV limit for new mortgages lowered from 106% in 2012 to 100% in 2018 (currently 102%). • Recommendation of Financial Stability Committee to continue the gradual reduction of LTVs beyond 2018 to a 90% limit. • DSTI and LTI limits in place since 2012, being gradually tightened (limits depend on income and interest rates). • New mortgages must be fully amortising in order for the interest payments to be tax-deductible (from 2013) 	<ul style="list-style-type: none"> • 3% systemic risk buffer and O-SII buffer between 1-2% being phased in 2016-2019; the higher of two applies to each bank. • The CCyB has been 0% since 2016. • Macro-prudential tools for loans (LTV limits, etc.) apply to banks and non-banks. 	
Norway	<ul style="list-style-type: none"> • DTI limit of 5 times gross income. • LTV limit of 85%. • Principal repayment requirements of 2.5% annually with LTV above 60%. 	<ul style="list-style-type: none"> • CCyB at 1.5% from January 2015. • Capital conservation buffer 2.5% since January 2013. • 3% systemic risk buffer. • Sectoral capital requirement (risk weight on residential mortgages). • Leverage ratio requirement. 	<ul style="list-style-type: none"> • Liquidity coverage ratio (LCR) requirements: 100% for systemically important banks, 80% for others (100% from 31 December 2017); LCR requirements in individual currencies.
Poland	<ul style="list-style-type: none"> • Specific LTV and DSTI caps for foreign currency loans (2010, 2011). 	<ul style="list-style-type: none"> • Higher risk weights or capital requirements on foreign currency loans (2007, 2012). 	
Slovak Republic	<ul style="list-style-type: none"> • Recommendations in October 2014: LTV ratio should not exceed 100%, with a given share of loans above 90%; DSTI limit at 100%; 30-year maturity restriction for mortgages. 	<ul style="list-style-type: none"> • Capital conservation buffer set to 2.5% as of 1 October 2014. • Systemic risk buffer and O-SII buffer with a combined value of up to 3% from 1 January 2018 after a phase-in. • CCyB increased to 0.5% as of August 2017. 	
Slovenia		<ul style="list-style-type: none"> • Higher risk weights or capital requirements on foreign currency loans (2007). 	
Sweden	<ul style="list-style-type: none"> • LTV cap at 85% since 2010. • Amortisation requirement for all new mortgages, depending on the LTV (June 2016). 	<ul style="list-style-type: none"> • 25% risk weight floor on mortgages since 2013/2014. • 5 percentage point additional capital requirement for systemic banks. • Liquidity coverage ratio of 100% in aggregate and separately in USD and EUR (since 2013). • CCyB at 2% (effective March 2017). 	
United Kingdom	<ul style="list-style-type: none"> • LTI limit at 4.5 for 85% of new owner-occupied mortgages (June 2014). • Financial Policy Committee recommendation on interest rate stress tests for assessing mortgage affordability (June 2014). 	<ul style="list-style-type: none"> • Financial Policy Committee's Stress Testing Framework (incl. annual housing market downturn scenario). • Leverage ratio requirement for major UK banks and building societies. 	

Note: CCyB = countercyclical capital buffer; O-SII = other systemically important institutions, LTI = loan to Income, LTV = Loan-To-Value, DTI = Debt-To-Income, DSTI = Debt-Service-To-Income.

1. Designed to limit the overreliance on off-balance sheet FX swaps which were used to meet financing needs for lending long term in FX.

Source: ESRB (2017), *A Review of Macroprudential Policy in the EU in 2016*, European Systemic Risk Board; De Crescenzo et al (2015), "Currency-based Measures Targeting Banks - Balancing National Regulation of Risk and Financial Openness", *OECD Working Papers on International Investment*, No. 2015/03, OECD Publishing.



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