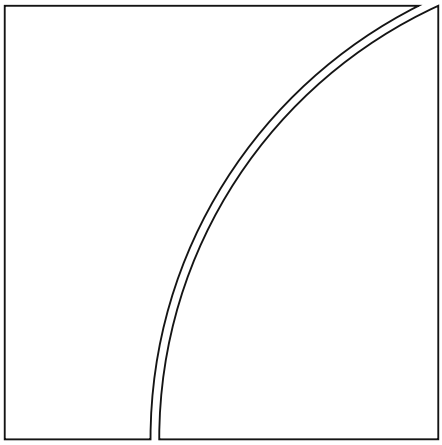

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Tackling the fiscal policy-financial stability nexus

by Claudio Borio, Marc Farag and Fabrizio Zampolli

Monetary and Economic Department

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Tackling the fiscal policy-financial stability nexus

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Abstract

Tackling the fiscal policy-financial stability nexus is essential to ensure financial and hence macroeconomic stability. In this paper, we review the literature on this topic and suggest how policy could best tackle the link. Doing so involves action on two fronts. First, incorporating financial stability considerations in the design of fiscal policy. This means, in particular, considering the risk of financial crises when assessing fiscal space, recognising the flattering effects of financial booms on fiscal positions and removing or reducing fiscal incentives to private debt accumulation. Second, acknowledging that domestic currency-denominated public debt is not fully risk-free in the design of the prudential regulation of financial institutions. This calls for carefully balanced risk-sensitive capital charges or other measures to limit banks' sovereign exposures with due regard to the special role of government bonds in the financial system and country-specific characteristics. That said, prudent regulation cannot substitute for fiscal prudence.

Keywords: financial crises; doom loops; sovereign exposures; prudential policy; fiscal policy.

JEL classification: E6; G2; G3; H1; H3; H6; H8.

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Contents

Introduction

The Great Financial Crisis (GFC) prompted major policy responses. Above all, policymakers have embarked on wide-ranging financial reforms. They have tightened prudential regulation and supervision, by both improving standards for individual institutions and strengthening the systemic, or macroprudential, orientation of their policy frameworks (Borio, Farag and Tarashev (2020)). And there has also been an active debate about whether and, if so, how, monetary policy frameworks should be adjusted in order to promote financial stability.[1]

While these efforts are essential to strengthen the financial sector's resilience and reduce the probability and cost of financial crises, in this paper we argue that they are not sufficient. In particular, policymakers have not as yet adequately addressed the link between fiscal policy and financial stability. The Covid-19 pandemic has further highlighted the importance of adopting such a holistic approach (BIS (2020)). Until this is done, a fully integrated macro-financial stability framework, involving prudential, monetary and fiscal policy, will remain beyond reach (BIS (2014, 2022), Borio, Shim and Shin (2022), Borio, Robinson and Shin (2023)).

The close link between fiscal policy and the financial sector – and banks in particular – was on full display during the GFC, very much in line with the historical record (Bordo and Meissner (2016)). In many advanced economies, unsustainable credit booms led to serious financial strains, financial institution bailouts and large-scale fiscal stimulus to fight deep recessions. This resulted in large increases in public debt. In turn, high public debt limited the room for fiscal stimulus and raised financing costs for many sovereigns and banks. This weighed down on the recovery and, in some cases, exacerbated the decline in economic activity. A number of European countries had to draw on external official aid to refinance their public debt or to recapitalise banks.

Tackling the fiscal policy-financial stability nexus involves action on two fronts. First, policymakers need to strengthen the ability of the sovereign to withstand banking crises that result from excessive *private sector indebtedness* and ensure that it does not inadvertently contribute to them. Here, large financial expansions and contractions – financial cycles – play a key role (see eg Borio (2014b)). Second, policymakers also need to strengthen banks' ability to face sovereign risk resulting from excessive *public sector indebtedness*. Action on both these fronts is necessary to prevent a sovereign-bank doom loop, whereby deteriorations in the creditworthiness of the sovereign and the banks reinforce each other.

Strengthening the sovereign requires explicitly incorporating financial stability considerations into fiscal policy. One element is to ensure that measures of fiscal space explicitly incorporate the costs that possible future banking crises can generate. A second element is to extend the principle of a countercyclical policy to address the impact of the financial cycle on the fiscal accounts, not least the flattering effect of financial booms (Borio, Lombardi and Zampolli (2017)). If sufficient buffers are maintained or built up in a financial boom, room is created to help repair balance sheets and stimulate demand if a crisis occurs (Obstfeld (2013)). Drawing on recent work (Borio, Contreras and Zampolli (2020) and Borio, Lombardi and Zampolli (2017), Borio, Gambacorta and Hofmann (2017)), we suggest how policymakers could meet these two challenges in practice – estimating the necessary fiscal buffers and cyclical adjustments. A third element – of a more structural nature – is to reduce or remove the debt bias inherent in the tax/subsidy regimes of many countries. Some of these incentives favouring debt over equity were introduced well before financial liberalisation to promote desirable economic and social goals (eg

[1] See eg Borio (2014a), Borio, Shim and Shin (2022), Borio, Robinson and Shin (2023), BIS (2016, 2019), IMF (2015) and references therein.

promoting home ownership). But nowadays they can unwittingly contribute to excessive leverage and greater financial fragility.[2]

Strengthening the banks requires a proper prudential treatment of their sovereign exposures. By and large, local currency government debt tends to be treated as a risk-free credit in prudential regulations, even if the historical record and market prices indicate otherwise. Ensuring that the regulatory treatment of sovereign exposures reflects sovereign risk more accurately would help diminish the amplification of risk and inhibit excessive accumulation of public debt. That said, the implementation of this principle would need to consider the special role of sovereign bonds in the financial system as well as country-specific characteristics. Furthermore, banks would continue to be exposed to sovereign risks indirectly, through the increased macroeconomic instability that unsustainable fiscal positions can generate. Therefore, no prudential treatment, regardless of its stringency, can substitute for fiscal prudence along the lines suggested above.

The rest of the paper proceeds as follows. Section 1 describes and documents in some detail the channels through which fiscal and financial risks propagate and mutually reinforce each other, including through the so-called doom loop. In recent years these channels have been most in evidence in the euro area, but they are much more general, as highlighted in several emerging market crises since the early 1980s. Section 2 explores the need to ensure that countries have sufficient fiscal buffers to address financial sector risks. This section explores how financial stability considerations can be incorporated into the measurement of fiscal space and cyclically adjusted fiscal balances. It also reviews the evidence on the debt bias inherent in the current systems of taxes and subsidies in major economies. Section 3 discusses the role of risk-sensitive prudential regulation in the treatment of sovereign exposures. It also sets out some high-level reflections on the implications for non-bank financial intermediation (NBFI). The conclusion summarises the policy implications of the analysis, highlighting the elements of a macro-financial stability framework needed to address the fiscal policy-financial stability nexus.

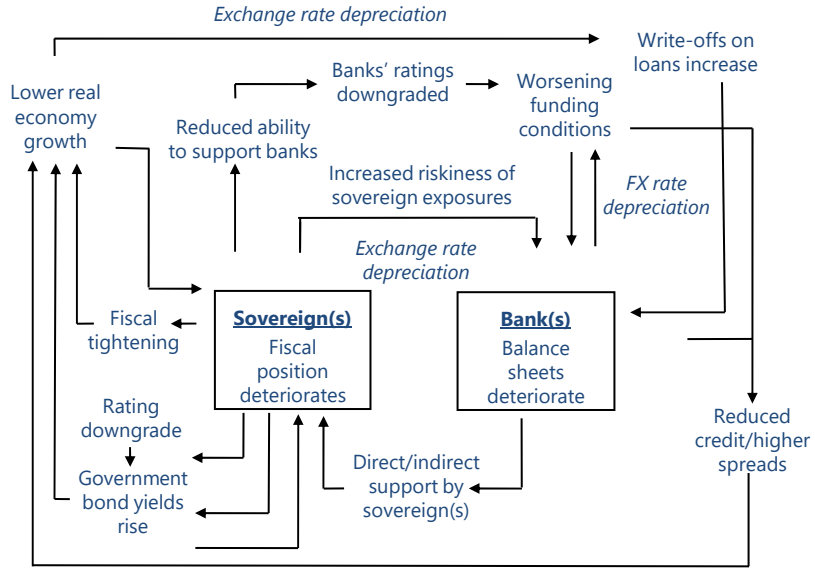
1. The two-way propagation channels of bank-sovereign risk

The financial and public sectors are closely intertwined. Banks (and other financial institutions) are a key source of funding for governments.[3] Governments, in turn, provide the ultimate backstop for the financial sector and underpin an economy's performance more generally. As a result, risks can propagate both ways through various channels. In one direction, a weak financial system can undermine fiscal health; in the other direction, a weak fiscal position can undermine the financial system's health (Graph 1).

[2] Other aspects of a macro-financial stability framework are also relevant, including the use of capital flow management measures or taxing risk exposures as a complement or substitute to prudential regulation. Discussing these measures, however, goes beyond the scope of this paper.

[3] Henceforth we use the terms "government" and "sovereign" interchangeably. We sometimes also use the term "banks" as a shorthand for the financial sector as a whole.

Bank-sovereign nexus transmission channels Graph 1



Source: authors' elaboration.

Propagation from the banks to the sovereign

Banks can affect the sovereign in several ways, all of which raise the risk of a substantial increase in public debt.

First, the sovereign is *directly* exposed to bank risk, both explicitly – through deposit insurance or other guarantees – and implicitly – through the expectation that it would be compelled to bail out institutions in trouble (see eg Diaz-Alejandro (1985)). Intervention can range from purchasing bad assets to recapitalising institutions, sometimes through temporary ownership. In some cases, the sovereign's support also extends to non-financial borrowers, including both corporations and households. While post-GFC reforms have aimed to allow authorities to resolve banks without resorting to the taxpayer, state support for failing banks has continued and obstacles to resolvability remain (FSB (2020)).

Direct bailout costs can be quite large, especially in emerging market economies (EMEs) (see eg Honahan and Klingebiel (2003), Reinhart and Rogoff (2009), Laeven and Valencia (2013, 2020), Bova et al (2016)). For instance, the median cost of over 150 systemic banking crises during the period 1970–2017 is 6.7% of GDP for advanced economies and 10% for emerging market economies (Laeven and Valencia (2020)). Importantly, there is significant variation across jurisdictions and banking crises. Most notably, the costs were huge in advanced economies during the GFC, with outlays for rescue packages amounting to close to 20% of GDP in the Netherlands, 44% in the United Kingdom and 70% in the United States (Panetta et al (2009), Marshall et al (2015)).[4] And the indirect bailout costs – encompassing measures such as debt guarantee schemes – are even larger: resources committed in rescue packages during the GFC often exceeded 50% of GDP.

[4] Recent research estimates this cost to be somewhat smaller for the United States, at 3.5% of GDP (Lucas (2019)).

Second, the sovereign is *indirectly* exposed to financial sector risk through the macroeconomic fallout of crises. After a banking crisis, fiscal balances tend to deteriorate much more and for much longer than following ordinary recessions. Two factors are responsible:

- The size and persistence of output and employment losses. Measured from peak to trough or from the peak to the point at which growth returns to pre-crisis rates, the average output loss ranges between 6 and 15% across countries, compared with less than 4% in recessions not preceded by a banking crisis.[5] More importantly, following a banking crisis, output rarely returns to its pre-crisis trend. And it takes several years on average for output to exceed its pre-crisis peak.[6] Trend growth may also suffer a lasting decline (Ball (2014), Borio, Kharroubi, Upper and Zampolli (2015), Jordà et al (2013), Reinhart and Reinhart (2015)). The interaction with automatic stabilisers exacerbates the impact of macroeconomic weakness on fiscal positions. Typically, the decline in fiscal balances tends to be larger in advanced economies than in EMEs, given their bigger automatic stabilisers (see eg Laeven and Valencia (2020)).
- The compositional change in tax revenues linked to the collapse in asset prices and financial activity. For instance, in a financial bust, housing transactions fall sharply and may create a large hole in public finances. Eschenbach and Schuknecht (2004) estimate that between 30 and 40% of the deterioration of fiscal balances in Sweden and the United Kingdom in the early 1990s bust was due to asset price effects, especially in the real estate market. More recent evidence indicates that financial variables boost fiscal balances over and above the impact of output and employment (Price and Dang (2011), Bénétrix and Lane (2017), Schuknecht (2020)).

Third, sovereigns tend to respond to crises with discretionary fiscal expansions. Provided that a country has sufficient fiscal space, such a response can help stabilise output and prevent the financial crisis from deepening. However, unless properly calibrated, this may leave a stubborn legacy of larger debt. In advanced economies, a discretionary fiscal response is frequently the single most important cause of the post-crisis public debt increase. By contrast, in EMEs the room for manoeuvre is typically smaller, most likely due to the tighter financing constraints they face (Laeven and Valencia (2020)). Most of the fiscal expansion in advanced economies during the 2008–09 recession was discretionary and, starting in mid-2010, was partly reversed as economies began to recover.[7]

Finally, the sovereign is also exposed to financial sector risk through the currency depreciation and interest rate hikes that may accompany financial stress or an outright banking crisis. Whenever a large share of public debt is denominated in foreign currency or indexed to it, such depreciation would significantly raise the domestic currency value of the public debt. Similarly, to the extent that the interest rates on debt are short term, higher domestic interest rates would quickly boost the debt service burden.[8]

[5] BCBS (2010) surveys the literature on the output costs of financial crises. See also Box III.B in BIS (2014). For more recent studies, see Furceri and Zdzienicka (2012), Cline (2016), and Romer and Romer (2017). Cerra and Saxena (2008), in particular, find that the output costs are permanent, in contrast to normal recessions. Some studies have also found permanent effects for ordinary recessions (see eg Martin et al (2015), Blanchard et al (2015)). See also Cruces and Trebesch (2013), Trebesch and Zabel (2017) and Forni et al (2021), that highlight how the output loss and growth depend on the severity of the crises.

[6] Reinhart and Rogoff (2009) find that it took more than four years on average for output per capita to return to its pre-crisis level after post-World War II crises and more than 10 years after the Great Depression crises.

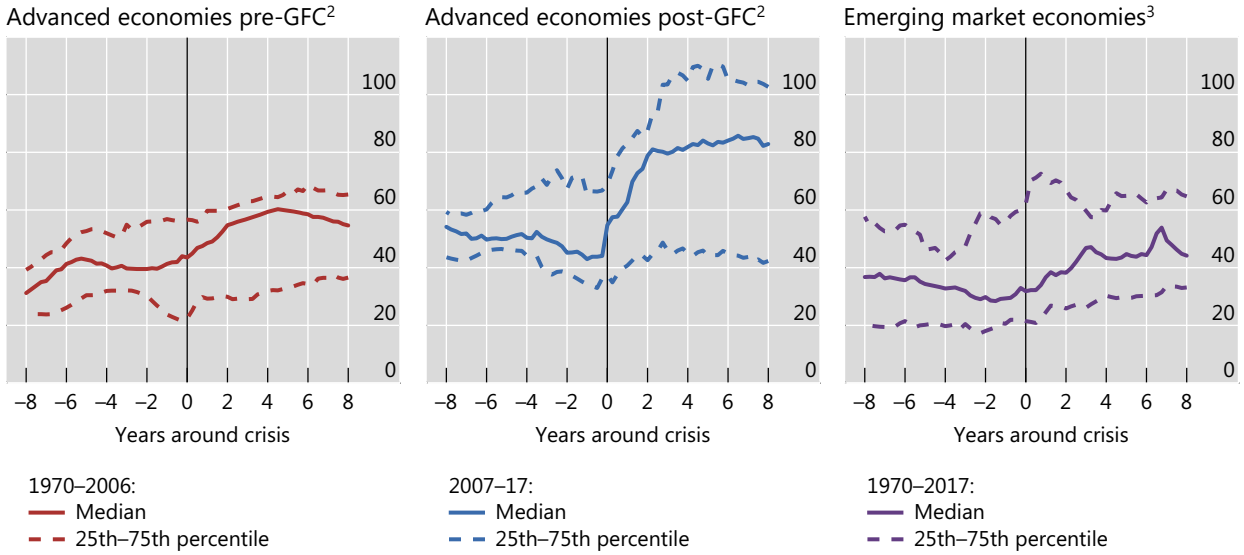
[7] Bernardini and Forni (2020) show that financial crises, which are often preceded by a build-up of private debt, tend to be followed by a larger and more prolonged increase in public debt than after an ordinary recession.

[8] Foreign currency borrowing, especially in US dollars, has always played a large role in EMEs. Over the past three decades, however, its relevance has declined as countries, at least sovereigns, have increasingly borrowed in local currency from foreign investors. This has reduced but not eliminated vulnerabilities. Hofmann et al (2020) show that changes in local currency bond yields may be amplified by fluctuations in the US dollar exchange rate. Carstens and Shin (2019) call this phenomenon "original sin redux".

Even with little foreign currency debt, an increase in financial sector risk could lead to a sharp currency depreciation, large capital outflows and increases in local currency bond yields, making it more costly for the sovereign to roll over its domestic currency debt. Furthermore, in case of a sharp devaluation, the sovereign may be forced to support other sectors that run currency mismatches (see eg Chui, Fender and Sushko (2014), Chui, Kuruc and Turner (2016)).[9]

Government debt level after a crisis[1]

Banking crises between 1970 and 2017; in percent of GDP — Graph 2



The vertical line indicates the year when the crisis starts.

[1] Median value across countries in the region and period. [2] Starting years of the crises in parentheses. Australia (1989), Austria (2008), Belgium (2008), Denmark (1987 and 2008), Finland (1991), France (1994 and 2008), Germany (2008), Greece (1991 and 2008), Ireland (2008), Italy (2008), Japan (1997), Luxemburg (2008), New Zealand (1987 and 2008), the Netherlands (2008), Norway (1991 and 2009), Portugal (2008), Spain (1977 and 2008), Sweden (1991 and 2008), Switzerland (2008), the United Kingdom (2007) and the United States (1988 and 2007). [3] Starting years of the crises in parentheses. Argentina (1980, 1989, 1995 and 2001), Brazil (1990, 1994 and 2001), Chile (1976 and 1981), China (2003), Colombia (1982 and 1998), the Czech Republic (1996), Egypt (1980 and 1991), Hungary (1991 and 2008), India (1993 and 2008), Indonesia (1994 and 1997), Korea (1997), Malaysia (1997), Mexico (1981 and 1994), Peru (1983), the Philippines (1983 and 1997), Poland (1992), Russia (1998 and 2008), Thailand (1983 and 1997) and Turkey (1982, 1994 and 2000).

Sources: Laeven and Valencia (2020); Reinhart, www.carmenreinhart.com/data; IMF, International Financial Statistics and World Economic Outlook; OECD, Economic Outlook; national data; authors' calculations.

One way to capture both direct and indirect fiscal costs of a banking crisis is to look at the change in public debt in its aftermath. The historical record shows that these costs are very large. For instance, for the post-war period, Reinhart and Rogoff (2009, 2013) find that, in both advanced and emerging economies, central government debt almost doubled on average within three years of the crisis outbreak (86% increase). Covering the period since 1970, the median cumulative increase in the government debt-to-GDP ratio in the five post-crisis years for advanced economies is approximately 20 percentage points and almost 40 percentage points, depending on whether one considers the pre- or post-GFC subsample

[9] The sovereign may also experience a currency crisis if investors come to expect a bailout of the private sector and the resulting impact on fiscal positions, inflation, depreciation and/or the imposition of capital controls (see eg Corsetti, Pesenti and Roubini (1999)). Theoretical models of currency crises that formalise this type of narrative include Velasco (1987), Calvo and Mendoza (1996) and Burnside et al (2004). See also Corsetti and Dedola (2016).

(Graph 2).[10] For EMEs, the post-banking crisis median increase is smaller but still sizeable, at 12 percentage points. In all cases, there is considerable variation across countries and episodes (see also Laeven and Valencia (2020), Bova et al (2016)).

Given the potentially large fiscal cost, it is unsurprising that empirical research has found significant contamination from financial to sovereign risk. For instance, analysis of pre- and post-GFC data shows that, in advanced economies, sovereign credit default swap (CDS) spreads are positively related to measures of the pre-crisis exposure of the financial system and pre-crisis growth in their assets (Dieckmann and Plank (2012)) as well as to cross-border bank exposures (Kallestrup et al (2016)). Risks arising from the non-financial corporate sector also matter. In a panel of EMEs, sovereign risk, as measured by local currency spreads over a synthetic risk-free rate (Du and Schreger (2016)), is found to be related to the extent of currency mismatches in the non-financial corporate sector both over time and across countries, over and above the size and composition of public debt (Du and Schreger (2022)).

Propagation from the sovereign to the banks

Sovereign credit events typically involve significant losses for sovereign debt holders.[11] This is most obvious in the case of default, through adverse contract changes (eg longer maturities and lower interest rates). Since the 1970s, loss-given-default rates have averaged 37%, with large variations across episodes. Moreover, large haircuts have typically led to protracted periods of market exclusion and/or high credit spreads, which contribute to making the output loss deeper and the recovery slower (Cruces and Trebesch (2013), Trebesch and Zabel (2017)). Short of default, rating downgrades and other events can still result in sizeable losses (see eg Aizenman et al (2013)).

Even if a severe credit event does not materialise, an increase in sovereign risk (reflecting the probability of such an event) can boost financial risk. There are at least three channels through which this can occur (see eg CGFS (2011)).[12]

First, the drop in the price of government securities weakens banks' balance sheets directly. Even short of a government default, an increase in sovereign risk premia will generate losses on direct holdings and depress the value of sovereign bonds as collateral. The size of these effects depends on the amount and duration of the government bonds held, although the extent of the recognition of the losses varies according to accounting treatment (eg historical cost versus marked-to-market).

Second, an increase in sovereign risk can tighten banks' funding conditions. Investors are likely to perceive banks as riskier and therefore charge higher spreads. It also saps the value of explicit and implicit government guarantees. Financial institutions holding a significant stock of foreign currency debt and/or facing maturity mismatches may be especially vulnerable: the higher risk of currency depreciation,

[10] Approximating these costs with changes in public debt over a sufficiently long horizon – in this case five years – allows for accounting for any recovery rates and reversal in fiscal stimulus.

[11] Sovereign credit events may come in different forms (BCBS (2017)): missed payments, debt restructuring or outright defaults, currency redenomination (or the risk thereof), loss from unanticipated inflation owing to sovereign distress, debt monetisation and/or sharp currency devaluations, and fluctuations in the value of sovereign exposures resulting from non-default events such as sovereign downgrades or market stress. The risk from such events covers the full universe of sovereign entities, including central governments, central banks, subnational governments and public sector entities (see eg Liu and Tan (2009) and references therein).

[12] Theoretical models that capture the contagion from fiscal to financial risk and broader macroeconomic effects include Bocola (2016), Bocola and Dovis (2019), Brutti (2011), Bolton and Jeanne (2011), Corsetti, Kuester, Meier and Müller (2012), Gennaioli et al (2014), Mendoza and Yue (2012), Sosa-Padilla (2018). Early models of currency crisis, following the seminal contribution of Krugman (1979), draw attention to unsustainable fiscal policy as a fundamental cause. Alberola et al (2021) show in a model of sovereign default that an increase in sovereign risk drives the currency risk premium.

sharp interest rate increases or impending capital controls may make investors and depositors more reluctant to provide funding.

Third, an increase in sovereign risk can weaken banks through its broader impact on the economy. Currency depreciation, lower stock prices and a lower credit rating[13] can make it more difficult for both financial and non-financial firms to tap capital markets, weakening aggregate demand and sapping banks' strength. In addition, fiscal policy may have less room for a countercyclical response and to support the banking system directly.

Research confirms the quantitative relevance of the transmission from fiscal to financial risk. Higher sovereign risk tends to depress bank valuations, raise measures of bank risk and reduce bank lending to a degree that depends on sovereign exposures. This does not simply reflect country risk: indeed, within the same country during the euro area debt crisis, banks with larger domestic sovereign exposures cut credit by more than their peers in response to increased sovereign risk (Acharya et al (2018), Altavilla et al (2017), Arellano et al (2019), Başkaya et al (2023), Bofondi et al (2018), Bottero et al (2020), Popov and van Horen (2015)). Country- and bank-level data show that this effect also holds for different periods and a large set of countries, including emerging market and developing economies (Gennaioli et al (2014, 2018)). (Box A sheds some empirical light on the evolution of banks' holdings of sovereign debt over time.)

Interestingly, even well capitalised banks without significant sovereign exposures face higher borrowing costs and reduced credit supply. The evidence points to different underlying factors. One such factor is the concern that slower economic activity would raise borrowers' default rates. For instance, Bocola (2016) estimates that this channel explains almost half of the sharp increase in bank lending spreads (60 basis points) faced by non-financial firms in Italy at the height of sovereign tensions. Another factor relates to rating agencies' sovereign ceiling policies. In response to a sovereign downgrade, banks whose rating is at the sovereign ceiling face higher funding costs and cut lending more than those that are further away, regardless of fundamentals (Adelino and Ferreira (2016)). Likewise, the reduction in non-financial firms' spending varies with how close their rating is to the ceiling (Almeida et al (2017), Dell'Ariccia et al (2018), IMF (2022), Deghi et al (2022)).

[13] The "sovereign ceiling" policies of rating agencies require that firms remain at or below the sovereign rating of their country of domicile. Firms' credit rating may therefore be reduced mechanically following a sovereign downgrade, which curtails their ability to obtain external finance regardless of whether their fundamentals have deteriorated.

Box A

Bank exposures to sovereign risk and post-pandemic trends

This box reviews the evolution of banks' sovereign debt holdings – focusing on domestic government exposures – over time and across jurisdictions. It then outlines a few considerations for the outlook of the bank-sovereign nexus channels in light of post-pandemic macro-financial developments.

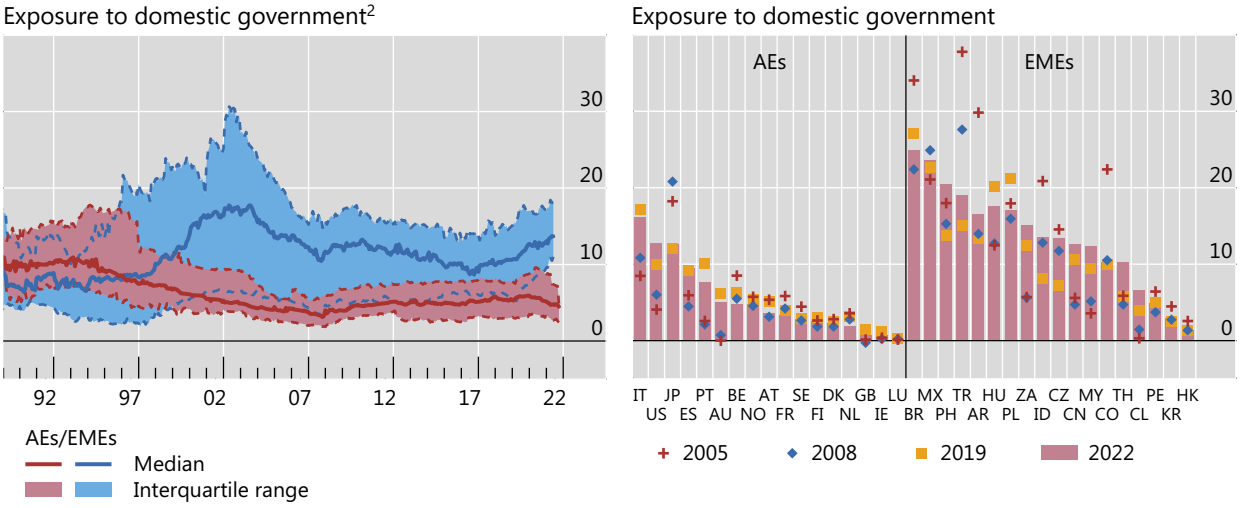
There are three takeaways when looking at banks' sovereign exposures over a long horizon.

First, banks' sovereign holdings have varied over time (Graph A1, left-hand panel). In both advanced economies (AEs) and emerging market economies (EMEs), exposures (as a share of assets) were on a declining trend before the Great Financial Crisis (GFC).① As public debt rose sharply following the GFC and the euro area debt crisis, exposures rose in both groups of economies. Thereafter, the downward trend resumed in AEs, supported by central banks' large-scale purchases of government securities. In contrast, in EMEs exposures have steadily increased since the start of the pandemic.②

Second, and perhaps most notably, aggregate data mask sizeable differences in the level of sovereign holdings across and within jurisdictions at any given time (Graph A1, right-hand panel). For example, the range of banks' domestic government holdings at the end of 2022 was between 1% (United Kingdom) and almost 25% (Mexico) of total assets. There is also substantial variation across banks within a given jurisdiction: for example, the share of sovereign bonds held by Italian banks ranges from approximately 15 to almost 60% of total assets.③ More broadly, banks' domestic government bond holdings in EMEs have historically been approximately twice those of their AE peers (Graph A1). This may, in part, reflect differences in the development of institutional investors. Similarly, while the median bank's sovereign debt holding as a share of its assets has remained broadly unchanged since 2005, banks in nearly half of the jurisdictions in our sample have increased their sovereign exposures (right-hand panel).④

Banks' sovereign exposures vary significantly across countries and over time[1]

As a share of total assets, in per cent — Graph A1



[1] By residence. The reporting population comprises all solo entities resident in the country, including those that are foreign-owned subsidiaries or branches of foreign entities. Branches and subsidiaries abroad of domestically owned entities are not included. [2] Median across 20 AEs and 22 EMEs. AEs: Austria, Australia, Belgium, Canada,, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland, and the United States. EMEs: Argentina, Brazil, Chile, China, Colombia, Czechia, Hong Kong SAR, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, Philippines, Poland, Russia, Saudi Arabia, Singapore, Thailand, Türkiye and South Africa.

Sources: ECB; IMF, *International Financial Statistics*; national data; BIS calculations.

Third, while banks' sovereign debt holdings may appear to comprise a relatively small share of their balance sheets, this may understate their materiality when it comes to banks' resilience, as measured by loss-absorbing capacity. For example, domestic government debt has accounted for around 6% and 11% of total assets for the median bank in AEs and EMEs, respectively (left-hand panel), while over the past decade, banks' capital levels – as measured by the Basel III Tier 1 leverage ratio – have varied from 3.5% to over 6% (BCBS (2023)). Moreover, as noted above, the data used in this box capture only domestic government holdings and do not reflect broader sovereign exposures (including, most notably, exposures to foreign governments and public sector entities).

Reflecting these developments, the importance of banks as investors in sovereign debt has evolved differently across AEs and EMEs recently. At the outset of the pandemic, nearly 80% of sovereign debt issued was picked up by (mostly local) banks, with this share falling progressively to under 10% at the end of 2021, due to the greater share of sovereign bonds held by central banks resulting from large-scale asset purchase programmes. The flipside of this change is that that banks' exposures to central banks – in the form of reserves – grew commensurately during this period (Hardy and Zhu (2023)). Looking ahead, the eventual unwinding of large-scale bond purchases may increase the importance of banks as sovereign debt investors. Both instances speak to the importance of ensuring that banks are well capitalised against the risk of sovereign disruptions, as discussed in Section 3.

① During the euro area debt crisis, sovereign exposures increased more in countries under financial stress. Possible, non-mutually exclusive, explanations include: (i) "risk shifting" behaviour by banks from private sector assets towards public debt; (ii) "gambling for resurrection", whereby banks' equity holders and managers shift part of the additional sovereign risk onto creditors and taxpayers; and/or (iii) "moral suasion", whereby authorities may induce banks to play a stabilising role as contrarian investors. For recent theoretical models with risk shifting or credit discrimination, see eg Ari (2018), Broner et al (2014), Cooper and Nikolov (2018), Farhi and Tirole (2018) and Uhlig (2014). There is evidence that some of these factors played a role in the euro area debt crisis (see eg Acharya and Steffen (2015)). In euro area stressed countries, publicly owned banks or banks that had recently been bailed out increased their holdings of domestic debt more than other banks and fared worse in response to spikes in sovereign risk. This contributed to amplifying the contraction in the lending supply (Altavilla et al (2017), De Marco and Macchiavelli (2016)). ② Changes over time within countries reflect both secular and cyclical forces. In EMEs, the decline in exposures before 2017 partly echoes the increasing financial sophistication and integration of EMEs. In both AEs and EMEs, changes partly reflect the business and financial cycles. Unsurprisingly, when credit demand declines and risk appetite is low, the demand for domestic public debt increases given its greater liquidity and safety. ③ As of 30 June 2022, based on the EBA's 2022 EU-wide transparency exercise. ④ Cross-country differences tend to persist and partly reflect structural factors, such as financial depth, the level of public debt, the central bank operations framework and regulatory constraints.

Default on domestic currency debt, inflation and financial repression

A widespread view is that default or restructuring is not realistic for *local currency* domestic debt: if push comes to shove, countries can always "inflate away", possibly supported by financial repression. History, however, indicates that formal default on domestic currency debt may happen, often alongside both inflation and financial repression. And, even when default does not occur, the costs imposed on the financial system and on banks to avoid it may not necessarily be small. Indeed, as noted above, the definition of sovereign risk encompasses a broad range of events (beyond a formal default) that can damage the financial system.

Inflating away debt through inflation alone is difficult. Inflation naturally reduces the real value of outstanding domestic currency debt.[14] However, for the typical average maturity (and share of inflation-indexed bonds), the reduction appears to be quantitatively small unless the inflation "surprise" – ie not embedded in the interest rate compensation when the contract is struck – is in double-digit percentage

[14] Given that fiscal items are set in nominal terms (and are not perfectly indexed to inflation), inflation – even if fully anticipated – can also help to shrink any fiscal deficit by reducing public spending and increasing tax revenue in real terms. For example, Persson et al (1998) estimate that, given the state of public finances and the economy in Sweden in 1994, an increase in inflation from 2 to 12% would have produced a net gain of 3–4% of 1998 GDP. However, Persson et al (1998) also estimate that these benefits would have fallen short of the costs of higher inflation, including those arising from higher real interest rates.

points. In addition, the window to exploit this option may close fast once fiscal problems begin to emerge, as investors may demand ever shorter durations to protect themselves (see eg Hilscher et al (2022) for the case of the United States).[15] Indeed, increasingly higher inflation may be needed – eventually ushering in hyperinflation.[16]

This is why a typical way of eroding the value of the debt is to combine inflation with financial repression. This involves restrictions that compel financial institutions and the public to hold domestic public debt at below-market interest rates. These restrictions will typically include cross-border capital controls to prevent capital outflows.[17] Although financial repression played an important role in reducing public debt ratios in the aftermath of World War II (Reinhart et al (2015), Reinhart and Sbrancia (2015)), it is unclear how far it could work in today's environment of highly mobile capital and liberalised financial services.

The historical record shows that defaults on domestic debt (which is typically denominated in domestic currency) are far from rare, albeit less frequent than those on foreign debt (Reinhart and Rogoff (2011b)). Often, but not always, domestic defaults accompany external defaults, tending to occur when countries face harsher economic conditions and markedly higher inflation. Indeed, an important lesson from history is that countries that had been considered "good sovereigns" did default, often after big geopolitical events (see eg Flandreau et al (2010), Flandreau (2013)). Evidence based on the period 1996–2012 finds that local and foreign currency bond defaults are equally likely and that the default probabilities of local currency bonds rise with the level of inflation (Jeanneret and Souissi (2016)).

Based on the historical record, rating agencies have fully incorporated the possibility of default on domestic currency debt. As a matter of course, they assign separate domestic currency and foreign currency sovereign ratings. For advanced economies, even those with small or negligible shares of foreign currency debt, domestic currency debt is not always rated triple A. As to EME ratings, domestic currency debt ratings were historically higher than sovereign bonds issued in a foreign currency, which may have reflected the view that sovereigns were less likely to default on local currency obligations (Amstad et al (2020)). However, the rating of local currency debt has declined over time so that today the gap between the two ratings is almost negligible (Graph 3).[18]

Even without a default, a high inflation scenario may hurt banks. In the short run, this could be the case owing to valuation effects. Higher inflation will lead to higher yields and hence lower prices on securities, as banks typically have assets of a longer duration (interest rate sensitivity) than their liabilities (see eg Perry (1992)). Banks would also suffer from a currency depreciation to the extent that they have a net liability foreign currency position. In the long run, higher inflation may hurt banks by reducing

[15] This is not to deny that, as stressed by the fiscal theory of the price level (FTPL), some inflation may help smooth the adjustment to adverse fiscal developments, thus allowing countries to avoid a sharper fiscal policy tightening (see eg Sims (2013, 2016)). But this presumes that the costs of inflation are sufficiently small, and that inflation is "controllable", staying below a reasonable rate and not causing large economic distortions or large and arbitrary wealth redistributions. Such an outcome would require sufficient policy credibility and institutional safeguards. Moreover, this view presumes that higher inflation will not disrupt the orderly functioning of financial markets. Typical models of the FTPL do not capture this effect. Finally, inflation is not a free lunch: it is best seen as a highly regressive tax, hitting the poorer segments of society disproportionately.

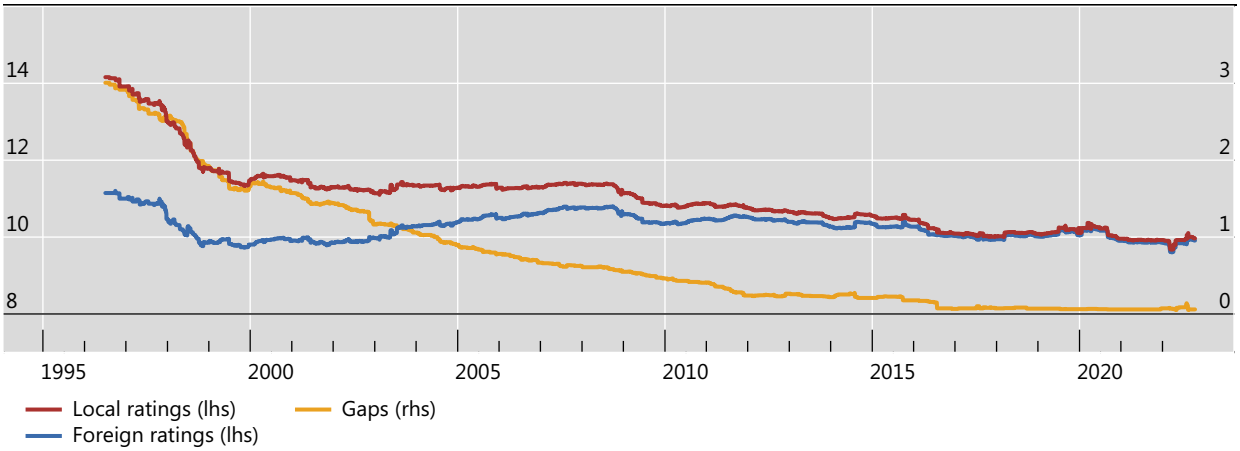
[16] High inflation and hyper-inflation are often the consequence of fiscal imbalances and accommodative behaviour by monetary policymakers (see eg Fischer et al (2002)). That said, without correcting the fiscal imbalance, tighter monetary policy may only postpone higher inflation (Sargent and Wallace (1981)).

[17] Financial restrictions may also be the outcome of financial regulation or credit policies. For instance, following the GFC, it has been argued that elements of financial repression have de facto reappeared in advanced economies, although not motivated by concerns with either sovereign risk or inflation (see eg Reinhart (2012) and van Riet (2013)).

[18] For inflation targeting regimes, Amstad et al (2020) find evidence supporting the hypothesis that higher inflation increases the willingness to contemplate default.

economic and financial activity, offsetting the higher net interest margins typically linked with higher nominal interest rates (see eg Borio, Gambacorta and Hofmann (2017), Claessens, Coleman and Donnelly (2016)). Indeed, high and especially variable inflation tends to coincide with a smaller financial sector, worse bank performance and lower average growth (see eg Choi et al (1996), Boyd et al (2001), Boyd and Champ (2006, 2009), Rousseau and Wachtel (2002)).

Local and foreign currency EME sovereign debt ratings have converged over time[1] Graph 3



[1] The left-hand axis is a numerical scale translating the average sovereign debt ratings from Fitch, Moody's and S&P for a sample of 73 EMEs, where 20 represents a rating of AAA or equivalent, and 1 represents a rating of CC or equivalent. The right-hand axis shows the difference between local and foreign ratings.

Sources: Amstad et al (2020); authors' calculations.

Similarly, the introduction of financial repression would also hurt banks. By design, the restrictions would oblige them to hold low-yielding assets. And, in the long run, banks could suffer indirectly, to the extent that financial repression lowers growth, most likely owing to credit and capital misallocation (see eg Roubini and Sala-i-Martin (1992, 1995), Levine (2005)).

Risk amplification and "doom loops"

The previous discussion indicates that sovereign and financial risks can be mutually reinforcing and may therefore generate "doom loops". Banking crises are a major source of deterioration in fiscal positions; in turn, a weaker sovereign can sap banks' strength. Indeed, banking and sovereign crises have frequently occurred simultaneously or have followed one another in quick succession (see eg Bordo and Meissner (2016)).[19] Market prices, too, reflect this mutual amplification of risks.

Outside default episodes, bank and sovereign risks tend to move in tandem. This is the case regardless of how these risks are measured (eg by CDS spreads, expected default probabilities or interest rate spreads). Studies focusing on euro area countries in the aftermath of the GFC generally find evidence

[19] Systemic banking crises are more frequent than sovereign debt crises and tend to lead them. They are typically preceded by a large and rapid rise in private credit and asset prices. See Borio and Lowe (2002), Drehmann et al (2011), Claessens, Kose and Terrones (2011), Reinhart and Rogoff (2011b), Schularick and Taylor (2012), Laeven and Valencia (2013), Jordà et al (2013, 2016)), Herrera et al (2019). Recent theoretical models of endogenous credit booms include Boissay et al (2016) and Gorton and Ordoñez (2020). Public debt does not tend to rise fast before a crisis: if anything, it is on average slightly countercyclical (Jordà et al (2016)) and not a common cause of banking crises (Kaminsky and Reinhart (1999)). Based on the historical record, the 2009–10 debt crisis in Greece looks more like the exception than the rule. That said, during a private credit boom, contingent financial liabilities build up, which translates into higher debt levels after a financial crisis materialises.

of a direct causal interdependence: the correlation between the two risks is stronger than can be explained by common factors, such as the state of the economy, market volatility and aggregate global risk (see eg Gerlach et al (2010), de Bruyckere et al (2013), Acharya et al (2014), Fratzscher and Rieth (2019), Hardy and Zhu (2023)). The strength of this correlation varies depending on a host of factors. For instance, it tends to be stronger in countries with less fiscal space – eg, higher government debt to GDP ratios – and where banks are weaker – eg more leveraged, more reliant on wholesale funding and holding larger amounts of government securities. Balance sheet variables also explain the strength of the correlation between individual bank risk and sovereign risk within the same country (de Bruyckere et al (2013), Acharya et al (2014)).

In EMEs, the correlation between sovereign and bank risks (as proxied by the expected default frequency) is also found to be strong, although it varies considerably over time and across countries. It tends to increase with the level of distress in the banking sector and with the tightness of global financial conditions. Furthermore, the spillovers vary across sectors: they are on average stronger from sovereign to banks than in the opposite direction. And they vary across countries: they are larger in those with higher public debt and larger bank holdings of public debt (IMF (2022), Deghi et al (2022)).

2. Fiscal policy to support financial stability

The previous discussion indicates that having adequate fiscal space is a prerequisite for financial stability, even when a debt crisis does not originate from public sector borrowing. Fiscal space dampens or breaks the vicious circle that propagates and amplifies any adverse event that hits the banking sector, making financial crises less likely.[20] In addition, it is a necessary condition for solving a crisis in an orderly way once it arises, including by backing up any lender of last resort or buyer of last resort central bank operations.

As is well known, many factors can undermine fiscal sustainability. But how can one specifically measure those linked to financial stability? That is, how can one assess in real time the potential impact of future financial (banking) crises on fiscal space (stock) or that of a financial boom on cyclically adjusted fiscal positions (flow)? Consider each question in turn.

Fiscal buffers

There is no hard and fast rule for determining the minimum or optimal size of a fiscal buffer against banking risk. To get a sense of the potential magnitudes, one can look at the mean or median fiscal costs experienced in past banking crises, which are quite large (Graph 2 above). However, since the direct and indirect fiscal costs vary greatly across countries and episodes, to come up with an assessment more suitable for policy, it is important to understand what explains this variation. And because any such assessment is shrouded in uncertainty, it is best to base it on a distribution of possible outcomes rather than on point estimates.

Borio, Contreras and Zampolli (2020) put forward a method for computing the distribution of the potential fiscal costs of a banking crisis based on the distribution of past crises' fiscal costs. This approach

[20] Lack of fiscal space may also imply persistently higher credit spreads and more distortionary taxation, which in turn may exert a significant drag on productivity and growth (see eg Cecchetti et al (2011), Checherita-Westphal and Rother (2012), Reinhart et al (2012), Baum et al (2013), Woo and Kumar (2015), Chudik et al (2017)). Lower average growth may then gradually erode the profitability and solidity of financial institutions, raising the probability of financial crises and creating the conditions for slow trend growth to be self-perpetuating.

is equivalent, in credit risk management parlance, to estimating *losses given default* as opposed to estimating *default probabilities*. It comprises three steps.

The first step is to approximate the overall ex post fiscal cost with the increase in gross public debt over a five-year window, as is standard in the literature (see eg Laeven and Valencia (2013, 2020), Bova et al (2016)). Such a measure includes both direct and indirect costs; and because it calculates the change over several years, it is less likely to overstate the true fiscal cost (see also Graph 2 and footnote 10).

The second step consists in finding the factors that best predict the fiscal cost in past banking crises. Here the authors find that a relatively small set of variables appears to provide the best prediction.[21] One variable pertains to the fiscal position itself: the pre-crisis government debt-to-GDP ratio tends to raise the fiscal cost – probably acting as a proxy for policy headroom.[22] The other variables include the pre-crisis level and growth rate of domestic credit to the private non-financial sector (aggravating factor) as well as foreign exchange reserves and bank capital (mitigating factors).

The third step consists in computing the mean and various percentiles of the conditional distribution of the fiscal cost *given* that a crisis has taken place. This is done based on quantile regressions that include the risk factors identified in the previous step. The projected quantiles are then interpolated to obtain a smooth distribution using a method akin to the one employed by Adrian et al (2019) in the "growth-at-risk model".

Based on data available at the end of 2018, the approach finds that the fiscal costs linked to possible future crises estimated based on those factors are significant (Graph 4). The expected average fiscal cost is within a range of 5–30% of GDP for advanced economies, with a cross-country average of 20%. The range is similar for emerging markets and less developed economies, although the cross-country average is lower. At the tail of the distribution, the fiscal losses can be substantial. On average across advanced economies, the 95th quantile is approximately 38% of GDP and the 99th quantile exceeds 40%.

Comparing estimates of these fiscal cost with typical estimates of fiscal space for OECD countries (eg Fournier and Fall (2017), Fournier and Bétin (2018)) suggests that the available space should be sufficient to absorb the cost of the crisis for most, but not all, economies in our sample.[23] However, these measures of fiscal space are likely to overstate the true amount of space available as they do not consider several sources of uncertainty. In the case of EMEs, considering the calculations of, for instance, Ganiko et al (2016) which account for various sources of uncertainty, fiscal sustainability in a number of countries looks vulnerable in the case of serious financial stress.

Any estimate of a fiscal cost is inevitably subject to a very high degree of uncertainty due to the method used, data availability and the impossibility of incorporating all relevant information. For this reason, the method proposed by Borio, Contreras and Zampolli (2020) is intended to be just one input in what is a much more complex decision. In particular, the method does not take into account the probability of a crisis; only the fiscal cost given a crisis. In addition, the estimates of fiscal cost might not capture the full benefits of the financial reforms following the GFC. These have not just raised bank capital, but also improved its quality and robustness, introduced liquidity standards, implemented macroprudential

[21] See also Amaglobeli et al (2017).

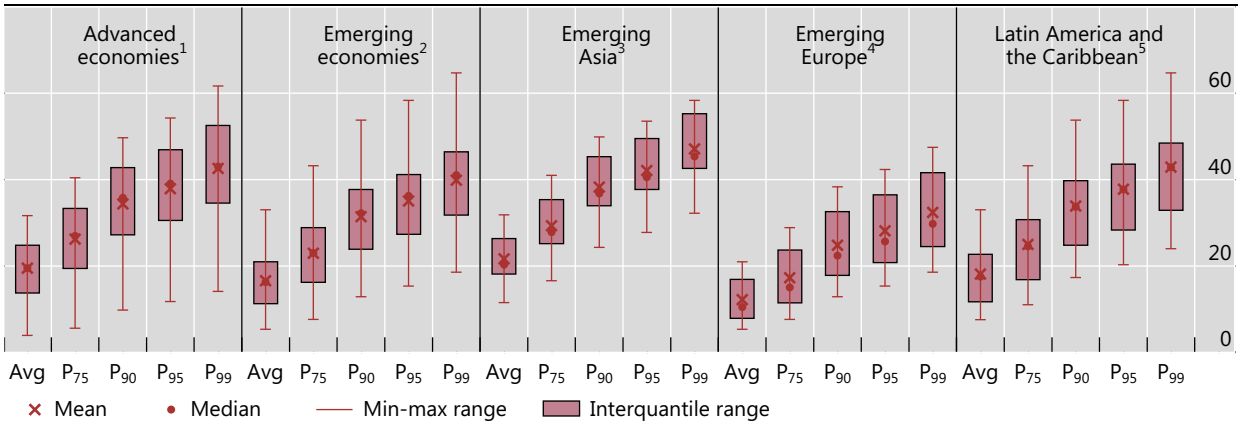
[22] This is consistent with evidence for advanced economies indicating that higher public debt at the onset of a crisis leads to deeper recessions and slower recoveries (Jordà et al (2016), Romer and Romer (2018), Aizenman et al (2019)).

[23] Producing estimates of fiscal space is notoriously complicated (see eg D'Erasmo et al (2016)). One simple method that has gained some traction in policy circles – and employed by Fournier and Fall (2017) and Fournier and Bétin (2018) – is to compute debt limits using a non-linear fiscal reaction function. This amounts to postulating that, for sufficiently high debt levels, the response of the fiscal authorities diminishes as debt increases (see eg Ghosh et al (2013)). However, this method may lead to significant over-estimation of fiscal space (see eg Box V.B in BIS (2016)).

frameworks and put in place specific arrangements to ensure the orderly resolution of systemically important banks (BIS (2018), Borio, Farag and Tarashev (2020)). Finally, large estimates of the ex ante fiscal cost do not imply that the best solution is necessarily or exclusively of a fiscal nature: prudential regulation is always an essential part of the solution (see below).

Size of required fiscal buffers to cover banking crisis fiscal cost, as of 2018

Percentage of GDP — Graph 4



The fiscal cost of a banking crisis is the predicted increase in public debt over a five-year period conditional on a crisis occurring and the observation of the risk factors at the end of 2017. Avg indicates the mean fiscal cost given a crisis; P75 P90, P95 and P99 are the 90th, 95th and 99th quantiles, respectively. The graph shows how the estimates of the average and the quantiles of the fiscal cost are distributed across countries.

[1] Advanced economies: Australia, Austria, Belgium, Croatia, Cyprus, Denmark, Finland, Greece, Ireland, Luxembourg, Malta, Netherlands, Portugal, Slovakia, Spain and Switzerland. [2] Emerging economies: Algeria, Argentina, Belarus, Bolivia, Bosnia and Herzegovina, Brazil, Bulgaria, Chile, China, Colombia, Czech Republic, Dominican Republic, Ecuador, El Salvador, Estonia, India, Indonesia, Kazakhstan, Latvia, Lithuania, Malaysia, Mexico, Moldovia, Nicaragua, Nigeria, North Macedonia, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Russia, South Africa, Sri Lanka, Thailand, Turkey, Ukraine, Uruguay, Vietnam and Zambia. [3] Emerging Asia: China, India, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand and Vietnam. [4] Emerging Europe: Belarus, Bosnia and Herzegovina, Bulgaria, Czech Republic, Lithuania, Latvia, Moldova, North Macedonia, Poland, Russia, Turkey and Ukraine. [5] Latin America and the Caribbean: Argentina, Brazil, Bolivia, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Mexico, Nicaragua, Panama, Paraguay, Peru and Uruguay.

Source: Borio, Contreras and Zampolli (2020).

Cyclical adjustments

Once policymakers have decided on the optimal size of fiscal space to use as a buffer, the key challenge is to prevent the fiscal space being inadvertently eroded over time. Indeed, fiscal positions fluctuate cyclically with the state of the business cycle but should remain constant over time to avoid a dangerous drift.

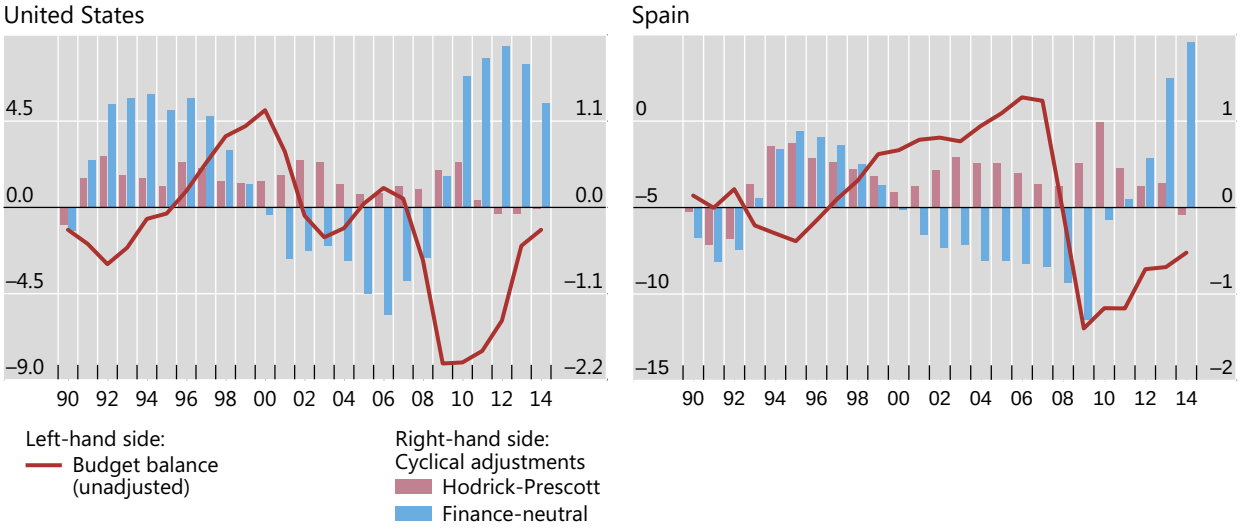
While measuring cyclically adjusted fiscal positions is generally difficult, a major limitation of standard approaches is that they fail to properly account for the flattering impact of financial booms – a typical source of subsequent recessions and outright banking crises (see eg Borio and Drehmann (2009), Schularick and Taylor (2012)). During such booms, estimates of potential output and potential growth will tend to be skewed upwards, thereby overestimating the strength of the underlying fiscal balance. In addition, unsustainable rises in asset prices may hide further weakness as they tend to boost revenues for any given output performance. An additional factor is that, under political economy pressure, policymakers may feel encouraged to relax fiscal policy further (see eg Tornell and Lane (1999), Lane (2003), Talvi and Végh (2005), Santos (2015)).

The pre-GFC experience of Spain and Ireland is quite telling. In both cases, government debt-to-GDP ratios were falling before the crisis and as events unfolded (ie in real time) measures of cyclically adjusted fiscal positions pointed to surpluses. But, once the crises erupted and measures were re-estimated following the standard methods, it turned out that both countries had run cyclically adjusted deficits during the boom. Their (unobservable) potential output had been overestimated. History, as it were, had been rewritten.

Borio, Disyatat and Juselius (2017) develop a method designed to capture the flattering impact of financial booms on the output gap in real time – so-called "finance-neutral" measures (see also Borio, Disyatat and Juselius (2014)). The method is an improvement over standard ones, such as production function approaches or those based on filtering methods that use information on inflation rather than the financial cycle. The main reason is that proxies for the financial cycle, including the behaviour of credit and property prices, contain useful information about output fluctuations at typical frequencies. Furthermore, unlike conventional measures, finance-neutral measures of the output gap obtained in real time tend to be quite close to those based on ex post data. The output gap measure thus obtained is then used to adjust the fiscal balance (see Borio, Lombardi and Zampolli (2017)).[24]

Cyclically adjusted fiscal balances (real time)

As a percentage of GDP — Graph 5



Sources: OECD; Borio, Lombardi and Zampolli (2017).

The comparison between different measures of the cyclically adjusted fiscal balances is striking (Graph 5). In the boom that preceded the GFC, the fiscal balances adjusted according to standard measures of the output gap (red lines) indicated a surplus, while the fiscal balances adjusted using the finance-neutral output gap (blue lines) indicated a deficit. The gap between the two measures is also significant, amounting in some periods to more than one percentage point of GDP.

Admittedly, such a finance-neutral measure of the fiscal balance does not incorporate all the channels through which fiscal strength may be overestimated. Further research could seek to incorporate factors such as the compositional effects of asset price booms (for a given output level), exchange rate-

[24] As a complement, for countries that rely heavily on commodity exports, it may be useful to make a cyclical correction of fiscal balances using information about commodity prices (eg Alberola et al (2016)).

induced effects on the valuation of debt and systematic patterns in interest rate behaviour (see Borio, Lombardi and Zampolli (2017) for a discussion).

Reducing the debt bias in the tax system

In most countries, tax systems favour debt over equity. In the household sector, several countries allow tax relief on mortgage interest payments, usually with the aim of encouraging home ownership. Similarly, in the corporate sector, income taxes generally allow interest payments to be deducted when determining taxable profits, whereas the return-on-equity, either through dividends or capital gains, is typically not deductible.[25] In both cases, removing, or at least reducing, the debt bias in taxation should lower leverage significantly. This, in turn, would reduce the probability and cost of a banking crisis (see eg De Mooij, Keen and Orihara (2014), Langedijk et al (2015)).

The available evidence supports the proposition that the tax system has a significant impact on leverage. While formal evidence is generally limited for the household sector (see eg Hendershott et al (2003)),[26] it is more substantial for the corporate sector. Across countries, financial and non-financial firms tend to have higher leverage where effective tax rates on corporate income are higher. And meta-analysis of studies that control for confounding factors finds consistent results: a 1 percentage point lower tax on corporate income reduces the debt-to-asset ratio in non-financial corporations by 0.27 percentage points (Feld et al (2013)).[27] For banks, the literature has found a broadly similar effect, although for larger banks the effect seems weaker (De Mooij and Keen (2016)). For non-bank financial intermediaries, the estimated effects are large, explaining as much as 10 percentage points of leverage (Luca and Tieman (2019)).

Country-specific studies of changes in the tax code – a quasi-natural experiment – have also reached similar conclusions. A case in point is Belgium in 2006, when the tax law was changed to enable firms to deduct a notional interest expense from their return on equity. Several studies show that, for non-financial firms and banks, the effect of these changes on leverage was similar to that found in earlier work (see eg Panier et al (2015), Schepens (2016)). For banks, the reduction in leverage occurred through an increase in capital rather than a reduction in assets. Banks responded by increasing loans at the expense of government securities (Célérier et al (2020) and by increasing their contribution to cross-border loan facilities relative to other foreign banks (Biswas et al (2022)).[28] Banks also started to manage their risks against return more conservatively: weakly capitalised banks directed new lending to firms with lower default probabilities (Schepens (2016)).[29] Similar effects are also visible in countries that introduced so-called "thin capitalisation rules", which allow deductibility only up to a certain threshold of debt or interest (De Mooij and Hebous (2018)).

[25] Personal income taxes on capital gains and dividends magnify debt bias. However, personal income taxes on interest income can reduce it.

[26] Hendershott et al (2003) estimate that the removal of mortgage tax relief in the United Kingdom reduced initial loan-to-value ratios (LTVs) of unconstrained purchasers by 30% but had a smaller effect on more constrained borrowers (ie borrowers who were at or near the maximum allowable LTV or loan-to-income ratio). In general, however, there is little empirical work exploring the size of any such effects.

[27] Early empirical studies based on the use of non-debt tax shields (eg depreciation and investment tax credits) failed to find a strong link between taxes and leverage (eg Myers (1984)). However, thanks to better measurement of marginal tax rates, subsequent work in the 1990s and 2000s identified a statistically significant, if modest, relationship.

[28] As government securities carry a zero risk weight (see section 3), reducing the debt bias diminished the incentive to invest in them and increased the incentive to expand loans.

[29] See also Gambacorta et al (2017) for an analysis of how banks responded to changes in corporate tax rates in Italy.

3. Financial regulation

As discussed in Section 1, the financial sector is highly exposed to sovereign risk, both directly and indirectly. This is true of both banks and NBFI entities, such as pension funds, insurance firms and collective investment vehicles.

All sovereign exposures, whether in the form of (tradeable) securities or (non-tradeable) loans, entail risks. Holding such exposures for investment or liquidity management purposes can result in losses due to interest rate, credit and/or liquidity risks. The recognition and materiality of these risks depends in part on the accounting classification. Sovereign securities that are marked to market will in principle capture the risks from all three channels, as their valuation changes with market conditions. In contrast, sovereign securities that are valued at amortised cost capture the magnitude of interest rate and liquidity risks only if truly held to maturity.

Ultimately, to ensure financial stability there is no substitute for fiscal prudence. After all, the sovereign's creditworthiness is the backstop for the financial sector and underpins the economy as a whole. Even so, prudential regulation and supervision can help protect the financial sector from the sovereign. What are the possible options, and how can regulation adequately safeguard financial institutions' resilience while also reflect the pervasive role played by government bonds across financial markets? In what follows, we focus primarily on banks, given their critical role in systemic risk and macroeconomic stability as well as their more developed prudential treatment. That said, we also cover to some extent NBFI entities, with special reference to the growing asset management sector.

Banks

A regulatory framework that shields banks from sovereign risk would deliver sufficient shock-absorbing capacity to withstand changes in sovereign valuations regardless of the source – interest rate, credit or liquidity risk. The specific treatment would vary, in part, based on whether sovereign holdings are marked to market or held at amortised cost.

How does the current Basel bank prudential framework fare from this perspective? Our assessment suggests that it does so unevenly. For exposures that are marked to market and held in the trading book, the regulatory treatment is more straightforward for most risk categories, as changes in the prices of those securities summarise the evolution of the various risk factors. By contrast, for those exposures valued at amortised cost and held in the banking book, there is room for further reflection. One example is the degree of protection against credit/default and interest rate risks. Another is the need for greater consistency between the accounting valuation of banks' sovereign holdings and their regulatory treatment in liquidity risk.

As regards interest rate risk, sovereign exposures are treated on a par with other exposures, with a mixed picture. Sovereign holdings that are marked to market and held in the trading book are capitalised against changes in market valuations stemming from interest rate changes. By contrast, there is no corresponding Pillar 1 requirement with regards to interest rate risk for exposures held in the banking book.[30]

Recent bank distress episodes have highlighted that sovereign securities held at amortised cost are not immune from the risk of changes in interest rates. As a result, their treatment may provide a false

[30] Pillar 1 requirements are the minimum global regulatory standards intended to be applicable to all internationally active banks.

sense of security in certain situations.[31] This, of course, is a limitation that is not specific to sovereign exposures but applies to the treatment of interest rate risk more generally (eg, Borio et al (2020)).

As regards credit risk, sovereign exposures are treated more favourably than other asset classes in the Basel bank prudential framework (Table 1, BCBS (2017) and BIS (2013))). In the risk-weighted capital framework, national supervisors have the discretion to apply a preferential risk weight to domestic sovereign debt denominated in the domestic currency. In practice, all Basel Committee member jurisdictions exercise this discretion and apply a zero percent risk weight. Banks using internally-modelled credit risk approaches are also exempt of the floor on the probability of default estimates for sovereign exposures. In a similar vein, supervisors have the discretion to apply a preferential default risk charge, including zero, for domestic sovereign debt in the market risk framework. In addition, there is national discretion to apply a zero percent haircut for certain repo-style transactions when it comes to recognising the risk-reducing effect of collateral.

This privileged treatment has material consequences. It means that, if supervisors exercise their distraction to the full, the current approach can result in no shock-absorbing capacity for credit and default risk, regardless of accounting treatment.

Government securities also have a privileged status in the treatment of liquidity risk (BCBS (2013)). To a large extent, this reflects the fact that, when denominated in domestic currency, they typically have the highest credit standing in any given jurisdiction and are traded in the most liquid markets. As a result, these securities classify as a high-quality liquid asset (HQLA) for the purpose of meeting Basel liquidity standards. As such, they are eligible for meeting liquidity requirements on a par with central bank reserves – specifically, the freely usable part of deposits held with the central bank. Other securities are also eligible, subject to stricter restrictions and criteria.

The treatment of sovereign liquidity risk also raises some questions. While banks are required to calculate the value of their HQLA buffer based on market valuations, there are no limits and haircuts that apply to eligible domestic sovereign debt.[32] Moreover, eligible sovereign HQLA can be held in the banking book – as many banks do – and thus valued at amortised cost for capital purposes, resulting in a discrepancy in valuation methods (Enria, 2022).[33] There is a certain inconsistency in valuing an asset on a held-to-maturity basis and having it eligible for liquidity requirements to meet unexpected outflows, which means that it can be sold at any time.[34,35]

Sovereign debt also enjoys a preferential treatment in other areas. The debt is exempt from the large exposure requirement, and supervisors may temporarily exempt central bank exposures from the

[31] The episodes of banking distress in March 2023 – including Silicon Valley Bank, Signature Bank and Silvergate Bank – highlighted the risks of holding liquid assets in the banking book and valued on a held-to-Maturity basis.

[32] Another issue is whether they should be treated as fully equivalent with bank reserves, not least given settlement lags. In fact, some supervisors make a distinction between the two. Yet another issue, not analysed here, concerns the system-wide implications of the heavy reliance on sovereign securities as collateral and to meet margin calls. See, for instance, Borio et al (2020) for a discussion mainly in the context of CCPs.

[33] As indicated by the failure of Silicon Valley Bank, this difference in valuation methods can be problematic. If an asset classified as held to maturity is sold, the whole portfolio of similar assets is reclassified. Apparently, this was a factor amplifying the run on deposits.

[34] The possibility of using the asset as collateral for borrowing, not least from the central bank, alleviates this tension only partially.

[35] A broader issue is whether, even if marked to market, government paper will always act as an effective cushion at times of stress. Because of the endogenous nature of market liquidity, it is uncertain whether designated sovereign HQLA would live up to their name at all times (Borio et al (2020)). At times of stress, the evaporation of market liquidity for any such asset could have systemic repercussions. A case in point is the September 2019 episode of heightened volatility in US money markets, where the market for repos backed by government bonds did not behave as assumed in the regulations (Williams (2019), Avalos et al (2019)).

leverage ratio. In some instances, and most recently following the outbreak of the pandemic, jurisdictions have provided additional, albeit mostly temporary, regulatory concessions for banks' sovereign exposures in their domestic implementation of the Basel framework.[36]

Summary of current regulatory treatment of banks' sovereign exposures Table 1

Interest rate risk
• No Pillar 1 interest rate risk capital charge for sovereign holdings in the banking book.
Credit risk: standardised approach
• Ratings-based look-up table. • National discretion to apply a preferential default risk weight for sovereign exposures denominated and funded in domestic currency.
Credit risk: internal ratings-based approach
• Exemption of 0.03% probability of default floor for sovereign exposures.
Credit risk: credit risk mitigation framework
• National discretion to apply a zero haircut for repo-style sovereign transactions with core market participants.
Revised market risk framework
• Standardised approach: national discretion to apply a preferential default risk charge for sovereign exposures denominated and funded in domestic currency. • Internal models approach: sovereign exposures included in models, including default risk models.
Large exposures framework
• Exemption of sovereign exposures.
Leverage ratio framework
• Discretion to exempt central bank reserves temporarily.
Liquidity standards
• No limits on amount of domestic sovereign debt eligible as high-quality liquid assets, with no haircuts applied.

Source: Authors' elaboration and BCBS (2017b).

Conceptually, the case for a preferential treatment of sovereign exposures – including those denominated in domestic currency – is debatable, especially as regards credit risk. First, sovereign claims do carry credit risk, regardless of whether they are held in the banking or trading book – the latter being subject to the market risk framework. As discussed in Section 1, sovereigns default even on their domestic currency debt. This is recognised in credit ratings (eg Amstad et al (2020)). The fact that defaults have been extremely rare in advanced economies need not be a good guide for the future. Second, even short of default, changing perceptions of fiscal risks and associated changes in asset values and funding conditions can hurt banks.

In general, eliminating the present favourable treatment of sovereign exposures by making capital charges proportional to effective risk would have several benefits.

Ex ante, it would discourage the build-up of large bank exposures in domestic sovereign bonds and provide an important signal that no asset class is entirely credit risk-free in practice. This would limit

[36] See eg BCBS (2014), Federal Reserve Board (2020) and FSB (2021a).

the incentive of undercapitalised banks to effectively undertake regulatory capital arbitrage or gable for resurrection by shifting their investment towards higher yielding but zero risk-weighted assets. This type of risk shifting, along with moral suasion, may have exacerbated the doom loops during the euro area debt crisis (ESRB (2015)).

Ex post, it would make banks better capitalised and able to withstand financial distress. This could ultimately translate into lower long-term funding costs for both banks and the government. Moreover, by reducing distortions among asset classes, it could also increase and improve the allocation of credit to private non-financial corporates.

Several arguments have been put forward to support the current treatment. Upon closer examination, however, none appears to be sufficiently strong to rule out some adjustments in the direction of greater risk sensitivity.

One argument concerns the special structural role that claims on the government play in the functioning of the financial system. Central government bonds are typically the most liquid asset available – in fact, they are often the only available liquid asset in economies with less developed financial systems. For much the same reason, they are the preferred form of collateral in repo markets (CGFS (2017)) and play an important role in monetary policy implementation. Tighter regulation, by increasing intermediation costs, could reduce the liquidity of the bonds and of the markets that depend on them for collateral.

These effects are possible, but there is a risk of overstating their practical significance and of missing the bigger picture. Take market liquidity. Recent studies have been exploring the impact of the new prudential regulations on market liquidity, notably that of higher capital standards and the leverage ratio (CGFS (2018), BCBS (2021, 2022), FSB (2022a)). The main conclusion is that prudential regulation is not a primary driver of bank dealer behaviour and of market dislocations. Moreover, there is a consensus that market liquidity was under-priced pre-crisis. If banks become more resilient and market stress less likely in the first place, market liquidity should become more robust. "Fair weather" liquidity does not well serve either the financial system or policymakers. Similar considerations apply to monetary policy implementation. It is unlikely that a more realistic treatment of sovereign risk would have first-order effects that outweighed the benefits. Banks are not the only players that arbitrage in the market. And adjustments in implementation frameworks could alleviate any undesired side effects (eg broadening the set of counterparties or set of instruments). Indeed, some implementation frameworks hardly use sovereign instruments: in this area, even more than in others, there are a hundred ways to skin a cat (eg Borio (1997)).

Another argument concerns the role of banks during economic downturns. One aspect relates to banks' behaviour during normal recessions. If prudential regulation weakened the demand for government debt at that point, this could limit the government's ability to carry out countercyclical policies. Another more specific aspect relates to episodes of stress in the sovereign debt market itself. Banks could act as contrarian buyers when market moves are "excessive", such as when self-fulfilling elements are involved. The experience of Italy during the euro area crisis is typically mentioned in this context (Lanotte et al (2016)). And that of EMEs hit by tighter external funding conditions could also be relevant. Anything that makes it harder for banks to play a shock-absorber role can exacerbate strains, weakening banks further.

The merit of this argument depends largely on circumstances and country-specific factors. In normal recessions, the impact of regulation is unlikely to be big. After all, public sector claims tend to be the comparatively safer ones and, at least in advanced economies, they often increase in value unless the fiscal position is already weak. Regulation cannot substitute for fiscal strength. As regards stress in the sovereign market itself, self-fulfilling elements may indeed be present, at least *in the short run*, in economies that cannot print their own currency or where foreign currency debt is significant. That said, a more realistic treatment of sovereign risk could provide the right signal to reduce the underlying fiscal vulnerabilities in the first place. In addition, having ex ante capital requirements for sovereign exposures

should make banks more resilient when the sovereign runs into trouble and hence more capable of acting as a stabilising force.

More generally, the strength of these potentially adverse effects depends, to a significant extent, on the financial system's structure and sophistication. Where banks comprise the dominant investor base for the sovereign, the first best would be to focus on developing capital markets to diversify the base (CGFS (2019)). Where the size of outstanding sovereign debt is large relative to the financial system and the economy, the priority would be to reduce it. That said, such transitions can only be gradual – a factor that prudential regulation needs to consider (see below for examples).[37]

While these arguments point to a clear direction of travel, the devil is in the details, as is often the case. Any change to the current treatment of sovereign exposures would have to address a number of difficult issues. It is worth at least listing them to provide a sense of the technical challenges involved.

The first issue is how exactly to define sovereign exposures. For example, should the treatment of central bank and central government exposures differ? It has been argued that, by construction, monetary liabilities are default-free. In principle, this is correct. But, while rare, central banks have defaulted on their liabilities historically, particularly in developing countries (Buiter (2008), Reinhart and Rogoff (2011a)).[38] Indeed, some credit rating agencies rate the credit riskiness of central banks based on a formal methodology that covers different potential default scenarios (DBRS Morningstar (2013)).[39] And, from a broader perspective, there would arguably be a certain inconsistency in treating central bank and government liabilities differently, since the creditworthiness of the state is what ultimately backs trust in the currency.[40]

The second issue is how to measure sovereign risk. Most sovereigns, especially among advanced economies, have not defaulted in the last few decades. As a result, there is little data for robustly estimating default probabilities and loss-given-default under the Basel internal ratings-based approach. Under the standardised approach for credit risk, instead, risk weights are based on ratings provided by external agencies (or, in jurisdictions where this is not possible, on alternative metrics). Credit ratings summarise a large amount of information and are supposed to be forwards-looking. They are also readily available and known to provide reliable ordinal rankings of risk. Yet they also tend to change infrequently and abruptly, as rating agencies seek to avoid ratings volatility. Moreover, authorities in various countries have outlawed, or are now actively discouraging, their use for regulatory purposes.

Alternative measures could be based on market or non-market indicators. The former, such as CDS spreads, are readily available and easy to translate into familiar risk measures such as default

[37] Yet another argument notes that the post-GFC reforms aimed at ending too big to fail (TBTF) should reduce the magnitude of some of the bank-sovereign nexus channels. Examples of specific reforms include bank resolution regimes, bail-in regimes and total loss-absorbing capacity requirements (Borio, Farag and Tarashev (2020), BCBS (2017b)). That said, as noted in Section 1, despite the great strides made by such reforms, there are still gaps that need to be addressed in order to truly end TBTF (FSB (2020)). And, even if such gaps were addressed, the reforms would have an impact on only some of the bank-sovereign nexus channels (Graph 1).

[38] This applies to the non-monetary liabilities. But there have been cases in which central banks have also de facto defaulted on their monetary ones. For example, Austria and Germany effectively defaulted on their banknotes by placing limits on the amount of old banknotes that could be exchanged for new banknotes post-World War II (DBRS Morningstar (2013)).

[39] The three main rating agencies do not rate central banks. By contrast, DBRS has a framework for doing so, and considers four types of defaults: missing a contractual payment on liabilities to private creditors; confiscating private or foreign exchange reserves; forcibly redenominating liabilities into another currency at a prejudicial exchange rate; and ceasing to recognise its own banknotes as legal tender.

[40] Another definitional dimension is how to set the perimeter of sovereign exposures to capture the full range of public sector entities and subnational governments that are subject to sovereign risk (BCBS (2017b)). Balancing risk sensitivity with simplicity is an important consideration.

probabilities. But their pricing is also affected by liquidity risk premia and shifts in investors' risk appetite, making them highly volatile. Furthermore, the necessary data may not be available for all countries. This leaves more standard non-market metrics, such as debt-to-GDP ratios and other indicators of fiscal sustainability or country risk. The translation of these indicators into risk weights is inevitably sensitive to modelling assumptions. Of course, technically, these measurement issues would be side-stepped if securities exposures were valued at market prices, which would also address the inconsistency of valuing them on a held-to-maturity basis in liquidity requirements.[41] This would also better align banks' risk-taking incentives, albeit at the cost of potentially larger reductions in capital at times of sovereign stress.

The third issue is which regulatory instruments to use: risk weights, large exposure limits or a combination of the two? Higher risk weights raise the required capital on each unit of investment in sovereign bonds. Large exposure limits constrain risk concentration more directly. Soft limits – increasing risk weights based on a bank's concentration of sovereign exposures – are also possible, making them more similar to risk weights (BCBS (2017b)). For instance, an increasing capital charge may be imposed for exposures above the limit or for step-wise thresholds. If limits are adopted at all, soft ones appear more flexible and would help to avoid cliff effects.

The final issue is how to handle the transition to any new sovereign risk requirement. Non-zero risk weights would require banks in several jurisdictions to raise their capital ratios and strict exposure limits to scale down exposures, especially in countries with high public debt. To prevent any adverse impact, the transition would need to be gradual. And regardless of the letter of the regulation, experience suggests that banks might try to front-load the reduction in exposures.

In conclusion, arguably, the current prudential treatment of sovereign exposures could be improved. Moving to a more balanced treatment that fully acknowledges the risky nature of public debt would provide a clear signal that no asset is truly risk-free. It would also reduce distortions by respecting more closely respecting proportionality to risks and help weaken the adverse feedback loop between the sovereign and banks. That said, any change would need to strike a careful balance. The clear benefits from prudential safeguards should be weighed against the broader, and special, role played by sovereign debt in the financial system – as a source of liquidity and for monetary policy implementation. Moreover, the risk of possible side or unintended effects, especially during the transition, would need to be addressed.

NBFI

The NBFI sector – including, in particular, a variety of asset management entities – comprises an increasingly important part of the financial system. It now accounts for almost half of total financial assets – an increase of 7 percentage points since the GFC (FSB (2022b)).

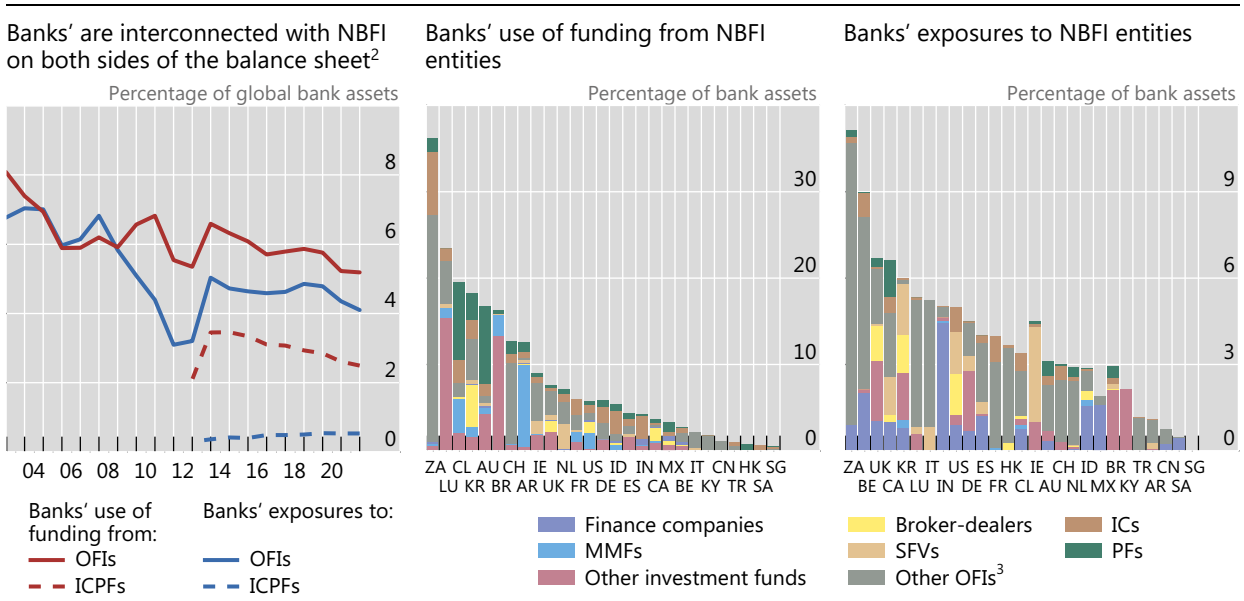
Moreover, the share of government debt held by NBFI entities is substantial. It ranges from 40% to 60% on average in AEs and EMEs, respectively, with the latter primarily comprising domestic NBFI investors (Fang et al (2022)). As with banks, NBFI sovereign holdings vary across jurisdictions (Farkas et al (2023), Domanski et al (2017)).

Thus, while to date most of the discussion on sovereign risk in the financial system has focused on banks, it is equally important to consider whether and how such risks could be transmitted and amplified through other financial entities. A full assessment of these issues goes well beyond the scope of this paper, but we highlight three broad channels that warrant further consideration.

[41] The inconsistency could also be addressed through the more modest step of excluding from the liquidity requirements the portion of the portfolio valued at amortised cost. See Enria (2022) and Borio et al (2020)).

First, episodes of market dislocations could trigger sovereign support – spanning both government and central bank measures – for NBFI entities, which could exacerbate moral hazard and increase fiscal pressure on sovereigns (Schuknecht (2020)). This is precisely what happened during the GFC, the Covid-19 pandemic "dash for cash" and, more recently, with the liability-driven investment funds and UK gilt market disruptions. In all these instances, NBFI entities played a key role in the amplification of the stress and received support through a varying combination of liquidity facilities, guarantees and asset purchases (BIS (2021), FSB (2021b), Aramonte and Rungcharoenkitkul (2022)). Other pockets of NBFI vulnerabilities include the under-funded nature of pension funds in several jurisdictions (Rauh (2018)), the ability to resolve central counterparties in an orderly manner on account of their growing size and systemic importance (Cunliffe (2018)), and fire sale dynamics resulting from distressed asset managers and insurers (Schucknecht (2020)). As a result, global efforts are under way to strengthen the regulatory framework for NBFI, including with regard to NBFI entities' liquidity mismatches (FSB (2021b)).[42]

Interconnectedness between banks and other financial institutions (OFIs)[1] Graph 6



ICs = insurance corporation; ICPFs = insurance corporation and pension funds; MMFs = money market funds; PFs = pension funds; SFVs = structured finance vehicles.

[1] For 21 jurisdictions and the euro area (left-hand panel), including Russia up until 2020, and for 29 jurisdictions (centre and right-hand panels). Changes in interconnectedness measures may also reflect improvements in the availability of data over time at a jurisdictional level. [2] Banks' use of funding from OFIs is banks' liabilities to OFIs as a share of bank assets. Banks' exposure to OFIs means banks' claims on OFIs as a share of bank assets. [3] Other OFIs includes central counterparties, hedge funds, trust companies and other unidentified OFIs.

Source: FSB (2022b).

Second, sovereign distress episodes could undermine the resilience of key NBFI entities through some of the channels that could impact the banking system. These includes credit and market risk from direct exposures, heightened funding costs and the second-order effects discussed above.

Finally, banks and NBFI entities are highly interconnected (Graph 6, left-hand panel), with a wide degree of variability across jurisdictions (Graph 6, right-hand panel). As such, distress in the NBFI sector

[42] The NBFI universe is vast and encompasses a range of institutions. In some instances, such as for insurers and pension funds, prudential regulation is of much older vintage. For other NBFI entities, regulation remains a barren patch (Borio, Farag and Tarashev (2020)).

can amplify the sources and channels of sovereign risk in the financial system. And the behaviour of NBFI entities during a sovereign stress may indirectly exacerbate the pressures on banks (eg as a result of fire sales of sovereign securities). These interlinkages underscore the importance of taking a holistic approach to mitigating sovereign risk in the financial system. Addressing these policy challenges and accompanying data gaps is daunting but urgent: while many efforts are under way both nationally and globally, so far they have not proceeded with the necessary speed and success (BIS (2021), Carstens (2021)).

Conclusion

No financial crisis should go to waste. The GFC and the euro area sovereign debt crisis are no exception. They triggered major policy efforts to strengthen financial regulation and supervision. Recognising the huge macroeconomic costs that financial instability can have and the importance of the build-up of financial imbalances as their root cause, these efforts have also sought to strengthen the systemic or macroprudential orientation of regulatory arrangements. And there has been a vigorous debate concerning the merits of enlisting monetary policy in tackling financial imbalances as part of a broader macro-financial stability framework.

That said, the role of fiscal policy has attracted less attention. Granted, a lot of emphasis has been given in the prudential framework to the issue of how to protect banks from the sovereign. But far less attention has been devoted to how to protect the sovereign from the banks, in the sense of protecting its creditworthiness from the excesses in private sector indebtedness that tend to be at the heart of banking crises. In this paper, we have argued that both dimensions need to be properly addressed. Only then will fiscal policy be an integral part of a fully articulated macro-financial stability framework.

We have highlighted a number of policy directions.

First, policymakers need to build adequate fiscal buffers. This means having fiscal space to an extent proportionate to the size and features of the financial system. The assessment of fiscal space would need to explicitly incorporate the risks of financial crises. This would instil confidence in the strength of the financial sector and allow the sovereign to act as an effective backstop in case of need. In addition, building adequate buffers means striving to improve the measurement of fiscal positions across the financial cycle to prevent the (involuntary) erosion of fiscal buffers during good times. We have indicated practical ways that can help to meet these two challenges – measuring fiscal space and financial cycle adjusted fiscal positions – though clearly more work is called for to make them fully operational.

Second, policymakers should continue to make progress towards reducing the favourable treatment of debt versus equity. This could be achieved by either limiting the deductibility of interest payments or by granting similar tax exemptions to equity. Several countries have introduced such measures, but there is scope to reduce this debt bias further.

Finally, in prudential regulation, a lot has been done to improve bank resilience to episodes of stress. As a result, banks should now be better placed to withstand shocks and provide credit both during and after a crisis. At the same time, more could be done to ensure that capital charges better reflect banks' sovereign risk exposures to avoid undue risk concentrations. In practice, this stricter prudential treatment would need to be calibrated in the light of the special role of sovereign debt in the financial system – as a source of liquidity, in the implementation of monetary policy and as a buffer for the macroeconomy. Similarly, gyrations in sovereign debt markets have tested the resilience of NBFI entities. While global efforts are under way to address NBFI vulnerabilities, these have so far been insufficient. Looking forward, it will be important to recognise the role of NBFI in the broader nexus between fiscal policy and financial stability.

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