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The State as Financier of Last Resort

Prepared by Bryn Battersby, Raphael Espinoza, Jason Harris,
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IMF Staff Discussion Notes (SDNs) showcase policy-related analysis and research being developed by IMF staff members and are published to elicit comments and to encourage debate. The views expressed in Staff Discussion Notes are those of the author(s) and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

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IMF Staff Discussion Notes

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The State as Financier of Last Resort

**Bryn Battersby, Raphael Espinoza, Jason Harris, Gee Hee Hong,
Sandra Lizarazo, Paolo Mauro, Amanda Sayegh**

Authorized for distribution by Vitor Gaspar
October 2022

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ABSTRACT: During the COVID-19 pandemic and global financial crisis, governments swiftly served as financiers of last resort through large financial support measures (FSMs) such as loan and guarantee programs and equity injections in firms. This Staff Discussion Note argues that such FSMs prevented bankruptcies and attenuated the recession by increasing firms' liquidity, reducing risk premiums, and boosting confidence. But FSMs also carry large and long-lasting fiscal costs and risks. The note presents recommendations for managing the legacies of the COVID-19 programs and preparing for future crises. Ideally, FSMs should be assessed and included in budget plans, though a balance needs to be struck between speed and scrutiny.

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Executive Summary

During the COVID-19 crisis and the global financial crisis (GFC), governments expanded their roles, serving as financiers of last resort. A prominent avenue, primarily aimed at firms, was large-scale use of financial support measures (FSMs) such as credit guarantees, loan programs, and equity injections. This Staff Discussion Note analyzes the macroeconomic benefits and fiscal costs of such measures; it also sketches a framework for managing their legacy and improving their design in preparation for future crises.

Financial support measures can be a large, rapid, and effective part of a policy response to extreme crises but bring elevated fiscal risks with long running implications for public finances. During the GFC, public sector interventions in the financial sector summed to trillions of US dollars and a decade later, governments' balance sheets remained exposed to a few of these programs (Igan and others 2019). Many of the lessons drawn from the GFC were applied during the COVID-19 pandemic, relating to the importance of rapid deployment of fiscal measures in the face of a deep slump, particularly where monetary policy is constrained, as well as the increased need for transparency and understanding of risks (IMF 2012, 2013). Announced FSMs reached nearly \$6 trillion globally, with the largest measures being guarantee programs in advanced economies and were also used in some emerging market economies. FSMs can be swiftly deployed, with various instruments suited to different circumstances (Table 1) and are complementary to budget measures that can take more time. FSMs are most effective where governments have the fiscal space or credibility to back them up and a pre-existing FSM frameworks that allow rapid scaling up. Because they can require complex institutional arrangements, often arranged to fit existing circumstances (for example, involving development or central banks), their deployment increases the importance of transparently reporting them.

FSM's macroeconomic benefits come from preventing bankruptcies by increasing firms' liquidity, reducing risk premiums and boosting confidence, but they are less effective during normal recessions. Using firm-level microsimulations, this note finds that FSMs can reduce bankruptcies significantly. However, these programs also increase corporate debt, and many firms permanently affected by the crisis are still likely to go bankrupt. Using FSMs in crises that are expected to be temporary and targeting the measures to firms that are likely to remain solvent helps ensure resources are used efficiently. Using a general equilibrium model, we show how FSMs reduce the risk of a vicious cycle between bankruptcies, high risk premium, households' and firms' pessimism, and contraction of activity. However, during normal recessions, when bankruptcies do not rise significantly, FSMs are less effective, and standard fiscal and monetary policies should be relied on. An empirical analysis of the announcement effect of the FSMs undertaken during the pandemic shows that these measures can lead to larger improvements in contemporaneous and forward-looking economic indicators than traditional budget measures, if governments have fiscal space. These benefits come at the cost of increased fiscal risks, as the public balance sheets' exposure to losses on FSM-related assets expands.

However, FSMs require strong institutional frameworks to be delivered effectively, and their otherwise opaque nature calls for enhanced transparency, monitoring, and ongoing management. Many FSMs are undertaken outside traditional budget and fiscal reporting, reducing transparency and raising governance issues. Thus, the bar for intervention should be set high, and the fiscal costs and fiscal risks that FSMs entail should be quantified and reported for as long as they remain in place. Developing policy frameworks now will mean FSMs are ready to be rolled out quickly in the future; will help governments determine which measures to use in different circumstances; and will assist in setting risk mitigation measures at the design stage, when the government's ability to control fiscal risks is greatest.

Introduction

During the COVID-19 crisis and the global financial crisis (GFC) governments swiftly served as financiers of last resort. In response to ordinary recessions, fiscal policy's economic stabilization role has traditionally been fulfilled by letting automatic stabilizers operate or undertaking discretionary tax or expenditure measures. But faced with major global crises and uncertainty during the GFC and pandemic, policymakers expanded the scale and modalities of fiscal interventions to support people and firms. A prominent avenue—primarily aimed at firms—was large-scale use of financial support measures (FSMs) such as credit guarantees, loan programs, and equity injections. This role of governments as financiers of last resort raises important and novel policy issues—including an assessment of the macroeconomic implications and the appropriate modalities to manage measures which carry sizable fiscal risks but, at least when first deployed, do not go through the standard budgetary process. This note analyzes the macroeconomic benefits and fiscal costs of such measures and sketches a framework for managing their legacy and improving their design in preparation for future crises. It is complementary to other IMF studies that analyze the role of fiscal policy during the pandemic more generally (IMF 2022a), traditional fiscal measures (IMF 2021a), as well as the monetary and financial sector policies response, including accommodative monetary policy, credit and regulatory forbearance, macroprudential loosening and flexible bank liquidity support (IMF 2020g, 2020h, 2020i).

Fiscal interventions during the GFC and the pandemic were massive, and financial support measures made up some of the earliest and largest responses. Traditional fiscal measures, such as tax cuts and increases in spending (“above the line” measures because they are recorded in the fiscal deficit) were used extensively in both crises across income groups. The cyclically adjusted primary deficit in advanced economies deteriorated over the first two years of the crisis by 3.9 percentage points during the GFC, and 5.9 percentage points during COVID-19. The magnitudes are somewhat smaller for emerging economies (3.5 and 2.6 percentage points). FSMs, which often do not affect the fiscal deficit—at least initially—were also heavily used. Government loans and equity injections affect government assets and liabilities, but not revenues and expenditures, and are thus referred to as “below the line” measures. Credit guarantees provided by governments initially do not affect fiscal accounts but create contingent liabilities. During the GFC, public sector interventions in the financial sector for the largest 37 economies included \$1.6 trillion of direct loan and equity interventions (4.5 percent of GDP) as well as \$1.9 trillion of guarantees (Igan and others, 2019). During the COVID-19 pandemic, announced FSMs reached nearly \$6 trillion globally (6 percent of GDP). In some advanced economies, the announced size of FSMs reached as much as 30 percent of GDP, dwarfing traditional fiscal measures. FSMs on both occasions were rolled out at large scale, as one of the first responses before more traditional measures followed, and supported firms, whereas households were cushioned at a steadier pace through budget measures such as wage support (which also helped firms) and cash transfers. As a result of higher energy prices in 2022, governments are under renewed pressure to provide support, with some European governments using FSMs to provide liquidity and solvency support to systemic utility firms.

The macroeconomic effects of financial support measures deployed economywide during crises are not yet well understood. During times of normal economic activity, FSMs usually focus on individual firms or sectors. For the most part, loans, guarantees, or equity injections are used to develop certain sectors, bail out individual state-owned enterprises (SOEs), or finance specific investment projects. This more sparing use reflects concerns that these policies may distort private agents' incentives to operate efficiently or induce excessive risk taking by the private sector (Acharya and Mora 2014, Cordella and others 2018, Wilcox and Yasuda 2019). Large-scale FSMs to support the macroeconomy have been less frequent, and policymaking

frameworks to support their effective design and management are less developed. This note explores the relative merits of different FSMs directed to firms and their macroeconomic impacts.¹ Because FSMs shift risks from private to public sector balance sheets, with long-lasting implications for the public finances,² we also explain how policy frameworks can be amended to improve decision making and mitigate fiscal risks.

Chapter 2 of this note documents the scale of financial support offered during the GFC and the pandemic. FSMs are largest during exceptional crises and in advanced economies. They have been used to a lesser extent in emerging economies and have been largely absent in low-income countries. This pattern may reflect countries' relative access to financing as well as credibility to back up financing programs, especially guarantees. During COVID-19, the most frequently used FSMs were guarantee programs, rapidly introduced and scaled up as soon as firms were hit by the pandemic and the ensuing social distancing policies.

Chapter 3 explores the benefits and fiscal costs of FSMs during crises. It considers the liquidity, solvency, and macroeconomic confidence channels by running detailed firm-level microsimulations of specific corporate support programs, using Portugal as an example, as well simulations from a macroeconomic model. Loans and guarantee programs provide a financial lifeline to firms that could be illiquid or appear insolvent, but that have good prospects of survival in the long term. These programs can also bring macroeconomic benefits by boosting confidence in firms' viability and reducing bankruptcy rates and risk premiums. An empirical analysis of the impact of FSM announcements also supports the findings from the simulation exercises. Announcements of FSMs are found to improve contemporaneous and forward-looking economic indicators if governments have fiscal space. These results suggest that FSMs may be apposite to address major crises by lowering uncertainty and bankruptcy rates, and thus improving financial conditions and the economic outlook.

Chapter 4 presents recommendations for governments to consider when managing the legacies of the COVID-19 programs and preparing for future crises. As many FSMs are undertaken outside traditional budget and fiscal reporting, it is crucial to strengthen fiscal risk reporting, monitoring and management. The objective is to improve policymaking through greater transparency on the potential costs and benefits of FSMs, and to avoid unwelcome surprises that may impinge on fiscal space. To that end, policy frameworks for designing FSMs and deciding on their use should be set up in advance of future crises. If the world is becoming more prone to extreme events, governments may be called upon to act as financiers of last resort more frequently and should ensure not only that the requisite fiscal buffers are built up in normal times, but also that appropriate frameworks are in place before they are called on to intervene on a large scale again.

¹ This comparison is complementary to that in IMF (2022a), which analyzes more generally the relative benefits of FSMs, support programs for households, and traditional fiscal stimuli.

² Ten years after the GFC, governments had only recovered about 60 percent of their direct interventions in the financial sector, and several countries still held assets worth more than 2 percent of GDP (Igan and others 2019).

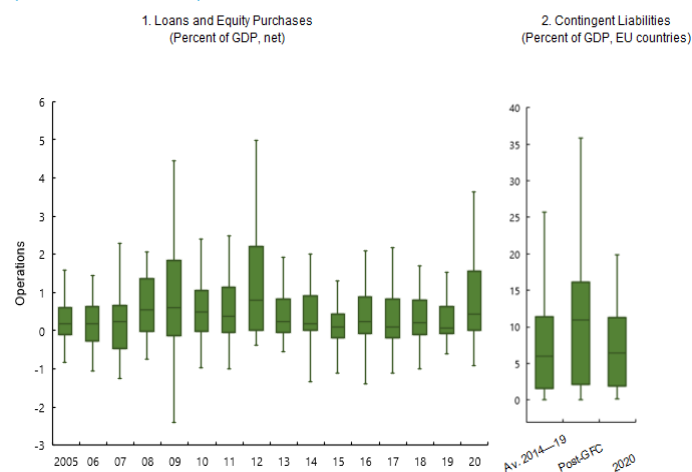
Fiscal Policy Response during Crises

The evidence from the last 20 years shows that governments implement larger FSMs during exceptional crises. Available data suggest an increase in government interventions during deep downturns.³ During the GFC (including the euro area crisis), some countries increased their loans and equity purchases by more than 4 percent of GDP and contingent liabilities increased above average, sometimes by more than 10 percent of GDP (Figure 1). Financing operations were much smaller in moderate recessions or in normal times (Figure 2). Interventions were larger for advanced economies (Figure 3).

During the GFC, FSMs focused on the financial sector because it was the origin of the crisis and systemically important. The larger programs included direct capital injections or bank nationalizations (Greece, Ireland, Mongolia, Ukraine), asset purchases (United States, United Kingdom; see Laeven and Valencia 2012) and guarantees (for example, to interbank transactions, foreign credit lines, and pension deposit in Nigeria). Several countries (for example, Chile, Japan, Korea, Romania,) also introduced or strengthened existing credit guarantee programs for nonfinancial firms (Cusmano 2018).

During the pandemic, governments sought to prevent widespread bankruptcies of firms that could not operate profitably because of the Great Lockdown but could rebound quickly after (IMF 2020a). In addition to large above the line measures, governments scaled up FSMs swiftly in March–April 2020 (Figures 4 and 5). In several advanced economies, the face value of guarantees made available exceeded 30 percent of GDP. FSMs were more promptly deployed where pre-existing FSM frameworks allowed rapid scaling up, such as in Germany and the United Kingdom.⁴ Equity injections were smaller and targeted specific recipients, such as state-owned enterprises, SOEs), large private enterprises deemed to be strategically important (for example, France’s loan of €3 billion to Air France/KLM), or financial corporations crucial for providing credit to the economy (for example, Colombia’s capitalization of development banks). Countries tended to inject equity only when a company became insolvent as a direct result of the crisis and the company was too important to fail.⁵ There were no major equity injection programs for small- and medium-sized enterprises.

Figure 1. Distribution of Net Loans and Equity Purchases and across Countries (Percent of GDP)



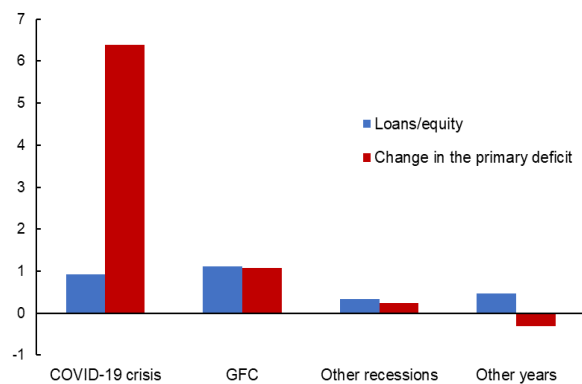
Sources: IMF Government Financial Statistics for panel 1 (see footnote 3 for country coverage); and Eurostat for panel 2.
Note: Net loans and equity purchases by the general government when available; otherwise, central government. Coverage over 2007–20 varies.

³ Acquisition of financial assets is available from the IMF Government Financial Statistics for 14 advanced economies (Austria, Belgium, Denmark, France, Germany, Canada, Finland, Greece, Australia, Cyprus, Hong Kong, Macao, Czech Republic, Estonia) and 13 emerging economies (Brazil, Chile, Colombia, Dominican Republic, Slovenia, Egypt, Armenia, Azerbaijan, Belarus, Albania, Georgia, Bulgaria, Croatia, Bosnia and Herzegovina). Data prior to the pandemic on guarantees are not readily available from cross-country databases, although they are sometimes reported in debt statistics, especially for low-income countries.

⁴ For example, the United Kingdom was able to initially expand existing business guarantee schemes at the British Business Bank while Germany expanded the backstop for loans and guarantees provided through the KfW Development Bank.

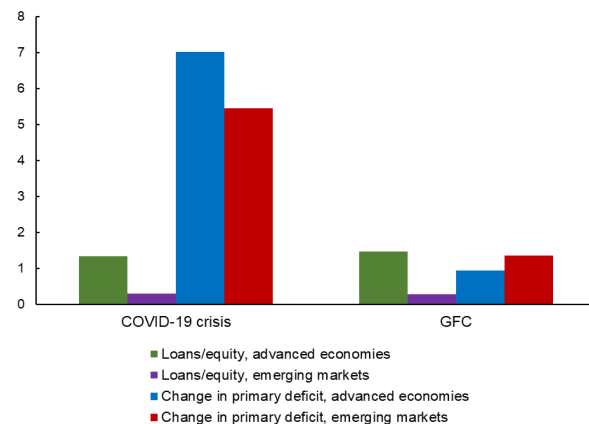
⁵ For example, the EU Temporary Framework for State Aid during COVID-19 listed four conditions for recapitalization, including that (1) there be no other option for the continued viability of the firm; (2) the injection be limited to the minimum required to ensure ongoing viability; (3) the recapitalization be in the common interest; and (4) the firm was not already in difficulty prior to COVID-19.

Figure 2. FSM and Change in Deficits
(Percent of GDP)



Note: See Figure 1. Recession defined as negative annual growth.

Figure 3. FSMs, by Income
(Percent of GDP)



Note: See Figure 2.

Figure 4. Cumulative Announced Fiscal Measures in Response to COVID-19
(USD trillions)

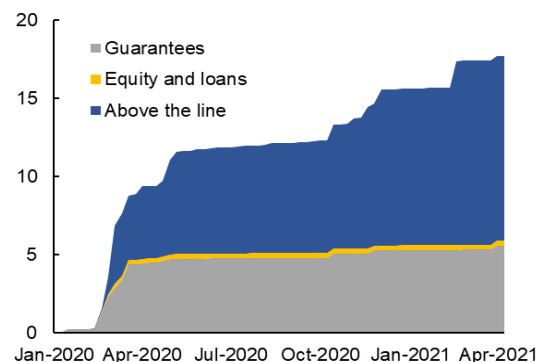
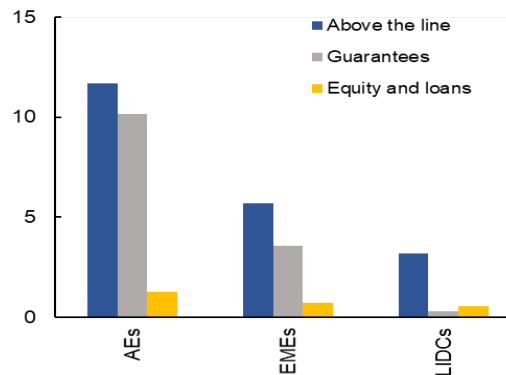


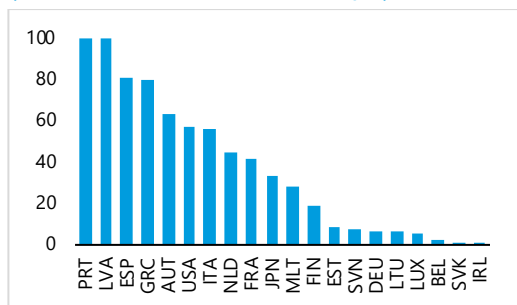
Figure 5. Total Announced Measures in Response to COVID-19
(Percent of GDP)



Sources: Jalles, Battersby and Lee (forthcoming); IMF, Fiscal Policy Responses to COVID-19 database; IMF, *World Economic Outlook*.

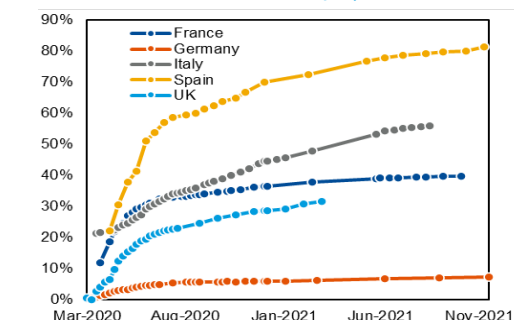
Note: Totals reported in Figure 2 refer to measures announced in response to the pandemic between Feb 2020 and May 2021.

Figure 6. Take-Up of Credit Support Schemes
(Percent of announced envelope)



Sources: Giron and Rodriguez-Vives (2021); IMF, Fiscal Response database; and IMF staff estimates.

Figure 7. Cumulative Take-Up of Credit Support
(Percent of announced envelope)



Source: Bruegel/PIIE.

The energy price shock in 2022, amplified by Russia’s invasion of Ukraine, has renewed pressure for governments to provide support to systemic energy firms. In Europe, which has been hardest hit due to cuts in natural gas flows from Russia, utility firms are facing liquidity and solvency pressures from higher and volatile prices. In addition to broader support to households and firms, European governments have announced a range of FSMs, some worth almost 5 percent of GDP (as of end of September 2022), in the form of guarantees and credit lines for liquidity support; and equity injections to provide solvency support.⁶

The large envelopes of FSMs are often justified by the desire to boost confidence, and take-up of FSMs by the private sector often ends up lower than envelopes made available by governments. The US\$700 billion Troubled Asset Relief Program (TARP) passed in October 2008 in the United States to address the financial crisis sought to restore confidence in banks’ solvency to ensure they could supply loans and financial services to the economy (Calomiris and Khan 2015). Eventually, the maximum exposure of the program reached about US\$420 billion. During the pandemic, confidence effects may have also played a role in stabilizing bank lending. Take-up of FSMs expanded quickly but ended up much lower than commitments (Figures 6 and 7). Other factors driving take-up may include the size of economic shocks, monetary support, the attractiveness of program terms, and bottlenecks in financial intermediaries in assessing loans. For instance, in Germany, take-up was low because lockdowns were less stringent, firms had access to direct grants and short-time working schemes (*Kurzarbeit*), and firms were concerned by the pricing of loans, a prohibition on distributing dividends, and limits on the remuneration of managers. Take-up in Spain and Italy was higher because liquidity needs of firms were greater and accessibility broader.

The largest fiscal costs occur when contingent liabilities for financial sectors are realized. From 2008 to 2011, financial sector support cost the Irish government 48.7 percent of GDP, one of the largest bailouts ever. On average, the realization of contingent liabilities due to the financial sector cost 10 percent of GDP, about four times more than support to the nonfinancial sector (Bova and others 2016). Although it is too early to assess the long-term impact of pandemic-related FSMs, loans issued under certain schemes are beginning to be wound down, with some guarantee and loans schemes ending in early to mid-2021 (United Kingdom, United States) while others continuing into 2022 (France’s *prêts garantis par l’État* – PGE).

In many countries, FSMs have lasting consequences on public sector balance sheets. The interventions during the GFC contributed to larger public sector balance sheets—with assets and liabilities increasing by 22 and 39 percent of GDP, respectively, during the crisis, and net worth falling by 17 percent of GDP (IMF 2018). During the early stages of the pandemic, balance sheets again expanded sharply, with both assets and liabilities increasing by more than 20 percent of GDP in 2020 alone.

Institutional arrangements to support lending and guarantee schemes can be complex. In some COVID-19 programs, private lenders provided the lead role in channeling liquidity support to businesses, with their credit risk mitigated by guaranteed schemes (Pakistan, Romania, Serbia, South Africa). This was sometimes supported by term funding provided by central banks, public banks, or subsidies (Argentina, Brazil, Germany, Honduras). In other cases, special purpose vehicles (SPVs) were created to acquire credit extended by lenders. These SPVs were usually created by central banks, which strengthened the institutional capacity of

⁶ The Bruegel think tank provides an updated tracker of policy announcements at <https://www.bruegel.org/dataset/national-policies-shield-consumers-rising-energy-prices>

the programs, but with losses backstopped by the government (India, Korea, United Kingdom, United States). In most cases, the government was the bearer of risk, and, in some cases, the channel and size of this risk was opaque and uncertain.

Effectiveness of Financial Support Measures

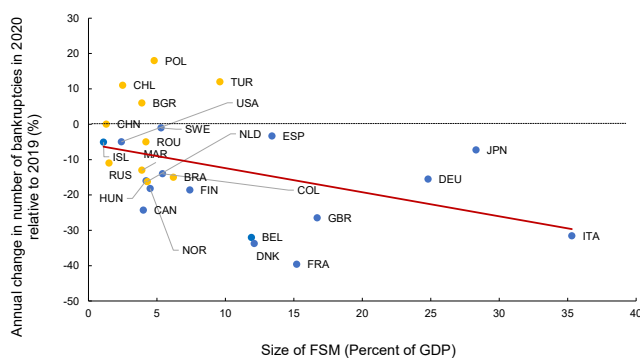
FSMs during the pandemic prevented bankruptcies and helped preserve the productive capacity of the economy.

Rather than rising as in past recessions, corporate failures fell during the pandemic; and the larger the FSM programs, the more corporate failures fell (Figure 8), although additional factors, such as liquidity from central banks, were also at play. In advanced economies, corporate bankruptcies in 2020 declined by 14 percent, on average, from the previous year, and liquidity indicators for firms improved (Giron and Rodriguez-Vives, 2021). FSMs were not the only policies lowering bankruptcies. Other policies included:

greater forbearance from lenders and changes to debt resolution frameworks (IMF 2020d, Demmou and others 2021); accommodative monetary policy and traditional fiscal policy measures, although traditional macro-stabilization policies may have had limited impact on demand because consumers were concerned about the spread of the virus (Chetty and others 2020). Existing estimates indicate that, absent policy measures, corporate bankruptcies during the pandemic would have increased by 5–20 percentage points, owing in equal part to liquidity shortfalls and insolvencies.⁷ Although FSMs will leave a legacy on balance sheets for both firms (Arena and others 2021) and the public sector, the worst-case scenario of widespread destruction of productive capacity was averted.

The remainder of this section uses both models and empirical evidence to explore the impact of FSMs on firms' liquidity and solvency, and the macroeconomy more generally. First, the impact of corporate support programs on liquidity and leverage is assessed by simulating a corporate finance model with firm-level data, using Portugal (which has a high share of contact-intensive industries that also undertook a variety of policies to support firms) as an example. Because FSMs can have additional effects (for example, on the functioning of credit markets and expectations) a macroeconomic model is used to analyze the broader impact of FSMs. The model emphasizes the feedback effects between the onset of a crisis, expectations of corporate defaults, and risk premiums. Finally, we explore whether the simulations' results are supported by the data,

Figure 8. Correlation between the Size of FSM and the Annual Change in Bankruptcies in 2020



Sources: Bankruptcy information from the OECD; and Euler Hermes Global Insolvency Report from Allianz Trade. FSM data from IMF (2021).

⁷ To model the impact of COVID-19 shocks on corporate balance sheets, simulations at firm-level can be conducted using an accounting approach to define liquidity and solvency (De Vito and Gómez 2020, Ebeke and others 2021) or using a model-based approach incorporating firm's cost-minimization (Gourinchas and others 2020). In addition, several studies have examined the implications of government support measures for troubled firms (Banerjee and others 2020, Osada and others 2020, Schivardi and Romano 2020, Bank of England's Financial Stability Report, May and August 2020).

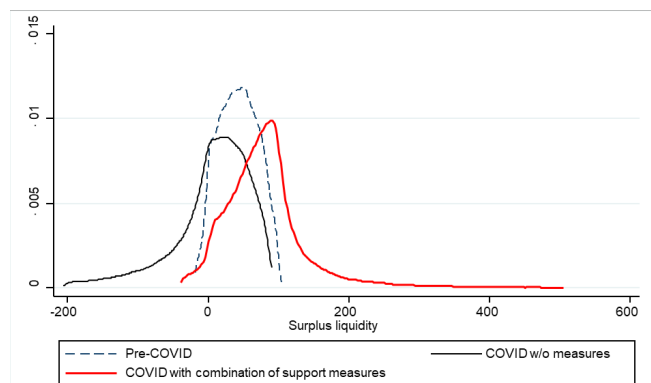
evaluating empirically the short-term effects of announcements of FSMs on economic activity and forward-looking indicators of firms' solvency.

Liquidity and Solvency Effects of Financial Support Measures.

Corporate support programs can prevent corporate defaults that would otherwise stem from illiquidity.

Firms enter financial distress by becoming illiquid after a negative short-term cash flow, or by becoming insolvent if expected future profits drop below debt obligations. FSMs can address both sources of financial distress. To identify the impact of the pandemic and the policy response, we apply a corporate finance model to over 280,000 Portuguese firms' financial statements as of end-2019 and examine the impact of FSMs on individual firms' finances (see Annex 1). Sector-specific expected recoveries are simulated to compute expected future cash flows, under a baseline (pre-COVID), a COVID-19 scenario without government support, and a COVID-19 scenario with government policies like those designed in Portugal. The simulations show that in the absence of government support programs, the share of firms in bankruptcy from illiquidity would have risen from 10 percent in 2019 to 36 percent in 2020, whereas it actually fell to 9 percent over the same period. Measures such as tax deferrals or wage subsidies lowered operating costs directly, thereby providing breathing room for firms under liquidity distress.⁸ Debt moratoria and credit guarantee programs also relaxed financial constraints, helping firms stay afloat. As shown in Figure 9, these measures led to an increase of "surplus liquidity," defined as the difference between cash and deposits and their minimum level to avoid bankruptcy.⁹

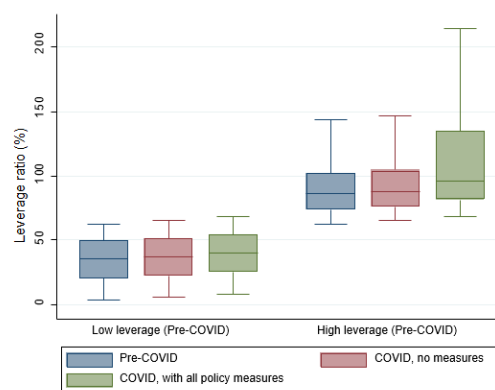
Figure 9. Effect of Pandemic and FSMs on "Surplus Liquidity"
(Density across firms)



Sources: IMF staff calculations; and ORBIS.

Note: Sample of 280,000 firms in Portugal. Three scenarios are compared: Pre-COVID-19; COVID with no fiscal measures, and COVID with the measures introduced by the government in 2020. Kernel density of simulated "surplus liquidity." The negative (positive) value of x-axis implies a shortfall (surplus) of liquidity. The calculations assume that surplus liquidity is accumulated as cash rather than spent.

Figure 10. Impact of Fiscal Measures on Corporate Solvency in Contact-Intensive Sectors



Source: IMF staff calculations.

Note: The figure shows the distribution across firms of the leverage ratio (share of debt to total assets) for firms in contact-intensive sectors, distinguishing between low and high pre-COVID leverage firms, where the former (latter) comprise the firms with leverage ratio below (above) the 75th percentile before the pandemic. The median is the middle line, and whiskers represent 25th and 75th percentile.

FSMs can also lead to higher leverage, potentially just deferring problems if the crisis is long lasting.

Focusing on the firms in contact-intensive sectors, which were the most affected by the economic fallout of

⁸ Wage subsidies also support solvency and avoid scarring from severing employer-employee relationships.

⁹ See Annex 1; the calculations assume that surplus liquidity is accumulated as cash rather than spent and this generates the long right tail of the distribution.

COVID-19, the exercise shows that leverage increased because of the COVID-19 crisis, and even more so after firms received government support (Figure 10). Extra borrowing through government guaranteed lending helps firms build up cash reserves at the time of the shock, providing buffers against liquidity shocks. However, this borrowing adds to debt, potentially undermining solvency for firms with weak prospects or pre-existing debt vulnerabilities. Prolonged reliance on government support by otherwise insolvent firms (sometimes labeled “zombification”) may lead to misallocation of resources (as workers and other factors of production are artificially retained in inefficient firms), lower investment, and weaker productivity growth (Hoshi and others 2022, Ebeke and others 2021; Demmou and others 2021, and IMF 2021b). In the simulations, 5 percent of firms in the contact intensive sector eventually go bankrupt because of the protracted crisis in this sector, compared to 0.8 percent for the other sector.¹⁰ Even if firms do not end up exiting due to insolvency, increased leverage and risks of zombification harm investment and productivity. Thus, using FSMs in crises that are likely to be temporary and targeting measures to firms that are likely to remain solvent is important, although when support to zombie firms represent a small share of total support, delaying a program in order to target it better is not ideal either (Gourinchas and others 2021).

Macroeconomic Channels and Effects

FSMs can have macroeconomic benefits beyond their impact on individual firms’ financial well-being, by reducing risk premiums and increasing economywide confidence. Both supply and demand factors can depress credit markets during major crises. First, expecting a rise in bankruptcies, financial institutions require higher risk premiums during crises, reducing the supply of credit at a given interest rate. Second, anticipating lower demand for their products, firms cut back on their own demand for inputs and thus for credit. This two-way relationship may lead to a vicious cycle that, depending on corporate vulnerability, can threaten macroeconomic and financial stability (Bernanke, Gertler and Gilchrist 1999). This mechanism is even stronger at the onset of an unprecedented crisis, when pessimistic expectations can become self-fulfilling.¹¹ By reducing the expected rate of bankruptcies and addressing firm’s financial constraints, FSMs tackle this vicious cycle, by improving prospective viability for all firms—including those firms that may not be eligible for, or may choose not to tap, available programs.¹²

A macroeconomic model illustrates how FSMs affect the interaction between bankruptcies, financial conditions, and formation of expectations. In the model (Annex 2), economic agents’ learning about the impact of an unprecedented crisis is crucial to the evolution of their expectations about future profits (as in Boz and Mendoza 2014). The shock makes agents pessimistic, leading to a surge in precautionary savings and a contraction in private consumption. Business prospects suffer, eroding incentives to invest and demand for credit. Likewise, credit supply falls as banks perceive greater corporate credit risk and are more reluctant to provide financing. More specifically, because of asymmetric information in the credit market, the risk premium is a function of the aggregate bankruptcy rate; a firm’s bankruptcy thus creates a negative externality on all firms via increased borrowing costs. With the economic contraction amplified by pessimism, a wave of bankruptcies and stark declines in output, investment, and employment become possible. A deflationary spiral

¹⁰ Using the same data set, IMF (2022b) highlights the increase in the risk of zombification and corporate insolvency risk in Portugal in the aftermath of the pandemic, particularly in the most affected sectors. The share of zombie firms rises from 1 percent prior to the pandemic to 4 percent. It also finds that credit support helped cover liquidity shortfalls but closed little of the equity shortfalls.

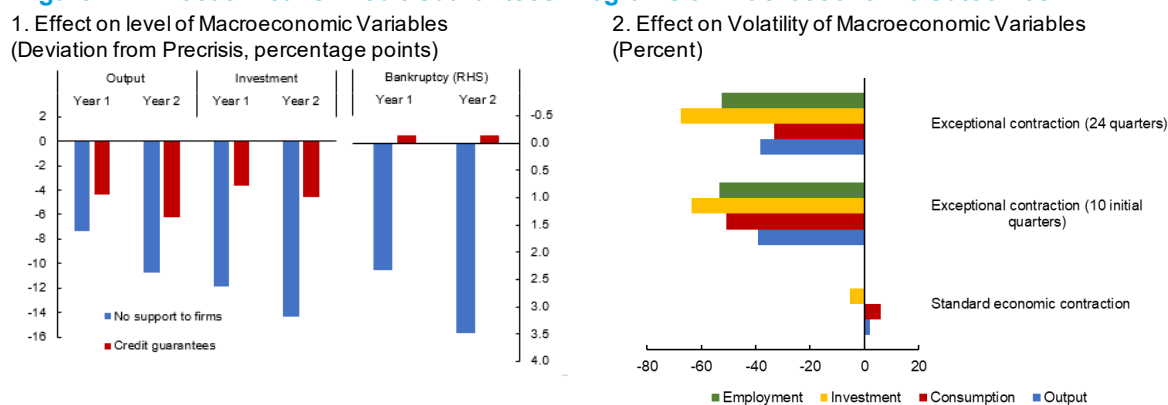
¹¹ Using US data from 1929 to 2015, López-Salido, Stein and Zakrajšek (2017) find that elevated investor sentiment in credit markets can be an important driver of economic fluctuations.

¹² See also Allen and others (2018) for an analysis of how guarantees facilitate credit flow, and OECD (2010) and World Bank (2013) on the use of guarantees during the GFC.

may ensue. Volatility increases because the shock is still not fully understood, resulting in sharp revisions of firms' and consumers' expectations.¹³

Without government support, the economic damage from an unprecedented shock like the pandemic can be massive and long-lasting. The model is calibrated to a typical advanced economy (Annex 2). Firms need financing to pay for about 60 percent of inputs. They have fixed costs, specific to each firm, which are uncertain and realized once the firm has taken its decisions regarding production and demand for inputs. If firms cannot cover their fixed costs, they declare bankruptcy, and their labor and capital are reallocated at a lower productivity. Average total factor productivity is calibrated to fall by 4 percent during the crisis. This implies that absent government support, the crisis pushes 2.5 percent of firms into bankruptcy, a magnitude similar to the increase observed during the GFC in the United States. With three waves of shocks over a period of 12 quarters (similar to the shocks observed during the pandemic), output falls by 7 percent in the first year of the shock in the absence of government support, and the economy returns to pre-shock trend after five years. During that period, the annual average loss of output is 6 percent.

Figure 11. Effect of Loans/Credit Guarantees Programs on Macroeconomic Outcomes



Source: IMF staff calculations.

Note: In an exceptional recession that reduces output by 7.3 percent the first year, credit guarantees, or loans can reduce the fall in output to 4.3 percent (panel 1). The bankruptcy rate increases from about 1 percent to 3.5 percent, but a support program can reduce the bankruptcy rate to 0.15 percentage points below precrisis. Volatility is reduced by 40 percent, whereas during standard contractions, the effect of these programs on volatility (of output, employment) is small or even marginally positive.

Government support in the form of FSMs reduces losses considerably. By lowering the bankruptcy rate and reducing firms' borrowing costs, FSMs reduce incentives to downsize production, supporting demand for productive inputs (Figure 11, panel 1). The negative effect on employment and investment is lessened. Stronger workers' and capital owners' incomes allow households to spend more. Such improved outcomes promote a more optimistic outlook on the economy, which further supports firms' viability, investment, and consumer spending. Crucially, the benefits of financing support measures go beyond their direct impact on individual recipient firms, by improving economywide confidence and financing conditions, and by limiting

¹³ Because the crisis has no precedent, the risk discovery process occurring after the shock weighs the latest developments more heavily. This leads to alternating situations of overvaluing or undervaluing economic risks, thus increasing macroeconomic volatility.

banking losses, improving broader financial stability.¹⁴ Where self-fulfilling pessimism is possible, FSMs reduce the depth of the recession by almost two-thirds and curtail volatility (Figure 11, panel 2). By reducing bankruptcy rates and risk premiums, they break the vicious cycle between borrowing costs and pessimistic expectations. In the model simulations, the support program reduces the bankruptcy rate by 3.6 percentage points (bringing it below its precrisis level) and the interest rate charged to firms by 4.3 percentage points. **FSMs also reduce the scarring effects of a deep recession.** Although growth can recover after a deep crisis, output losses tend to be permanent, possibly because human and physical capital accumulation is slowed down and total factor productivity is affected (Ollivaud and Turner 2014, Cerra, Fatás, and Saxena 2020). In the model simulations, five years after the start of the crisis, firms' capital remains below precrisis levels in the absence of government guarantees.

During standard recessions, FSMs are less effective because uncertainty is less pronounced, and firms' buffers may be sufficient to prevent a rise in bankruptcies. In standard recessions, economic agents can more readily rely on past information when gauging risks. Most firms have sufficient buffers and corporate bankruptcies do not rise significantly, so risk premiums remain stable. As a result, FSMs are less appropriate. By comparison, automatic stabilizers can reduce macroeconomic volatility by 20–50 percent (Van den Noord 2000; Andrés, Domenech, and Fatás, 2008).

Although guarantees, subsidized loans, or transfers to firms can all be effective, guarantees entail lower fiscal costs. Loans or transfers require upfront costs for the government that must be financed through higher taxes, lower expenditure, or additional government borrowing, all potentially reducing the impact of the policy. Whereas subsidized loans may be eventually repaid, transfers may not be recouped. Guarantees only have explicit fiscal costs when they fail to prevent a significant rise in bankruptcies, but in such cases, loans of similar magnitudes wouldn't be able to prevent bankruptcies or would imply similar fiscal losses. In the model simulations, if the government provides subsidies or subsidized loans instead of guarantees, the fiscal cost is 4.8 percent points of GDP higher in the first year of the program and 3.5 percentage points of GDP higher, on average, during the five years following the shock. This said, guarantees that involve sizable fiscal risks may lead to potentially unexpected costs if they are issued liberally and conditions deteriorate more than expected.

Empirical Estimates of Impact

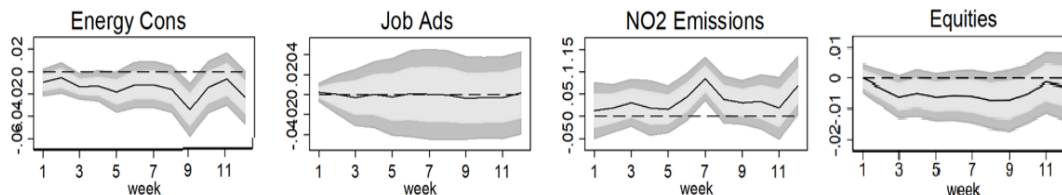
These results are supported by an empirical analysis of FSM announcements during the pandemic that find guarantees and loan schemes boosted contemporaneous and forward-looking macroeconomic indicators. The literature on the macroeconomic impact of the fiscal measures implemented during the pandemic is still limited. Although fiscal policy has played an important role in mitigating the crisis (Chudik, Mohaddes and Raissi 2021), the main channel has likely been the support to firms' liquidity (Gourinchas and others 2021) and the protection given to households, both in advanced economies (Chetty and others 2020) and in emerging markets (Bui and others 2022). By estimating the dynamic response of fiscal announcement shocks in a panel of advanced and emerging economies, the authors find the announcement of FSMs during the pandemic broadly increased economic activity and improved expectations (Jalles and others forthcoming). The announcement of guarantee programs had the most significant impact on short-term activity, with the

¹⁴ See Catalan and Hoffmeister (2022) for a model of the macro-financial feedback loop that also accounts for bank-specific lending response to crises. As the pandemic hurt some sectors more than others and led to supply-chain disruptions, some analyses of the impact of one firm's choices on demand for other firms' products (or on the supply of inputs that other firms need) have emphasized the need for policies that work in the presence of asymmetries. Woodford (2022) points out, for example, that credit guarantees are more helpful than generalized interest rate cuts, because they restore the flow of credit to those firms that may have lost it altogether. Guarantees may prevent an implosion caused by a chain reaction of non-payments, loss of demand, and lack of inputs.

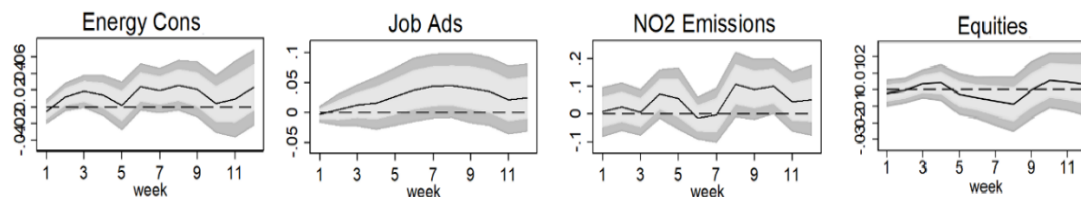
largest measures raising energy consumption and, in some cases, NO₂ emissions—indicators correlated to industrial activity, which is less contact intensive. Job ads, which capture both contemporaneous activity and firms’ outlook, also increased by about 5 percent in the weeks following announcements (Figure 12).¹⁵ Markets appear to prefer guarantee schemes compared to above the line and loan schemes, with equity prices (that capture prospects of firms’ solvency and profitability) increasing by 1–2 percent after their announcement. Results are similar, albeit less strong, after below the line measures were announced, whereas announcements of traditional (“above the line”) measures had little-to-no short-term effects,¹⁶ at least in the constrained lockdown environment. The literature has also argued that pushing aggregate demand with traditional fiscal policy is inappropriate during a pandemic, when fiscal support should rather be geared toward those directly harmed by the fall in contact-intensive activities (Romer 2021).

Figure 12: Impulse Responses to Large Fiscal Announcement Shocks by Type

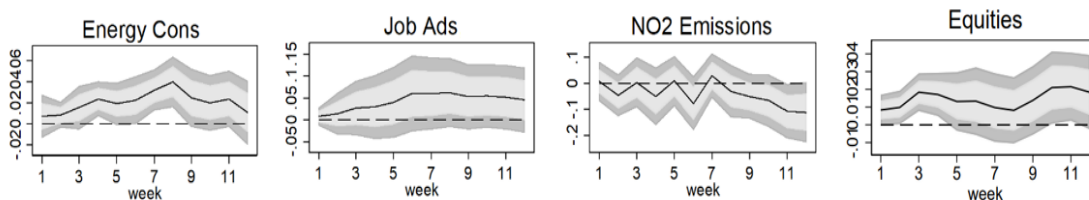
1. Above the Line Measures



2. Below the Line Measures



3. Credit Guarantees



Source: Jalles, Battersby, and Lee (forthcoming).

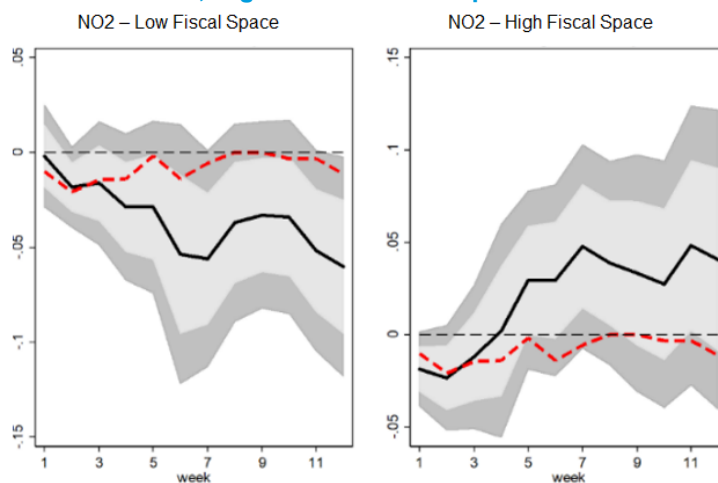
Note: Light and dark shaded areas denote confidence bands at the 68 and 90 percent levels. T = 0 is the week of the fiscal announcement shock. The dependent variable is 1 when the size of the fiscal measure is two standard deviations above the mean.

¹⁵ This is consistent with Deb and others (2021), who find fiscal measures were more effective for advanced economies, and those with a low precrisis public debt-to-GDP ratio. They also found below the line measures were more effective in general, and particularly under lockdown, whereas above the line measures were more effective when containment measures were eased.

¹⁶ Data on announcements usually reflected discretionary measures (such as grants to households and firms, and deferred tax arrangements), and usually did not include nondiscretionary measures such as those associated with automatic stabilizers.

Guarantee schemes were more effective in countries with either cash or credibility, both in terms of macroeconomic impact and their effect on sovereign interest rates. For governments with ample fiscal space, contemporaneous indicators rose by more, suggesting greater efficacy, whereas in countries with low fiscal space they appear to have a negative impact (Figure 13). In advanced and emerging economies, the announcement of FSMs tended to reduce sovereign spreads, suggesting the market perceived the benefits of the measures as more important than potential future risks. In low-income countries sovereign spreads widened, perhaps reflecting investors' concerns regarding the ability of low-income countries to manage greater fiscal risks (Figure 14), though the size of low-income country FSM interventions were relatively small.

Figure 13. Conditional Impulse Responses to Fiscal Announcements, High vs. Low Fiscal Space

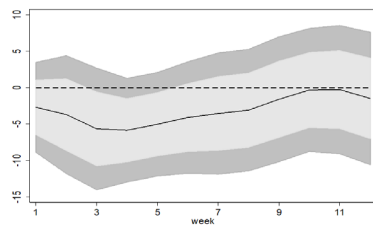


Source: Jalles, Battersby, and Lee (forthcoming)

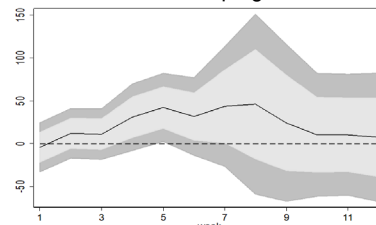
Note: Fiscal space is defined as debt-to-GDP with low and high fiscal space representing below and above median debt-to-GDP country groupings. The red line denotes the variable's unconditional result for comparison purposes

Figure 14. Impulse Responses on Sovereign Bond Spreads to Announcement of Guarantee Measures

1. Advanced Economies



2. Low-income Developing Countries



Source: Jalles, Battersby, and Lee (forthcoming).

Fiscal Costs from Financial Support Measures

Although FSMs may not affect deficits or financing needs initially, they can have future impacts on fiscal balance and debt levels. Whereas tax cuts or expenditure increases are immediately reflected in fiscal deficits, FSMs may only impact the public finances by increasing fiscal risks, at least in the near term. This can be part of the appeal of FSMs, especially for governments operating in a fiscal- or financing-constrained environment. Loan programs and equity injections expand the public sector's balance sheet by increasing both assets and liabilities. Guarantees may have no immediate impact, because they are a future promise contingent on the loans not being serviced (hence a contingent liability). Even so, they can increase future deficits if loans are written down or guarantees are called. Consequently, it is important to record this increased risk exposure. More generally, the ultimate fiscal impact of FSMs may depend on how they are implemented, be it directly by government or through central banks or state-owned enterprises. If these measures are not properly reported and accounted for, they can be difficult to manage and can distort policymaking (Box 1).

Box 1. Accounting for Credit Support Measures and Quasi-Fiscal Activities

FSMs typically do not immediately worsen the fiscal balance (and can even improve it if fees are charged). Like traditional measures, loans and equity injections are funded through increased borrowing or asset drawdowns. If the government receives an asset of similar value in return (the loan or equity), government net worth is typically unchanged in the short-term. Over the longer term, however, these new assets could expose the government to a risk of losses. For instance, a loan default or asset write off reduces the value of the government's assets and its net worth position. Under GFSM 2014 principles, a loan or asset write-off also impacts on fiscal balances at the time it is written off. Even where they may not initially impact revenues and expenditures, good practice sees FSMs being recorded in budgetary documents and appropriations.

Discrete government guarantees to banks, firms, or households usually have no immediate upfront fiscal impact unless the expected cost is budgeted. However, these instruments create a contingent liability, with the government exposed to future calls on guarantees. A call on a guarantee would increase gross public debt, as the guaranteed debt is assumed by the government. Under GFSM 2014 principles, expected losses on standardized guaranteed schemes are treated differently to individual guarantees: provisions for expected losses on the guaranteed portfolio impact both fiscal balances and debt at the time the standardized guarantee is issued (or in subsequent reassessments), as an estimated average of the annual portfolio loss.

An important deviation from this is when loans are provided to beneficiaries that are not expected to be repaid, or guarantees are issued which are highly likely to be called. In these instances, good practice requires that these interventions be recorded as expenditure at the time the loan or guarantee is issued, immediately reducing the fiscal balance and net worth.

In some instances, credit support measures may be implemented by public corporations on behalf of the government. These measures are often referred to as quasi-fiscal activities and can include the loan and guarantee programs managed by central banks, the government-directed expansion of credit at public banks, or the deferral of billing at state-owned utilities. In circumstances where it is clear that the government has instructed the public corporation to carry out those interventions for public policy purposes, budgeting and reporting should reflect the substance, with these interventions considered as being undertaken by the government and recorded on the general government balance sheet. In all other instances, those transactions will affect the balance sheet of the public corporation in much the same way that below the line and contingent liability measures affect a general government's balance sheet. That said, regardless of which approach is deemed appropriate, from a public-sector balance sheet perspective, the effect is the same.

Although the implications for any specific country's balance sheets vary depending on the actions taken, they result in additional risks assumed across the public sector. Monitoring and managing the implications of this is crucial for reducing uncertainty and ensuring fiscal sustainability.

Strengthening Policymaking Frameworks

During the GFC and pandemic, decisions on FSMs were taken at impressive speed, but in some cases policy frameworks were not fully in place to effectively manage them. The GFC demonstrated that FSMs can be large, subject to governance issues, and not scrutinized or reported in the same way as traditional budget measures (IMF 2012). Lessons from that crisis underscored the importance of undertaking FSMs based on existing policy making frameworks. However, the novel nature and nascent institutional arrangements through which FSMs were implemented meant that monitoring, analysis and reporting channels need to be

enhanced. This section presents considerations, drawn from experience, to strengthen policy frameworks and ensure governments are better prepared for future crises.

Strengthening Policymaking Frameworks

Given their use of public resources, FSMs warrant similar scrutiny and budget procedures as traditional fiscal support measures. Policy decision-making can become distorted, and policymakers may unduly favor FSMs over direct funding when FSMs (owing to their less-visible impact on fiscal aggregates) are subject to less stringent scrutiny than traditional budget measures. Ideally, all FSMs should be assessed, costed, and included in budget plans using similar budget procedures as traditional fiscal support measures. During crises, when a balance needs to be struck between speed and scrutiny, necessity may require streamlined ex ante processes and high-level estimation of costs given heightened uncertainty. This increases the importance of committing upfront to clear and transparent ex post disclosure and scrutiny (IMF, 2020d).

Quantifying the fiscal costs and risks of FSMs at the time of decision helps clarify policy tradeoffs, even under heightened uncertainty (IMF 2021b). This ensures that the case for intervention and the relative merits of individual measures are duly assessed (Box 2). This also helps inform decisions on whether costs can be accommodated, or additional risk mitigation measures should be adopted.¹⁷ While future cash flows of financial measures are uncertain, expected costs should be estimated based on available information. In an environment of heightened uncertainty, policymakers can be presented with scenarios that consider the fiscal implications under different assumptions and macroeconomic conditions. Extra attention should be given to the maximum exposure of decisions, which provides an indication of costs in the worst-case situation (IMF 2020c). For public loans and guarantees, credit risk evaluation techniques, similar to those used in financial analysis, can also be used. With a subsidy element estimated to be about 40 percent on average, the ex-ante fiscal costs of the largest guarantee programs in advanced economies were substantial (Box 3, Hong and Lucas 2022). The IMF [Fiscal Risk Toolkit](#) provides practical tools and methodologies to estimate expected costs and conduct scenario analysis. Estimates of the subsidy element, together with estimates of the incremental borrowing resulting from FSMs, can also be used to compute a fiscal multiplier, with Lucas (2016) estimating that in 2010, the multiplier of US federal credit programs was about 5.

Incorporating expected costs into budgets and medium-term fiscal plans ensure fiscal projections are credible and resources are available to meet potential costs. Costs can be budgeted for on an annual cash flow or net present value basis in the year support is provided. Estimates can be included as general provisions in the budget, or specific budget lines in agency budgets (Saxena 2017). For example, the United States Federal Credit Reform Act of 1990 requires the inclusion of the present value of expected costs of credit schemes in agency budgets in the year the intervention is made.

These policy frameworks provide the basis for determining when and how to intervene, though their novel nature requires that additional characteristics be considered. The case for intervention is strongest when adverse economic shocks are temporary but too large for private sector actors to mitigate or absorb;

¹⁷ In Australia, all major new policy proposals are required to be assessed using a [Risk Potential Assessment Tool](#) which provides a standardized template to assess the grounds for, and risks of, all major new policy proposals. Colombia has established a standardized methodology to estimate fiscal risks derived from [government guarantees](#), which takes into account credit and market risks, and expected and unexpected losses. The [UK Contingent Liability Approval Framework](#) requires proposals involving new contingent liabilities to be assessed against their rationale, exposure, risk and return, risk management, and mitigation.

disruption to the economy or macro-critical sectors threatens long-term scarring; and alternative policy levers are unlikely to be sufficient or as effective. Policy decisions on the form of intervention can be guided by:

- **Nature of shock:** Traditional fiscal policy measures are usually targeted at supporting aggregate demand by boosting incomes or direct government spending. In situations where credit or financial markets may freeze amid high uncertainty, FSMs can quickly boost confidence, shore up liquidity, and ensure the flow of credit to the real economy. FSMs are more appropriate for temporary shocks, and they should not seek to address long-lasting weaknesses, because their protracted use is costly and can distort incentives.¹⁸
- **Relative merits of alternative FSMs:** Each FSM has differing costs and benefits and is appropriate for specific circumstances (Table 1). Guarantee and debt measures are more effective for liquidity challenges, with guarantees more appropriate where the financial sector has capacity to lend, and debt more appropriate when direct state intervention is necessary. Equity injections are more suitable for situations where systemically important firms are facing solvency challenges. Although equity also allows government to capture gains on the upside if the economy and firm strengthen, it also implies higher upfront costs and requires more careful targeting and selection criteria. In addition to the fiscal costs, different FSMs have features that may alter market behavior or asset prices, leading to unintended adverse effects on credit conditions (repayment discipline, credit supply, and demand) as well as consumption, savings, and investment decisions.
- **Shape of the measure:** Defining the speed, duration and risk exposure of the measures should follow the general guidance of being timely, targeted, and temporary. Measures that build on existing programs or leverage existing policy mechanisms and infrastructure will likely facilitate more timely support than those that require new delivery mechanisms. There may be trade-offs between these principles. Greater targeting may be more cost effective but can also increase administrative requirements and slow the pace of support. For example, extensive eligibility requirements for guarantees and loan schemes increase the time required for assessment and approval. More temporary measures may reduce the fiscal exposure, but also their impact on firms and the economy. Making judgments on such tradeoffs can be difficult when the duration and depth of the crisis are not yet known, and pressure can build for rolling extensions. A well-designed exit strategy, with a structured phasing out of support measures combined with swift restructuring provisions for nonviable firms is important. Exit criteria should be clearly communicated and based on publicly verifiable milestones that help align public expectations with government objectives.
- **Institutional considerations:** The design of the interventions should take into account where the institutional strengths are in the public sector to meet the challenges of FSMs. In designing the measures, the implementing agencies, including monetary and financial authorities, will need to provide guidance on criteria and eligibility, as well as terms of the measures (for example coverage, risk sharing, seniority, and fees), that will be practical and lead to take up by firms. Due consideration will need to be given to legal changes and frameworks that may be necessary to make the measures operative and institute transparency requirements. Implementing agencies will need to assess applicant firms against the criteria and manage them on an ongoing basis. The implementing agency will need an established relationship with the financial sector to channel the funds to recipients. Finally, a coordination mechanism will be needed to channel information on design, implementation, and execution across government agencies.

¹⁸ IMF (2022a) discusses the relative benefits of automatic stabilizers, discretionary stimulus, and FSMs.

Table 1. Relative Merits of Different Financial Support Measures

Measure	Benefit	Cost	Institutional Challenges	Appropriate Circumstance
All	Positive impact on macroeconomic activity Reduces economic scarring by reducing the failures of otherwise viable firms, improving financial conditions, lowering job losses and improving labor market attachment.	Increase in balance sheet, debt &/or fiscal risks Increase in public debt and financing needs, either immediate or in the future Potential increase in borrowing costs Potential distortionary effects on market behavior and asset prices	Expanded role of state in private finances, governance and decision-making Degree of targeting Greater coordination and information costs from layers of intermediation Exit strategies Increased fiscal risk management complexity State aid and competitive neutrality considerations	Large-scale FSMs appropriate in crisis environment where otherwise viable firms are at risk. Financing conditions, which depend on global environment, affect the desirability of large-scale FSMs Government has fiscal space
Guarantee	Largest macroeconomic effect Lowers firms' borrowing costs Unfreezes credit from financial sector by placing first loss on government Provides rapid liquidity to firms to enable them to continue operations No immediate cash flow requirements for the state	Increases firms' leverage Expands financial sector exposure to affected firms Increased moral hazard for financial sector (can issue loans with reduced/no risk) Creates a contingent liability for the state, increasing risk of creating future liabilities and cash flow requirements	Defining eligibility criteria Defining guarantee terms (degree of coverage, interest, length, grace periods, seniority, guarantee fee, subsidization) Intermediary costs and complexities Targeting to temporarily illiquid but solvent firms under uncertainty	Otherwise, viable firms facing liquidity challenges Financial sector has capacity to lend, but not the willingness (due to uncertainty) High credibility Government relationship with financial sector well established
Loans	Provides immediate liquidity to qualifying firms to enable them to continue operations Creates a loan asset for the state, so no immediate impact on net financial worth If institutional arrangements exist, quick and low complexity way to distribute liquidity Shares risk with and leverages selecting/monitoring capacity of financial sector if joint with	Increases firms' leverage (at their discretion) No immediate impact on firm's solvency unless grant component included Loan asset creates risk of future (immediate) write-downs for the state if loan is written down in the future (at time of issuance) If institutional arrangements do not exist, rapid development of loan issuance facilities	Defining eligibility criteria Defining loan terms (interest, length, grace periods, seniority, subsidization) Intermediary costs and complexities Targeting to temporarily illiquid but solvent firms under uncertainty	Otherwise, viable firms facing liquidity challenges Financial sector doesn't have the capacity to lend Government has fiscal space Government has existing credit facilities to build on
Equity	Provides immediate improvement to firms' solvency and liquidity For systemically important firms prevents systemwide failures If firm is solvent, creates an equity asset with no change to net financial worth Equity asset for the state provides an upside stake in post-crisis improvement	No significant macroeconomic impact Immediate cashflow cost to the government, requiring increased borrowing If firm is insolvent, value of state equity stake written down immediately, reducing net financial worth Equity asset is high risk, with potential future write-downs reducing net financial worth	State ownership of firms creates a role for state in decision-making and governance State aid considerations Sale of equity stake Targeting to temporarily insolvent firms	Otherwise, viable firms facing solvency challenges Systemically important firms Government has fiscal space and credibility Programmatic sectoral equity injections (for example, SMEs, Diez and others 2021)

Sources: Diez and others (2021); OECD (2020); World Bank; IMF (2020a, 2020b, 2020c, 2019); and IMF staff.

Financing constraints are a key factor determining the size of action. Countries with greater fiscal space—lower debts, or credibility that allows affordable access to market financing—have more room to maneuver and their fiscal policy responses tend to be more credible and effective (Deb and others 2020; Jalles and others, forthcoming). In this regard, fiscal stress tests may be helpful for governments as they prepare for future crises by identifying the potential size of shocks, channels through which fiscal risks will propagate under different circumstances, and the degree of necessary fiscal space under various types of crises (IMF 2015). Stress tests can consider idiosyncratic domestic shocks or common global shocks, with different implications for policies (OBR 2021).

Box 2. Policy Approval Framework for Crisis Interventions – A Concise Checklist

Deciding whether to intervene

- Is there a need for government intervention?
- Can other macroeconomic policy levers provide the needed support?
- What areas should fiscal policy measures support (for example, liquidity, income, aggregate demand)?
- What form of policy instrument is likely to be most effective in meeting these challenges?

Deciding on specific interventions

- Is this measure the most cost-effective way of providing the needed support?
- Have we considered all alternative options (for example, tax deferrals, direct support, equity, loans)?
- Are complementary measures being taken (traditional measures widening the deficit, or central bank interventions) and are they coordinated?
- Is the measure targeted to the sectors, individuals, firms most in need and/or where the impact will be largest?
- How will targeting affect the administrative burden and speed of deployment?
- Is there an advantage in government exposure to the sector or entity over the medium-term?
- Do we have capacity to administer and implement these measures?
- How quickly can the support be provided and what are the lags associated with its economic impact?
- Are there any longer-term adverse implications of taking this action (for example, incentives that distort behavior or asset allocation)? How can these be managed?
- Are there implications for other government jurisdictions (for example, local governments)? Have they been consulted?

Determining whether costs can be accommodated:

- What are costs of the measure? How will this impact the deficit, financing requirements and debt?
- Are there longer-term costs not factored into the medium-term budget framework?
- What fiscal risks are associated with the measure? What are the maximum costs under the worst-case scenario? What are the likely costs?
- Can the costs be accommodated without undermining fiscal credibility or breaching fiscal rules?
- Should budget provisions be made for actions that may give rise to future budget costs?
- How do we best communicate the fiscal impacts to maintain credibility?

Risk mitigation:

- Have risks been identified as part of the proposal?
- Have appropriate risk mitigation measures been adopted? What will be their impact?
- Do we have a clear exit strategy in place? How can we best communicate this to manage public expectations?

Risk management:

- Who will be responsible for administering and managing the scheme or intervention? Does this entity have the required capacities?
- Who will be responsible for monitoring and managing its associated risks?
- Are arrangements for periodic reporting of the financial impacts and risks clear?
- Should advice on implementation or design be sought from external experts?

Risk mitigation measures need to be considered at the design stage, when the government’s ability to control risks is greatest. Well-designed risk mitigation measures help reduce the likelihood of risks materializing or limit fiscal costs if they do (Saxena 2017, World Bank 2019). For loan and guarantee schemes, governments can limit exposure through timing, coverage and eligibility provisions, for example by limiting the maturity of the programs, placing limits on loan sizes or prohibiting risky borrowers from accessing credit schemes. Partial guarantees and collateral requirements retain the ability to recover assets in the event of default and discourage excessive risk taking by recipients and intermediaries. These measures help to ensure that beneficiaries and other stakeholders have “skin in the game.” Risk-based guarantee charges compensate governments for their increased exposure, as well as limiting overall exposure. Governments need to assess the trade-offs between mitigating and bearing risks early on, based on assessments of costs and benefits, and capacity to accommodate residual risk.

Managing the legacy of crisis interventions

FSMs put in place during crises expand government balance sheets and have ongoing implications that may take many years to unwind. Following the GFC, government balance sheets remained considerably larger than before (IMF 2018, 2019). Although many of the FSMs provided during the pandemic will remain in place for several years, others have already been wound down. For example, some guarantee and loans schemes were wound up in early to mid-2021 (United Kingdom, United States) while others were continued and eventually wound up in 2022 (France’s PGE). Still others have continued, albeit with tightening of conditions (Italy). Even where funds have been wound down quickly and methodically, they may still have large outstanding liabilities for some years (France, the United Kingdom).

Governments would benefit from monitoring and managing FSMs on an ongoing basis, with estimates of their fiscal costs updated as events unfold. Regular updates of asset valuations and risk assessments can then be considered when deciding on whether budget provisions or buffers should be adjusted. To incorporate their impact in fiscal forecasts, forward-looking assessments (for example using statistical models linked to macroeconomic developments or scenario analysis) can help gauge how these risks may evolve in the future. Clarity over risk management responsibilities is helpful, with arrangements in place to ensure risk managers have access to information on a timely basis. This may require developing new analytical capacities within ministries of finance, as well as new information channels with implementing agencies.

Transparently reporting on fiscal risks and their realization can increase confidence in the quality of fiscal management and underpin fiscal credibility (IMF 2012, 2018). For example, the United Kingdom publishes detailed information on losses and fraud arising in the Bounce Back Loan Scheme. In the United States, the Pandemic Response Accountability Committee was established as part of the CARES Act to promote transparency across COVID-19 related FSMs. International accounting and reporting standards provide guidance on including these measures in government balance sheets and fiscal documents. Given that many FSMs are delivered outside the general government (for instance, by central banks or development banks), financial reporting on a public sector basis assists tracking and understanding the broader picture of the interventions (IMF 2018, Alves, De Clerck, and Gamboa Arbalaez 2020). Because of their uncertain nature, guarantees and other fiscal risks are not typically recorded in government financial statements and fiscal reports (IMF 2018). Publishing fiscal risk statements, as part of, or alongside government budgets, can help the public understand the full consequences of government decision-making and help policymakers better appreciate how existing risks evolve. The [IMF’s Fiscal Transparency Code and Handbook](#) (2018) provides guidance for disclosing specific risks.

Conclusion

During the pandemic and GFC, governments acted as financiers of last resort to stabilize economies, transferring risk from the private sector to the public. Financial support measures, which go beyond traditional budgetary support, were especially large and effective. Although a comprehensive assessment is difficult at this early stage as the pandemic shows signs of improvement, arguably this was a calculated bet that paid off in many countries—combined with other measures such as liquidity provision by central banks—in terms of reducing bankruptcies and attenuating the depth of the recession. Traditional fiscal policy levers, even combined with monetary stimulus, would likely have been insufficient to limit economic implosion, long-lasting unemployment, widespread bankruptcies, and enduring damage to economic growth. Even so, these interventions are not costless. They result in a transfer of risk from the private to the public sector, expansions in public sector balance sheets, and contingent liabilities that can impact the public finances for years.

FSMs preserve productive capacity by improving firms' liquidity and solvency, and more generally boosting confidence and macroeconomic performance. FSMs supported firms' liquidity and led bankruptcy rates to fall in many countries during the pandemic. They also facilitated a decline in risk premiums, a loosening of financing conditions, and an improvement in the long-term viability of firms. Our empirical analysis also shows that both real-time and forward-looking measures of economic activity improved after FSMs were announced, particularly where governments had fiscal space.

Nonetheless, the bar for intervention should be set high. FSMs tend to be less transparent, their costs large and uncertain, and their benefits not as well established as traditional measures. They increase fiscal risks, with large implications for future debt and deficits which, given their scale, could impinge on fiscal space in the future, often at the worst times. These interventions can also distort private sector decision-making over the longer term. For example, they can lead to riskier behavior if they entrench an expectation that the corporations will be bailed out. FSMs are at their most effective during crises, when they can short circuit a doom loop of low confidence and tight financing, and thus preserve productive capacity. They are less effective during standard economic slowdowns, when traditional fiscal and monetary actions are the first port of call for policymakers. In the current juncture of high energy prices, systemically important firms, especially in the energy sector, may require support. This should be limited to systemic companies, whose operation is required for macroeconomic stability. The modality of support should be tailored to the duration of the shock and not be extended beyond the necessary timeframe.

During a crisis there is no substitute for fiscal space, and governments should seek to build that space during normal times. Because deploying FSMs is easier and more effective when countries have fiscal space, bringing debt down to prudent levels, investing in quality assets, and reducing unnecessary fiscal risks when conditions allow, can give governments greater scope to act when needed. Regular fiscal stress tests, combined with probabilistic forecasting methods, help integrate fiscal risks in fiscal frameworks (IMF 2016).

Governments should build their institutional capacity to design, deploy, and manage FSMs, so that they are ready to be rolled out quickly in the future. Deploying FSMs for macroeconomic purposes remains novel, and ministries of finance would benefit from honing their understanding of how they work, how best to design them, and how to mitigate their risks. Developing a standing policymaking framework ensures that FSMs can be well targeted, timely, and cost effective, keeping fiscal risks within manageable levels. Where

FSMs have been deployed, ongoing monitoring mechanisms are needed to assist governments assess the value of those interventions and provide early warning should fiscal risks be about to crystallize.

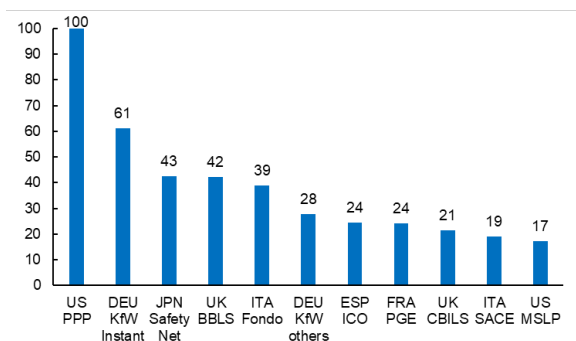
Box 3. Fair Value Approach

Measuring the true costs of FSMs is important for decision making, for instance to allow comparing different policy options. The fair value approach (CBO 2012) produces cost estimates for credit support programs that are “grant-equivalent,” that is, the program’s cost presented is equivalent to the cost of providing an upfront cash grant of the same amount (Lucas and Moore 2010). The fair value approach computes the net present value of cash flows on an accrual basis, to and from the government, over the life of the loan or guarantees, as of a specified point in time.¹⁹ Cash flows are discounted at rates that include risk premiums to account for the market value of risky cash flows, often inferred from market rates.

The subsidy provided by the loan or guarantee (subsidy element) reports the lifetime cost of the programs for the government. The subsidy element is measured as the difference between actual disbursement amount and the present value of all the expected future cash flows associated with the program (including the amounts disbursed, principal repaid, interest received, fees charged, and net losses that accrue from defaults), discounted at market rates (see Annex 3 for more details).

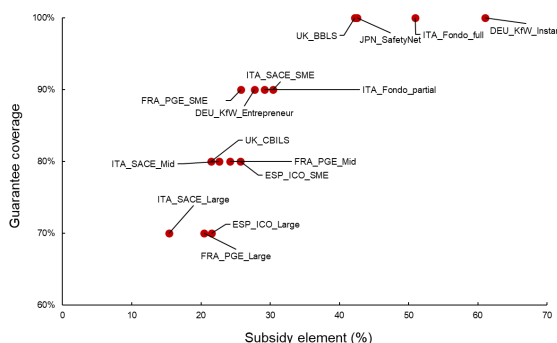
An average of 40 percent of loan principals were subsidized by advanced economies’ governments during the pandemic (or 25 percent if excluding the US Paycheck Protection Program that is largely subsidized). The analysis covers the seven countries that made the most extensive use of credit guarantee programs during the pandemic (Hong and Lucas, forthcoming). Significant cross-country differences exist in the estimated subsidy element (Figure 15). Programs with a longer maturity or higher guarantee rates tend to have larger subsidy component, whereas higher fees or interest rates reduce it. As guarantees were often more generous for small enterprises, the subsidy components and associated fiscal risks are higher in those programs (Figure 16).

Figure 15. Estimated Subsidy Element by Credit Guarantee Programs in Seven Advanced Economies (Percent)



Source Hong and Lucas (2022).
Note: Y-axis shows the subsidy element in percent.

Figure 16. Correlation between the Estimated Subsidy Element and Guarantee Coverage



Source: Hong and Lucas (2022).

¹⁹ CBO (2012) for more details on the methodology, as well as concerns related to the implementation of a fair-value approach.

Annex 1. Corporate Support Programs during COVID-19 in Portugal: Model and Simulation

Model

A corporate finance model is used to quantify the effectiveness of the government's measures to support firms during the COVID-19 pandemic, using Portugal as an example. The simulation is based on a corporate finance model that highlights the interconnectedness between illiquidity and insolvency when cash flows are uncertain (Gryglewicz 2011). Cash flows are uncertain for two reasons. First, short-term shocks affect cash flows at any time, potentially leading to a default because of illiquidity, if its cash reserves are below a certain threshold. Second, the equity holders' view on the long-term profitability of the firm evolves over time, and this affects their expected earnings, which may make a firm insolvent if the expected value of the firm falls below its debt obligations.

To capture these two varying sources of uncertainty, cash flows are assumed to follow a Brownian motion with a drift. Specifically, a firm generates a stochastic flow of earnings before interest and taxes (EBIT) with true (but unobserved) mean $\bar{\mu}$, and volatility σ . \bar{Z} represents a standard Brownian motion.

$$dX_t = \bar{\mu}d_t + \sigma d\bar{Z}_t$$

All parties (the equity holders, the debt holders) have the same information at each time t . They observe the cumulative EBIT process $\{X_s, s \leq t\}$ but they do not know $\bar{\mu}$. The first source of uncertainty (liquidity shock) is represented by the realized EBIT X_s , which is subject to the Brownian shocks $d\bar{Z}_t$. Second, since the true mean $\bar{\mu}$ is unknown ex-ante to all parties, the value of the firm is uncertain and evolves with time. Indeed, the parties update their expectation of the true mean, based on a filtration $\{\mathcal{F}_t\}$, such that $\mu_t = E[\bar{\mu}|\mathcal{F}_t]$. In other words, each realization of the EBIT process also gives information that is used by the parties to update their view on the value of the firm.

In this set-up, a firm can default for two reasons. First, cash reserves may fall below a certain threshold, triggering a liquidity default. The threshold for minimum liquidity is higher the higher the value of the firm because firms that have a high value are worth protecting from liquidity shortfalls. Second, a firm can become insolvent if the (updated) expectation of the true value of the firms (which depends on $\mu_t = E[\bar{\mu}|\mathcal{F}_t]$) fall below its debt obligations. This is how successive negative earning (liquidity) shocks affect firm solvency.

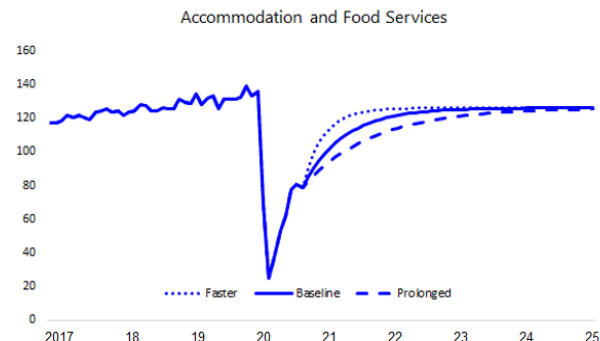
Simulations

The model is used to simulate the impact of COVID-19 shocks on corporate balance sheets and the risk of illiquidity and insolvency, comparing scenarios that include or exclude the COVID-19 government support programs, using Portugal as an example (see details of the programs below). The firm-level corporate balance sheets are obtained from ORBIS, with the data available up to 2018.

The simulations are conducted for three periods: (1) pre COVID-19, (2) during the COVID-19 pandemic, and (3) post COVID-19. The key parameters for simulations are the cash flow rate (μ) and volatility (σ) for each period. Since it is not feasible to generate firm-specific scenarios, scenarios are constructed for each industry, with a specific recovery path, calibrated to match monthly industrial production observed in Portugal. To focus on the impact of government supports on the corporate balance sheet (for instance, excluding the effects of vaccinations or waves of COVID), the simulations are conducted from the vantage point of the initial months of COVID-19.

First, the pre-COVID firm-specific μ 's and σ 's are estimated by applying a maximum likelihood estimation on the EBIT variable. Their value during the COVID-19 pandemic is inferred from the realized output for each sector in March 2020. More specifically, we calculate the drop in industry-level output taken from the industrial production series, by comparing the average pre-COVID level of output with the realized output in March 2020. This allows us to recover μ 's and σ 's during COVID-19, represented as a multiple of the pre-COVID values, where the multiple is the change in output due to COVID. For the post-COVID-19 calculations, we introduce various scenarios of recovery paths for each sector using the industrial production series, with a half-life calculation. As a result, we recover the duration needed for each industry to reach its pre-COVID level of output. Annex Figure 1.1 is an example of the path assumed for the “accommodation and food services” sector.

Annex Figure 1.1. Recovery Path Assumed for Post-COVID: Accommodation and Food Services



Sources: Haver Analytics; and IMF staff estimates.

Government policies introduced

The measures announced by the Portuguese government are entered separately and jointly in the simulation to understand the effects of these measures on corporate liquidity and solvency situations.²⁰ These measures affect firms' EBIT through operating costs (wages, taxes) and debt (loans deferrals, guarantees) and long-term profitability based on the recovery path (Annex Table 2.1). As we do not have a detailed firm-level information on how they used government support programs, we assume that all available firms used the maximum amount allowed by each measure. The following programs are used for simulations: (1) grants (800 million euros for micro and small companies); (2) wage subsidies covering 70 percent of 2/3 of gross remuneration until a certain threshold; (3) tax deferrals of VAT and corporate tax for firms with revenue below 10 million euros and whose activity has been closed or had a revenue fall above 20 percent; (4) loan and debt deferrals; and (5) government credit lines available only to the affected sectors such as tourism and restaurant, with the maximum loan principal amount not to exceed either 1) twice the annual wage bill or 2) 25 percent of the total turnover in 2019.²¹

Annex Table 2.1. How Government Measures Affect Corporate Balance Sheets

Cash Balance	Grants (+)
Operating Costs	Wage subsidies (–) Tax deferrals (–)
Stock of Debt	Loans and debt deferrals (–) for t Loans and debt deferrals (+) for $t+1$ Credit guarantees and credit lines (+) for $t, t+1, \dots$

Source: IMF staff.

Note: This table describes how government support measures enter corporate balance sheets in the simulations, similar to the approach taken by De Vito and Gómez (2020) and Ebeke and others (2021).

²⁰ The main source of this information is the IMF Fiscal Monitor Database of Country Fiscal Measures in Response to the COVID-19 Pandemic' complemented by the data sets from Bruegel ([The fiscal response to the economic fallout from the coronavirus | Bruegel](#)) and the website of the Caixa General de Depositos.

²¹ The Portuguese government later extended the credit lines to all sectors. For the simulation, we assume that only

Annex 2. General Equilibrium Model of Government Support to the Corporate Sector During and Unprecedented Crisis

Model

An open economy is populated by households that consume a tradable good c , own firms and supply labor l in exchange of an hourly wage w . These households hold financial assets, b with a return r^* , and physical assets (capital), $k \geq 0$, that they rent (at a rate r^k) to the firms. They also pay taxes on income and consumption and receive government transfers (T). Households maximize welfare by choosing consumption, leisure, and holdings of financial and physical assets. Welfare also depends on government consumption, g .

$$\text{Max}_{c,l,b',k'} \sum_{t=0}^{\infty} \beta^t u(c, l, g) \quad \text{s.t.} \quad (1 - \tau^c)c + I + b' = (1 - \tau^l)(wl + r^k k) + (1 + r^*)b + T$$

$$k' = (1 - \delta)k + I$$

The firms are competitive and take prices as given (w, r^k, p^m). Firms produce using a constant return to scale technology that combines labor, capital, and intermediate goods, m , to produce a homogenous tradable good, y , given an aggregate level of productivity A , that is subject to an aggregate productivity shock Z , and a firm specific productivity shock φ^i .

$$y^i = \varphi^i Z A k^{\alpha^k} l^{\alpha^l} m^{(1-\alpha^k-\alpha^l)}$$

The aggregate productivity shock is of the form $Z = \mu z$. z follows an $AR(1)$ process of the form $z = \bar{z} + \rho^z z_{-1} + \varepsilon$, where $\varepsilon \sim N(0, \sigma^\varepsilon)$. μ defines two distinct regimes, $\mu = \mu^H = 1$ during normal times, and $\mu = \mu^L < 1$ during disaster periods. The switch between these two regimes is governed by a Markovian stochastic process with a probability transition matrix initially given by $\aleph_0(\mu' | \mu)$, and known to all agents in the economy. Because the disastrous shock is unprecedented, in period 0 the realization of μ^L is highly unexpected and economic agents assign an almost 0 probability to its occurrence. Nevertheless, μ^L is realized in $t = 0$.

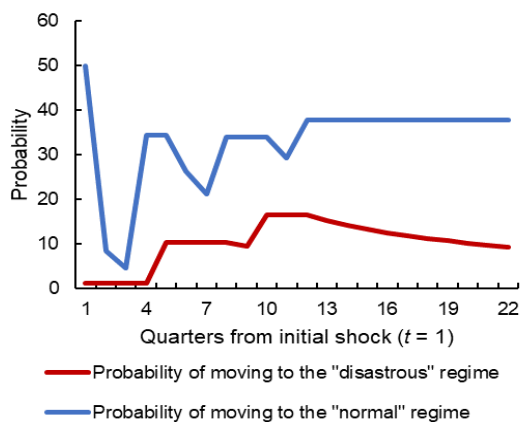
The matrix of transition probabilities between the regimes is $P^\aleph(\aleph' | \aleph) = (p_{ij}^\aleph)_{i,j \in \{L,H\}}$. After the first observed occurrence of the disastrous regime μ^L , through the observation of the subsequent realizations of the regimes, the agents update their assessment of the transition probabilities: $p_{HH}^\aleph = \frac{n^{HH}}{n^{HH} + n^{HL}}$; $p_{LL}^\aleph = \frac{n^{LL}}{n^{LL} + n^{LH}}$; $p_{HL}^\aleph = 1 - p_{HH}^\aleph$; $p_{LH}^\aleph = 1 - p_{LL}^\aleph$; where n^{ij} is the number of transitions from state i to state j observed until this period. For the assumptions made in the calibration of the model to the pandemic, Annex Figure 2.1 shows how p_{HH}^\aleph (probability to remain in normal times), p_{HL}^\aleph (probability to move to a disastrous regime), p_{LH}^\aleph (probability to leave a disastrous regime), and p_{LL}^\aleph (probability to remain in a disastrous regime) evolve through time. In the calibration of the model after the initial realization of the shock, the probability that agents assign to move from normal times to disastrous times grows rapidly and only falls again after the last wave of the shock is seen. At the same time, once the economy enters the disastrous regime, the probability assigned to leaving it falls rapidly in the first year of the regime, and only after seeing the first wave passing this probability begins to increase again, but in the long-term settles at a much lower level than in the period pre-shock.

The firm specific productivity shock is realized once the firm has taken its decisions regarding its production level and its demand for inputs. This shock comes from a uniform distribution

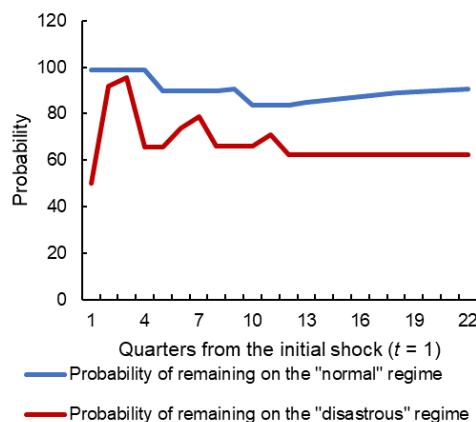
$$\varphi^i \sim U[\varphi^{\min}, \varphi^{\max}]$$

Annex Figure 2.1 Evolution through Time of the Beliefs Regarding the Probabilities of Transition for the “Normal” (H) and “Disastrous” (L) Regimes (Percent)

1. Probabilities of Moving to the “Normal” (H) and “Disastrous” (L) Regimes



2. Probabilities of Remaining on the “Normal” (H) and “Disastrous” (L) Regimes



Source: IMF staff calculations.

Firms in the economy need to borrow J^F from domestic banks to finance a fraction ϑ of their production costs. Thus, higher bank lending rates, r^F , increase production costs. However, depending on the government’s policies, they might also be able to borrow directly from the government J^G , at an interest rate $r^{G,F}$. Besides production costs, firms must cover their fixed costs, F . When firms cannot cover those costs and honor their debts, they declare bankruptcy. Given the distribution of specific productivity shocks, φ^i , the aggregate level of productivity z and the economic regime μ , every period a given share of firms goes bankrupt. Firms’ profits are given by Π^R when they succeed, and by Π^D when they fail. Firms fail when their idiosyncratic productivity shock is lower than the level φ^* , which corresponds to the level of idiosyncratic productivity for which the firm’s profits Π^D are equal to 0:

$$\Pi = \begin{cases} \Pi^R = y^i - wl - p^m m + J^F - (1 + r^F)J^F + J^G - (1 + r^{G,F})J^G - F & \text{if } \varphi^i > \varphi^* \\ \Pi^D = \phi y^{D,i} - wl - p^m m + J^F - (1 + r^F)J^F + J^G - (1 + r^{G,F})J^G - F & \text{if } \varphi^i \leq \varphi^* \end{cases}$$

Firms maximize their expected benefits

$$\text{Max}_{k,l,m} E[\Pi] = (1 - \omega)\Pi^R + \omega\Pi^D$$

subject to an advanced borrowing constraint $J^F + J^G = \kappa(wl + p^m m)$; with κ corresponding to the fraction of the productive inputs costs that needs to be financed in advanced. We assume that the functional form for the government loans is $J^G = \phi\kappa(wl + p^m m)$ with $0 < \phi < 1$. ω corresponds to the probability of firms’ bankruptcy, which in turn is the probability that $\varphi^i \leq \varphi^*$.

$$\omega = \frac{\varphi^* - \varphi^{\min}}{\varphi^{\max} - \varphi^{\min}}$$

defining $\Lambda = (1 - \phi)r^F + \phi r^{G,F}$ the threshold for the idiosyncratic productivity that defines bankruptcy is given by

$$\varphi^* = (1 - \alpha^k) + \frac{F}{k \left(z \mu A \left(\frac{\alpha^m}{p^m} \right)^{\alpha^m} \left(\frac{\alpha^l}{w} \right)^{\alpha^l} \left(\frac{1}{1 + \kappa \Lambda} \right)^{1 - \alpha^k} \right)^{\frac{1}{\alpha^k}}}$$

From the previous equation it is clear that when the effective interest rate for the firms (λ) is higher, then the threshold for the idiosyncratic productivity increases φ^* , and the probability of observing values of idiosyncratic productivity below that threshold (ω) increases. The previous equation also allows to infer that at higher levels of productivity (AZ) the probability of firm bankruptcy is lower.

The effective interest rate for the firms λ depends on the interest rate on government loans ($r^{G,F}$), the share of the total financing that those loans cover (ϑ) and on the credit risk premium that banks charge to the firms and that determines r^F .

Banks are risk neutral; therefore, they lend as long as their expected benefits are at least as high as the returns of holding safe assets. In equilibrium the interest rate that they charge on the loans to the firms is $1 + r^F = (1 + r^*) / (1 - \omega(1 - \eta))$, where η corresponds to the fraction of the firms' loans that the government guarantees and r^* is the risk-free interest rate. By offering guarantees, the government can reduce firms' financing (and production) costs.

In addition to providing guarantees to loans or direct loans to firms, the government in this economy collects taxes, buys goods, and services, and gives transfers to the households. The government also borrows from international markets.

Calibration

The calibration assumes an autocorrelation and standard deviation of the total factor productivity consistent with the volatility and autocorrelation of the detrended GDP in advanced economies (AEs) (for example, according to the April 2022 WEO data set, for the period between 2000 and 2019 the detrended GDP's median autocorrelation for the group of AEs is 0.69, much lower than for emerging markets (EMs) and low-income countries (LICs) for which the median autocorrelations are 0.79 and 0.81, respectively; the median of the detrended GDP's standard deviation for the group of AEs is 1.92 percent, also much lower than for EMs and LICs for which the standard deviations are 2.5 and 2.67, respectively).

The average total productivity during the exceptional crisis is 4 percent lower than during standard times. The autocorrelation of z and its standard deviation (the same across regimes) are 0.7 and 0.015, respectively. The support for the idiosyncratic productivity shock is given by [0.895, 1.105]. Fix costs are about 6 percent of average firms' output.

As in the data, in the calibration intermediate goods as share of gross output are about 50 percent (according to the OECD dataset on input output matrices, for the latest available year, AEs ES' ratio of intermediate goods to gross product is 0.5303, slightly higher than for EMs (0.5046) and much larger than for LICs (0.4352)).

The calibration of the model assumes that, after the initial realization of the unprecedented shock, three waves of this shock are observed over a period of 10 quarters, with the first wave ending after 3 quarters. Firms are assumed to need financing for 0.581 of their inputs (the value of κ is 0.7, the share of labor in GDP (α^l) corresponds to 0.66 and the share of intermediate goods in gross output is 0.5). The priors for p_{HH}^{x0} and p_{LL}^{x0} at time 0 are 0.97 and 0.5 respectively.

In the calibration public debt is assumed to be sustainable—despite its level—and riskless, as it is the case for AEs. The calibration produces a sufficiently high level of private debt as share of GDP (close to 200 percent) consistent with the high values observed in AEs (according to the GDD, for the period between 2000 and 2019

AEs' average private debt is about 174 percent of GDP whilst the averages for EMs and LICs are 60 percent and 16 percent, respectively).

Results of the Model

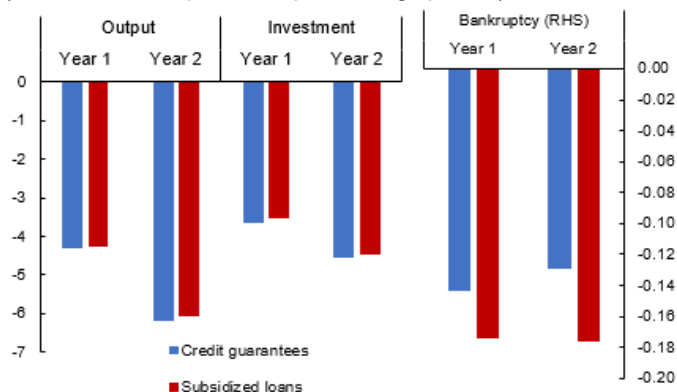
Beyond the results on the text, which establish an important effect of the guarantees during the periods of heightened uncertainty on macroeconomic aggregates, an important result is that their effect on economic aggregates is pretty similar to the effect of direct loans (under the assumption that guarantees are fully credible and properly administered). See Annex Figure 2.2, panel 1, which compares the effect of guarantees versus loans in output, investment and the bankruptcy rate.

Nevertheless, as mentioned in the main text, guarantees are less costly for the government. See Annex Figure 2.2, panel 2, which shows the time series of excess overall fiscal deficits for the two different alternatives of corporate support considered in this analysis.

Annex Figure 2.2. Loans vs Credit Guarantees: Macroeconomic Impact and Fiscal Deficit

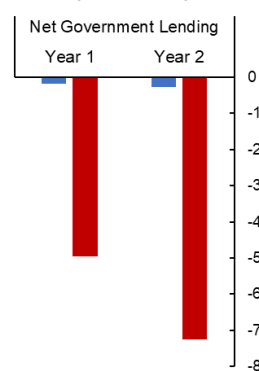
1. Effect on Output, Investment and Bankruptcy Rate during an Exceptional Recession

(Deviation from precrisis, percentage points)



2. Effect on the Overall Fiscal Deficit during an Exceptional Recession

(Deviation from precrisis, percent of GDP)

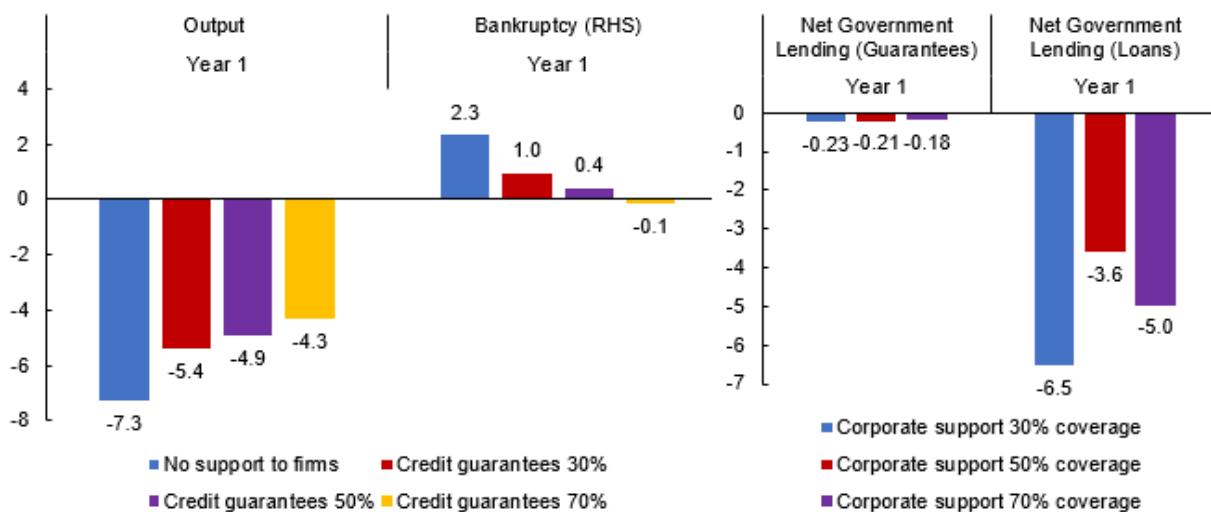


Source: IMF staff calculations.

Note: In an exceptional recession corporate support in the form of guarantees is as impactful as support in the form of direct subsidized loans (panel 1). However, support through direct loans (if the program has a coverage of about 70 percent of total loans) would increase overall fiscal deficits by 5.0 percent the first year and by more than 7 percent in the second year while the impact of guarantees in the deficit is almost zero (panel 2).

During exceptional contractions characterized by heightened uncertainty, high levels of guarantees or direct loans can be more effective and overall, less costly in terms of GDP than lower levels of support, as these larger policy responses help to achieve a significantly higher level of GDP (Annex Figure 2.3).

Annex Figure 2.3. Macroeconomic Impact and Fiscal Deficit for Different Levels of Corporate Support



Source: IMF staff calculations.

Note: In an exceptional recession a large size corporate support program (either in the form of guarantees or subsidized direct loans) has a stronger impact in macroeconomic aggregates: For example, a corporate support program with 30 percent coverage reduces the first-year output contraction from 7.3 percent without support to 5.4 percent, and if the program has a 70 percent coverage, the output contraction is even smaller (4.3 percent). However, the additional effect on output is not proportional (increasing a corporate support program with 30 coverage reduces the output contraction by 2 percentage points, increasing support to cover 70 percent of credit/loans only reduces the output contraction by an additional 1 percent). Therefore, the fiscal impact of the programs doesn't necessarily increase monotonically, and a smaller size program might generate a larger deficit in terms of GDP: For example, a program of corporate support with 30 percent coverage increases the fiscal deficit by more than 6 percent while program with 70 percent coverage increases the deficit by 5 percent.

Annex 3. Subsidy Element in Guarantees Schemes

The lifetime cost of a new loan or loan guarantee is generally described as the subsidy provided by the loan or loan guarantee, referred to as the “subsidy element.” It is measured by discounting all of the expected future cash flows associated with the loan or loan guarantee—including the amounts disbursed, principal repaid, interest received, fees charged, and net losses that accrue from defaults – to a present value at the date the loan is disbursed. The present value depends on the discount rate that is used to translate future cash flows into a cash-equivalent amount. In addition to the discount rate, the maturity of the loan or guarantee, the interest rate charged for the loan, the grace period of interest payments or pre-amortization (period during which principal payments are exempted), the share of government guarantees in the case of corporate default, and guarantee fees determine the subsidy amount.

A loan or loan guarantee program generates a subsidy for both borrowers (firms) and lenders (banks). First, the subsidy element to firms is computed as the difference between the loans disbursed to firms at time t and the present value of cash flows that firms pay to the banks. For cross-country comparison, the subsidy element is normalized for a disbursement to 100:

$$\text{Subsidy Element for Firms} = \text{Actual Disbursement} - \sum_{t=1}^M \frac{CF_t}{(1+r^{FV})^t}$$

where M refers to the average maturity of loans and CF_t refers to the sum of principal payment, interest payments and guarantee fees. r^{FV} is the fair-value discount rate. For fully guaranteed loan schemes, the interest rate applied to the interest payments is taken from the government administered interest rate. For partial guaranteed loan schemes, the interest rate is the weighted average between the government administered interest rate applied to fully guaranteed loans for the portion that is guaranteed and the fair-value rate for the portion that is not guaranteed.¹

A subsidy for banks, on the other hand, is related to the guaranteed cash flows to banks by the government even if the borrower defaults, in proportion to the government guarantee share. For the portion where the cash flow is guaranteed, banks are able to charge the borrowers an interest rate higher than the government’s borrowing rate (see footnote 18 for more details on the interest rate applied to borrowers). More broadly, the subsidy elements to banks are determined by the share of government guarantee coverage, the difference between the interest rate charged to borrowers and the government’s borrowing rate, and the individual bank’s costs associated with loan originations and administration.

$$\text{Subsidy Element to Banks} = \sum_{t=1}^M \frac{CF_{t, \text{non-guaranteed}}}{(1+r^{FV})^t} + \sum_{t=1}^M \frac{CF_{t, \text{guaranteed}}}{(1+r^{rf})^t} - C$$

where $CF_{t, \text{guaranteed}}$ and $CF_{t, \text{non-guaranteed}}$ refer to the share of cash flows guaranteed and non-guaranteed, respectively. C refers to the bank’s cost of lending.

¹ For example, in a government guarantee scheme with 80% coverage, the interest rate applied to interest payments is calculated as a weighted average of (1) the mandated government rate used for fully guaranteed loans and (2) a fair-value rate, with the former receiving 80% weight and the latter 20% weight. The idea is to assume that there are two separate cash flows from the borrowers, one with a full guarantee and the other with a probability of default.

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