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Authorized for distribution by Jihad Alwazir and Carolina Renteria
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ABSTRACT: We develop a stylized balance sheet framework to help identify 'quasi-fiscal' components of central bank crisis interventions and show how sources of fiscal risk are created from both the new claims and how they are funded. Combining central bank balance sheet data with survey evidence from intervention announcements, we document the risks to the public sector balance sheet from central banks' interventions in response to the Covid-19 crisis, including non-conventional lending to the financial and non-financial sectors and large-scale purchases of government securities. Case study analysis indicates that management of fiscal risks from central bank crisis interventions varies greatly across countries, although several good practices can be identified.

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WORKING PAPERS

Quasi-Fiscal Implications of Central Bank Crisis Interventions

Prepared by John Hooley, Ashraf Khan, Claney Lattie, Istvan Mak, Natalia Salazar, Amanda Sayegh, and Peter Stella[1]

[1] Prepared under the guidance of Jihad Alwazir and Carolina Renteria and with valued contributions from Rudy Wytenburg and Jason Harris. The authors would also like to thank Hussein Bidawi, Stephane Couderc, Majdeline El Reyess, Chris Erceg, Christophe Hemous, Richard Hughes, Raphael Lam, Paolo Mauro, Alex Tiemann and many other IMF country teams and several IMF executive director offices and their authorities for their inputs and helpful comments.

Contents

Glossary

AE	Advanced Economy
APF	Asset Purchase Facility
BoE	Bank of England
BIS	Bank for International Settlements
CARES Act	Coronavirus Aid, Relief, and Economic Security Act
CB	Central Bank
CBID	Central Bank Interventions Database
CBT	Central Bank Transparency
CCFF	Covid-19 Corporate Financing Facility
CIC	Currency in Circulation
CPFF	Commercial Paper Funding Facility
DM	Developed Market
ECB	European Central Bank
EME	Emerging Market
EMDE	Emerging Market or Developing Economy
EU	European Union
FMS	Financial Market Support Facilities
FX	Foreign Exchange
GDP	Gross Domestic Product
GFC	Global Financial Crisis
IFRS	International Financial Regulation Standards
LIC	Low-income Country
LPR	Liquidity-providing Repo
LWR	Liquidity-withdrawing Repo
LOLR	Lender of Last Resort
MBS	Mortgage-Backed Securities
MFS	Monetary and Financial Statistics
MPC	Monetary Policy Committee
NFS	Non-Financial Sector Support Facilities
PS	Purchases of Private Securities
PSBS	Public Sector Balance Sheet
ONS	Office for National Statistics
QE	Quantitative Easing
Repo	Repurchase Agreement
SPV	Special Purpose Vehicle
TS	Purchases of Treasury Securities

TSA	Treasury Single Account
UK	United Kingdom
USA	United States of America
VIE	Variable Interest Entity
ZLB	Zero Lower Bound

Executive Summary

Central banks implemented a range of unconventional and sometimes novel policy responses to the Covid-19 pandemic; while these were largely successful, many also had fiscal implications. The measures taken during the Covid-19 crisis[1] built on and went beyond those employed in the Global Financial Crisis (GFC), including non-conventional liquidity support to financial and non-financial firms (lending and asset purchases), as well as large-scale purchases of government securities under quantitative easing (QE) programs. Such interventions played an important role in in stabilizing financial and economic conditions and mitigating the impact of the crisis on households and firms. However, many of them also had fiscal implications, including the creation of additional risks for public sector balance sheets and fiscal policy more broadly. These quasi-fiscal aspects of central bank crisis interventions have received relatively little attention in the literature until now.[2] Yet understanding and mitigating these risks is essential for the sound management of public finances as countries both exit from the current crisis and prepare for future crises.

To help identify 'quasi-fiscal' components of central bank crisis interventions, and hence sources of fiscal risk, this paper develops a stylized balance sheet framework. In general, a central bank activity can be considered to have a quasi-fiscal component when it impacts materially the fiscal accounts, and/or affects other aspects of fiscal policy (tax, spending, financing), either directly or in the future. A balance sheet approach has several advantages for the study of these issues. Constructing a stylized 'core' central bank balance sheet from first principles helps to demonstrate an important result: that central bank balance sheets do not necessarily have fiscal components (consistent with many central bank balance sheets prior to the GFC). Subsequently augmenting the balance sheet with activities that have quasi-fiscal properties shows how financial risks are created, from both the asset side and the liability side. The approach also helps to demonstrate how fiscal risk from a central bank intervention depends critically on how it is funded, and that interventions conducted at the zero-lower bound carry additional fiscal implications when they are funded by newly-created reserves.

Application of this framework to the Covid-19 crisis highlights an expansion in central bank balance sheets that was larger and more widespread than the GFC. Based on a sample of 67 central banks, the median balance sheet increased by around 6 percent of GDP during 2020−21 compared to 2 percent in the GFC, while in 10 percent of cases, balance sheets expanded by more than 20 percent of GDP. The expansion in central bank assets was larger in advanced economies where quantitative easing programs drove balance sheet expansion relative to emerging market economies (EMEs) and low-income countries (LICs), where financial sector support was more important. Only a few central banks provided direct support to the non-financial sector, and for those that did, the size of support was relatively small in most cases.

Support facilities provided to the financial and non-financial private sectors transferred risks onto the central bank balance sheet and provided implicit subsidies. Based on a survey of 176 central bank interventions undertaken between March and December 2020, we document the quasi-fiscal risks associated with each intervention as well as any risk mitigation mechanism. Unconventional liquidity operations to the financial sector typically increased financial risks, by lowering collateral eligibility criteria, interest rates or haircuts below the standard conventionally acceptable to the central bank. Support to the non-financial sector

[1] For the purposes of this paper, the period of the Covid-19 crisis is defined as 2020-2021, and hence excludes the financial and economic shocks related to Russia's invasion of Ukraine in February 2022.

[2] Battersby et al (2022) document financial support measures implemented across the entire public sector, though do not examine the quasi-fiscal implications of those implemented by the central bank.

in the Covid-19 crisis was not widespread but was still significant for some central banks. As support was extended to new counterparties, including loans to small and medium-sized companies, as well as private sector securities purchases, central banks took new forms of risks onto their balance sheet that they were not accustomed to assess (and price), particularly in the case of complex private sector asset portfolios. Counterparties of central banks' crisis interventions typically receive an implicit subsidy, since the eligibility criteria of unconventional schemes by nature provide preferential treatment to the participants.

Large-scale central bank purchases of government securities transferred a considerable amount of interest rate risk from private investors onto the consolidated sovereign balance sheet. In several countries, central bank purchases of government securities that were funded by creation of new commercial bank reserves facilitated the financing of the government's additional spending needs during the pandemic. As a result, the share of government debt held by central banks increased significantly, despite large additional issuance of government securities to fund crisis expenditures. Of those central banks that increased their holdings of government debt during Covid-19, net purchases represented more than 10 percent of the outstanding debt stock in 20 percent of cases and more than fully covered the government's additional borrowing requirements in 10 percent of cases. And in 40 percent of cases, central banks fully financed their new claims on government with additional issuance of commercial bank reserves, implying a dramatic shortening in the maturity of consolidated public liabilities and an increase in interest rate risk. These risks have since started to materialize for some central banks, following the shift in the environment from low to high interest rates.

Country case study analysis shows variation in the design of central bank crisis interventions, with different approaches used to mitigate financial risks and promote accountability. We studied the design and governance of crisis interventions undertaken across different central banks, including through a set of individual case studies. Risk mitigation provisions included use of repos or swaps over outright purchases, setting appropriately tight exposure caps and eligibility criteria, and enhancing asset management expertise. Measures to promote accountability included timely and transparent reporting, proper accounting treatment and strong central bank governance. In a few cases, sunset clauses and asset swaps with the government or private sector helped to mitigate risks and increase transparency, while giving additional flexibility to central banks to be able to wind down balance sheets once monetary policy conditions allow.

In several countries, the fiscal authority has played an active role in risk management of central bank crisis interventions, including through providing robust fiscal backstops and enhancing oversight and policy coordination. A sound fiscal backstop is particularly important for insulating central banks from the risks inherent in unconventional liquidity support and long-term asset purchases. Provision of government indemnities for specific liquidity support operations to the private sector was relatively common, although comprehensive central bank recapitalization frameworks to capture a wider set of risks were not. Some countries enhanced external oversight procedures for interventions, including through strengthening reporting requirements and accountability mechanisms. Policy coordination between the fiscal authority and central bank took place, although use of legal structures for crisis coordination was rare.

Similar types of operation were implemented by central banks in some countries and the fiscal authority in others, raising the question of optimal delegation of tasks between institutions. During the GFC and Covid-19 crises, there were several examples of the same type of operation implemented by either the monetary, or fiscal authority in different cases (purchases of mortgage-backed securities, for example). While it is often assumed that the central bank has a comparative advantage in the implementation of financial market-based measures such as liquidity support or securities purchases (due to existing infrastructure and

connections), several country examples indicate that interventions implemented by the government on its own balance sheet cannot only be successful, but the associated fiscal risks can also be more transparently and effectively managed. Moreover, government implementation of crisis interventions, where feasible, can also help to limit the amount of assets on the central bank balance sheet that have quasi-fiscal components and hence help to safeguard the bank's operational autonomy to conduct its core monetary policy and financial stability mandates.

I. Introduction

Central banks implemented a range of significant, unconventional, and sometimes novel, policy responses to the Covid-19 pandemic, going beyond those employed in the Global Financial Crisis. The tools employed to mitigate the impact of the pandemic drew from central banks' experience during the Global Financial Crisis (GFC) and included conventional operations, such as lender of last resort and swap lines; as well as more unconventional asset purchase and lending programs (both private and public sector) and lowering collateral standards. Several major central banks extended or introduced large-scale asset purchases (LSAPs) financed almost exclusively by the creation of an equivalent amount of central bank reserves.[4] And some introduced long-term lending operations to households and non-financial corporations.[5]

While these interventions helped to stabilize financial and economic conditions, they also had fiscal implications, including the creation of additional risks for public sector balance sheets. Aggressive central bank interventions were on the most part successful in achieving their aims of easing financial market stress, ensuring the transmission of monetary policy and the flow of credit to the economy, and thereby mitigating declines in output and employment. Large-scale purchases of government securities also facilitated a rapid increase in government borrowing, helping to fund additional crisis-related expenditures. At the same time, some interventions led central banks to take on additional and new financial risks, while others affected the allocation of public resources between groups within society. Rogoff (2020) raised concerns around the risks to central bank independence from some central bank actions in the Covid-19 crisis, considering them to be 'forms of fiscal policy [which] could be implemented just as well or even better by finance ministries,' while Buiter (2020a and 2020b) argued that the Fed 'built up significant credit risks through non-transparent (quasi-) fiscal actions.' Policymakers, too, took interest: the EU Parliament (2020) commissioned an in-depth study into the overlaps between fiscal policy and ECB's actions in the Covid-19 crisis.

This paper develops a framework to help identify quasi-fiscal components of central bank crisis interventions and identifies some principles for their effective management and transparent disclosure, drawing from the responses to the Covid-19 crisis. Central bank activities that have quasi-fiscal components can, and often do, result in improved macroeconomic outcomes. However, the interventions themselves and the supporting governance arrangements need to be carefully designed to ensure clear accountabilities, appropriate policy coordination, strong fiscal and central bank transparency, and adequate central bank balance sheet protection. This paper therefore develops a framework to identify quasi-fiscal components of central bank interventions and considers good practices in terms of policy design, institutional

[4] Overnight interest-bearing demand deposits held by commercial banks at the central bank.

[5] Support was provided both indirectly through financial intermediaries (e.g., funding for lending schemes that target specific sectors) as well as direct lending to non-financial firms (loans or asset purchases, either on primary or secondary markets). See Cavallino and De Fiore (2020).

coordination and transparency, drawing on the experience of the GFC and Covid-19 crisis and lessons from the management of other fiscal risks (IMF, 2016).

More generally, the paper attempts to present a comprehensive and systematic approach to improving the understanding of the fiscal nature and risks from central bank crisis interventions. The fiscal consequences of central bank actions have received relatively little direct attention in academic work. However, there are several related strands of literature which this paper builds on. The central banking literature on the moral hazard implications and financial risks from lender of last resort (LOLR) policy is well-developed[6], although it dates for the most part from before the Global Financial and Covid-19 crises which expanded massively the scope and magnitude of central bank activities with quasi-fiscal implications. Another strand of the literature focuses on central bank losses and how to pay for them (Stella and Lonnberg (2008), Archer and Moser-Boehm (2013)), though with a focus on the implications for central bank operations, rather than for the public sector balance sheet as a whole. More recent IMF work developed a public sector balance sheet approach to fiscal policy and sovereign asset and liability management (IMF, 2018). Perhaps the work most directly related to this paper, however, is MacKenzie and Stella (1996), which takes a holistic approach, categorizing a broad range of quasi-fiscal activities by public financial institutions, though with a focus on emerging markets in non-crisis contexts.[7]

The paper proceeds as follows. Section II develops a simple balance sheet framework for the identification of the quasi-fiscal components of central bank activities. Section III presents a descriptive analysis of the interventions in the Covid-19 crisis, using balance sheet data and a survey of central bank intervention announcements. Section IV discusses policies and institutional arrangements for effective management of the fiscal risks from central bank actions. Section V concludes. A separate Annex paper contains a set of individual country case studies that draw lessons from the central bank interventions during the Covid-19 crisis.[8]

II. A Balance Sheet Framework

This section develops a conceptual framework to illustrate why central bank crisis interventions can have fiscal implications. In general terms, a central bank activity can be considered to have fiscal effects, either because it impacts materially the fiscal accounts, and/or affects other aspects of fiscal policy (tax, spending, financing), either directly, or in the future (Annex I discusses in more detail the concept of 'quasi-fiscal' as it relates to central bank activities). Since the central bank is a public financial institution, its activities impact (negatively) the fiscal accounts mainly when they create financial losses for the central bank, leading to lower dividends for the government, or the need for the Treasury to recapitalize the central bank. A central bank activity can also affect fiscal policy if it creates implicit taxes and subsidies, affecting resource allocation in the economy and leading to distortions, or by altering the structure of public debt or market for government securities, impeding the effectiveness of sovereign debt management. Not all central bank activities have fiscal implications – an important principle we illustrate with construction of a stylized non-quasi-fiscal balance sheet.

[6] Charles Goodhart makes these points elegantly: 'Central Banks in some countries… have actually become technically insolvent (using generally accepted accounting principles) as a result of losses incurred on loans and support of the domestic financial system. But such insolvency does not make much difference because what stands behind the liabilities of the central bank is not its capital but the strength and taxing power of the State." See Goodhart (1999), p.348.

[7] In Latin America, for example, the term 'Cuasi-fiscal' has been used for many years, owing to central bank losses from lending to governments at low or zero interest rates. See Piekarz (1987), for example.

[8] Hooley et al (2023), 'Quasi-Fiscal Implications of Central Bank Crisis Interventions: Case Studies' IMF Working Paper No. 23/115

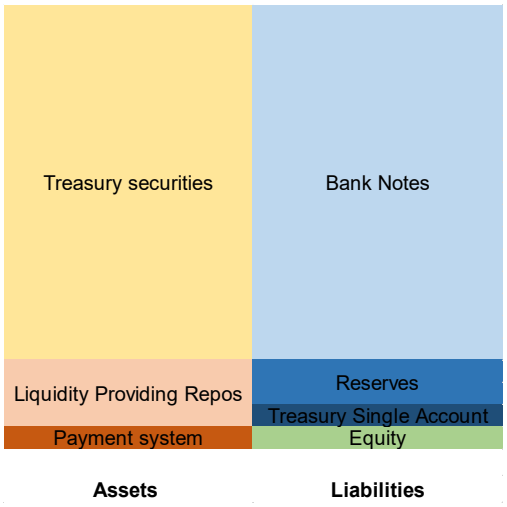
In practice, however, many central bank activities do have fiscal components, both those undertaken in crisis and non-crisis times. The focus in this paper, however, is on the types of interventions taken in response to systemic financial crises, largely introduced for the first time in the GFC and expanded in the Covid-19 crisis.

A Stylized 'Non-quasi-fiscal' Central Bank Balance Sheet

A counterfactual exercise illustrates that in the absence of crisis interventions, central bank balance sheets have only minimal quasi-fiscal effects. Historically, central banks have engaged in a rather narrow set of 'core' activities, in which they can be considered to have a comparative advantage relative to both private banks and the government. These include payment system operation, provision of treasury services to the government, note issuance and setting monetary policy. **Figure 1** illustrates such a stylized 'core' central bank balance sheet, which was, in fact, consistent with the practice of many central banks in advanced economies (AEs) prior to the GFC. Their balance sheets were typically only a few percent of GDP and assets expanded in line with currency in circulation and reserves, having only a negligible operational imprint on financial markets.[9]

The core central bank balance sheet is virtually assured profitability and there are no implicit taxes and subsidies.[10] Central banks generally operate as public enterprises and charge prices on payment system and treasury services that fully recover costs and sometimes incorporate a shadow return on invested capital.[11] Note (cash) issuance is zero-interest bearing, while central bank collateralized repo lending is marginally profitable since the rate charged exceeds the interest rate paid on reserves (hence conventional monetary operations in this set up entail virtually no risk).[12] Operational expenses—depreciation of fixed assets (payments systems technology) plus wage, pension and other current and capital costs—are then more than covered by the interest on the central bank's holdings of securities. Hence, the central bank will tend to run an operational surplus and the Treasury receives dividends. And since operations are conducted at market rates (including remuneration of reserves), there are no implicit taxes or subsidies.

Figure 1. A Stylized Non-Quasi-Fiscal Central Bank Balance Sheet



[9] See Stella (2010). JP Morgan Chase, the largest US bank held $2.2 billion in deposits at FRBs at end-2006 compared with total assets of $1,352 billion. A typical composition of liabilities was about 90 percent banknotes, 5 percent reserves, and 5 percent equity; the typical asset composition was about 90 percent government securities, 5 percent liquidity providing repos, and 1 percent physical assets. In GDP terms, Canada had perhaps the world's smallest central bank balance sheet, at less than 4 percent of GDP.

[10] For example, the central bank of the Netherlands, De Nederlandsche Bank, has not made a loss since the Napoleonic Wars and the Federal Reserve has not made a loss in any year going back to its foundation in 1914.

[11] Although central banks often provide intra-day credit to banks in managing modern payments systems, this is typically secured with high quality pre-pledged collateral.

[12] We do not focus on the potential quasi-fiscal implications of conventional monetary operations in this paper. Although conventional monetary operations can have both a marginal impact on the dividend received by government and distributional effects, these should both be small in non-crisis times and when policy rates are above the zero-lower bound. Moreover, the focus of the paper is on the quasi-fiscal components of crisis-specific central bank interventions.

The central bank's government securities portfolio does not influence the structure of public debt, while monetary operations do not impact Treasury operations. In the standard situation, where the central bank holds domestic debt primarily as the counterpart to banknote liabilities, it is common for the bank to acquire a portfolio that mirrors the private sector portfolio in order to have a neutral impact on the structure of consolidated sovereign debt. The central bank acquires securities as a non-competitive bidder in proportion to what the government offers to the market at its regular auctions. In addition, in well-coordinated systems, the central bank's monetary operations act to offset the Treasury's cash and debt management operations (known in advance) to effectively steer the targeted interest rate.

Central Bank Balance Sheets in Practice

In practice, most central banks diverge from the above model and their balance sheets have a quasi-fiscal component to some degree. Prior to the GFC, the most prominent examples of activities with a quasi-fiscal component were lender of last resort financing, and holdings of foreign exchange (FX) reserves.[13] The quasi-fiscal component of such activities arises mostly due to the inherent financial risks of the assets, and/or the need to finance them with interest-bearing debt. However, the associated risk depends on several factors, including their magnitude and financing, intervention design, and the nature of government support or governance arrangements (discussed in Section IV).

A pre-GFC central bank balance sheet with quasi-fiscal components is illustrated in Figure 2. In this stylized set up, we augment the non-quasi-fiscal balance sheet with an LOLR loan and FX reserves. The LOLR loan is provided as a repo, financed with an increase in bank reserves, though to preserve money market rates consistent with the policy target, the initial increase in bank reserves is sterilized through changes in other Liquidity Providing Repos (LPR), Treasury Securities (TS), Liquidity Withdrawing Repos (LWR) and issuance of central bank debt.[14] An LOLR loan can hence lead to an increase in central bank assets, or not, depending on the sterilization measures employed. Holdings of FX reserves (usually in the form of foreign government securities) lead to an expansion of the balance sheet and are financed by interest-bearing central bank debt, such as loans from commerical banks, issuance of central bank debt securities, or government deposits, and so are sterilized.[15]

[13] Other examples include multiple exchange rate (MER) practices and lending on non-market terms. See Mackenzie and Stella (1996) for a full discussion.

[14] Central banks will usually follow a standard sequence in absorbing liquidity injected through LOLR lending. First, they will adjust the shortest duration instruments such as net LPRs offered. If those means are exhausted, and if they expect the liquidity injection to be of long duration, they will sell treasury securities (or foreign exchange) and/or issue central bank debt (in local or foreign currency in the form of FX swaps (the latter are not common but used when government debt is scarce, e.g., in Singapore).

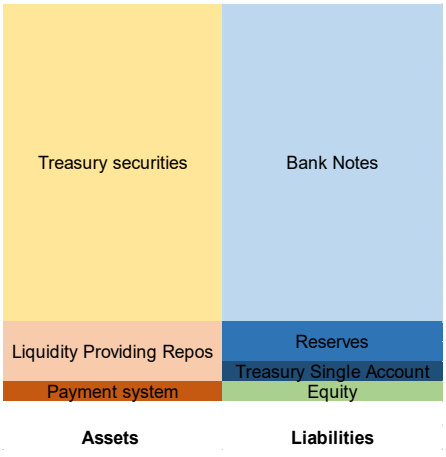
[15] In the case of large FX reserves, the central bank can even become a net borrower from the banking system.

Table 1. A Typology of Fiscal Risks from Central Bank Activities pre-GFC

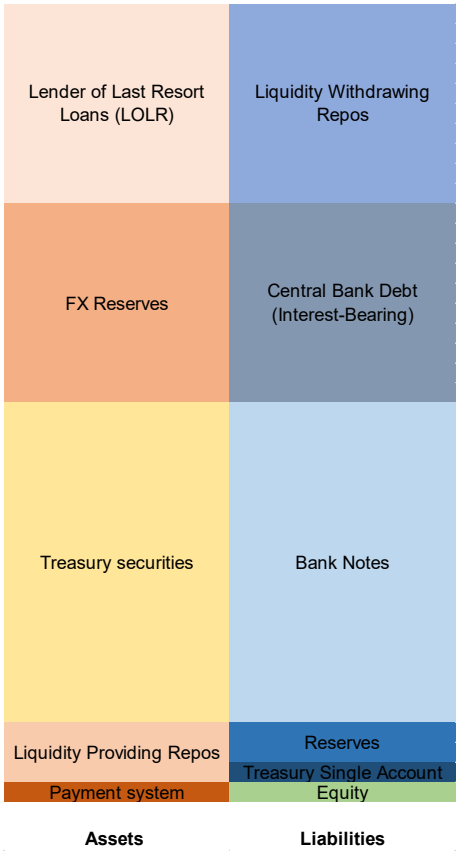
Activity	Financial risk	Policy Risk
Payment systems	Counterparty risk from daylight overdrafts and inadequate collateral.	Implicit tax on financial intermediation if reserves are unremunerated.
Note issuance		
Banker to government	Lending at artificially low rates.	Implicit subsidy (lending at low rates) or tax (deposits not renumerated) to/on central government.
Lender of last resort loan (LOLR)	Non-performing loan and insufficient or low-quality collateral. Risks to net income if financed by interest-bearing debt.	Implicit subsidy to borrower. Potential preferential treatment.
FX reserves	Low-yielding assets and risks to net income if financed by interest-bearing debt.	Issuance of large amounts of debt securities and fragmentation of government securities markets.
Note: The above typology covers only those activities illustrated in the stylized balance sheets in the Figures 1 and 2.		

Figure 2. Stylized Central Bank Balance Sheets pre-GFC

a. Non-Quasi-Fiscal



b. With Quasi-Fiscal Components



During the GFC and subsequent Covid-19 crisis, central bank balance sheets expanded with new forms of liquidity support to the private sector and asset purchases (both private and public sector assets):

- ***Financial market support facilities.*** Central banks expanded the set of liquidity facilities offered, providing repos at longer maturities and at more relaxed terms (for example, by accepting a wider range of collateral).
- ***Non-financial market support facilities.*** Facilities targeting an easing of credit conditions for corporates and households provided liquidity directly (purchases of commercial paper, for example), or indirectly, by providing liquidity to financial institutions conditional on their lending to the non-financial sector.
- ***Purchases of private securities.*** A range of securities were purchased outright, including corporate bonds, mortgage-backed securities (MBS), and even equities.
- ***Purchases of government securities.*** Government securities were also purchased outright and sometimes at a large scale in the case of quantitative easing programs. Purchases generally targeted specific maturity segments (in other words deliberately not upholding the market-neutrality principle) and were typically undertaken in the secondary markets (but not in all cases).

Figure 3 augments the central bank balance sheet with a stylized toolkit used in response to periods of systemic financial stress, such as the GFC and Covid-19 crises. We assume our central bank is operating at the zero-lower bound (ZLB), as was the case for several central banks in the recent crises (the non-ZLB case is shown in Annex II).[16] We consider the potential impact on the central bank balance sheet of crisis-scale interventions conducted at the ZLB, assuming that all other policy assets also increase in this scenario (Treasury securities, liquidity-providing repos and LOLR to individual banks). When central banks operate at the ZLB, there is no need to ensure that the quantity of reserves remains constant and unconventional activities can be funded by creation of new bank reserves. For example, in the case of large-scale asset purchases, the amount of securities held is chosen by the central bank and the liabilities to finance those purchases exceed the amount desired by the market. On the liability side, in addition to reserves, the assets may be funded by a mix of liquidity-providing repos, central bank debt, and specific treasury support if the government provides equity. Note that in our framework, quantitative easing (QE) policies are a special case of unconventional asset purchases to meet core central bank monetary and financial stability objectives, conducted at the ZLB and financed through newly-created central bank liabilities.

Central bank interventions in response to systemic crises can have important quasi-fiscal components and pose particularly high risks. Some of these risks are discussed below (and summarized in **Table 2):**

- ***Financial risks from private sector liquidity support.*** During crises, the risks from unconventional support facilities to the private sector are likely to be even greater than for traditional LOLR. Such support may be seen primarily, though not entirely, as partial substitutes to LOLR in a variety of novel forms and to

[16] When a central bank operates above the ZLB, increases in central bank assets from unconventional operations need to be offset by other measures to maintain reserves in equilibrium (otherwise it would accept a loss of control over money market interest rates or the exchange rate). Hence, new unconventional assets must either be financed by reductions in other assets (sales of existing treasury securities, for example, if these are held in sufficient quantities), or by increases in liabilities other than commercial bank reserves. However, in systemic crises, the increase in unconventional assets is likely to be greater than the amount of existing assets able to be sold, in this case the Treasury may provide funding, or the central bank may need to issue interest-bearing debt instruments. Alternatively, the central bank could coordinate policies with the Treasury so that the latter absorbs the additional liquidity created from new unconventional assets (for example through issuance of additional treasury bills).

an extended range of counterparties. In a crisis, however, credit risk is both individual and systemic and the interest rate on lending operations is likely to not be sufficiently high to compensate for the increased risk, while the quality of the collateral is likely to be well below the standard conventionally acceptable to the central bank. Furthermore, as central banks extend liquidity support to new counterparties beyond the banking system, including loans to small and medium sized entities,[17] they may be less able to accurately assess (and price) the associated financial risks.

- ***Investment risks from private sector asset purchases***. Central bank outright purchases of private sector securities directly transfer financial risk from the private to the public sector balance sheet. Central banks may also lack the capacity to accurately assess and manage the associated financial risks from such non-conventional asset holdings, particularly in the case of complex private sector security portfolios.
- ***Interest rate risks from issuance of interest-bearing central bank debt to fund interventions.*** Central bank crisis interventions can be sizeable (particularly large-scale public sector asset purchases) and may need to be funded by large amounts of very short-term interest-bearing debt, magnifying the financial risks facing central banks.[18] In such cases, raising interest rates for policy purposes may have a material negative impact on the central bank operational balance.[19] **Box 1** discusses interest rate risks from central bank purchases of government securities in the context of recent QE programs.
- ***Risks to public debt management.*** Issuance of very short-term central bank debt securities to finance non-core assets can also complicate public debt management, something that is conventionally the responsibility of the government.[20] When a central bank issues debt into the same market as the Treasury, it can lead to segmentation in the market for public securities, creating market inefficiencies. In the case of large-scale central bank purchases of long-dated government bonds financed with overnight interest-bearing instruments (a typical feature of recent QE programs), the average duration of consolidated public debt held by the market falls, while the risk profile of consolidated public debt increases. Although these purchases can prevent a steep increase in sovereign yields and so provide space for additional crisis fiscal measures, when central banks do not coordinate these operations with their respective Treasury, it can lead to inefficiencies in sovereign debt management.[21]
- ***Implicit subsidies and taxes.*** Counterparties of central banks' crisis interventions typically receive an implicit subsidy. The eligibility criteria of unconventional schemes by nature provide preferential treatment to the participants -for example, firms able to access financial non-financial market support facilities, or the private companies whose securities are eligible for purchase by the central bank.[22] Similar to LOLR, this can raise questions as to whether the schemes were designed to favor certain banks or firms in the first

[17] Mervyn King, former Governor of the Bank of England, suggested that central banks become the "pawnbroker for all seasons" meaning standing ready to lend to "anyone" with adequate collateral.

[18] In the core central bank balance sheet model in Figure 1, the quantity of central bank debt held by the market was determined by the market demand for banknotes (paying a zero nominal interest rate). In the case of additional activities, where these are sizeable and unable to be financed by offsetting sales of other assets, the balance sheet will need to expand and financed by interest-bearing debt (in the case of above the zero lower bound), or commercial bank reserves (at the zero lower bound).

[19] The negative impact on the central bank's operating balance from increases in interest rates is magnified in situations where the central bank is a net debtor to the domestic economy (the case for many EMDE central banks which withdraw liquidity from the economy on a net basis).

[20] In the case of Chile's central bank, for example, most of the financing of its balance sheet comprises central bank securities, consequently, it devotes considerable attention to debt management activities, which are normally the province of the government.

[21] See also Section IV and the Case Studies Annex Paper. Academic literature covering this topic includes McCauley and Ueda (2009) and Greenwood, Hanson, Rudolf, and Summers (2014).

[22] For example, the Federal Reserve's Secondary Market Corporate Credit Facility purchased debt securities of 86 companies rated BB and above in March 2020, including Coca Cola, Walmart and McDonalds.

Box 1. Fiscal Risks from Central Bank Holdings of Government Securities

Large-scale central bank purchases of government bonds through quantitative easing programs have, by design, transferred a considerable amount of interest rate risk from private investors onto the consolidated sovereign balance sheet. To the extent that QE helped to induce an extended period of low market interest rates, the cash flow impact on sovereign interest payments was flattered by the effective introduction of large quantities of very short-term floating rate debt in exchange for higher coupon fixed-rate debt. This cash flow improvement was somewhat of a 'fiscal illusion', however, as it was not risk-adjusted. Interest-rate risk on consolidated public sector balance sheets increased dramatically in some cases. [1]

A sharp increase in policy and market rates in 2022 led the risk-adjusted reality come to the fore. Interest payments on very short-term floating rate debt soared, placing many central banks in a negative net income position with the knock-on effects of a sharp decrease in financial transfers to governments. For example, the US and UK central banks began to make cash losses on their stock of asset purchases in 2022, which are expected to continue for some time.[2] Although the overall net direct financial results from the sovereign debt management alterations associated with QE remain to be seen, the final analysis will need to consider the risk-adjusted financial return to the policy so that it may be appropriately weighed against the macroeconomic policy benefits. In future, consideration of the debt management implications of QE ex-ante may enable a more efficient attainment of its policy goals.

Accounting considerations

The timing of capital losses is also affected by institutional accounting practices. Should losses be recognized up front (i.e., marked to market), the effect would be much larger than the annual loss. For example, in 2022 the Fed reported a $807 billion unrealized loss on its holdings of Treasury securities (and a $1.2 billion loss on its overall holdings).

There are two methods of accounting for the impact of interest rate increases on central banks finances: the **flow method** that recognizes the losses gradually over time as they are realized in cash flow, and the **stock method**, which recognizes valuation losses immediately in the profit and loss statement. Both methods have a similar impact over the long run, the difference lies in the timing.

Some central banks, such as the Banks of England and Canada, value their QE assets at market prices, so would see immediate valuation changes under the stock method. However, most central banks (including the Fed, ECB and BoJ) value their QE assets at amortized value, not recognizing unrealized profits or losses, as they anticipate holding the securities through maturity.

[1] The 2019 UK Fiscal Risks Report noted that the BoE's APF purchases of Government securities financed with creation of bank reserves paying bank rate had increased the amount of public sector debt with a maturity of less than one year from 20 to 40 percent, increasing interest rate risk.

[2] See the Federal Reserve's Annual Report on Open Market Operations - 2022 and the Bank of England's Asset Purchase Facility Quarterly Report - 2023 Q1. According to the Federal Reserve report, 'by September 2022, most Reserve Banks had suspended weekly remittances to the Treasury.' In the UK, the Treasury made its first transfer to the (indemnified) APF in October 2022, while the BoE's estimates suggest that if interest rates follow the market-implied path, cumulative APF cash flows could decline from £100 bn in 2022 to -£100 bn by 2033. If interest rates increase to 1 percent above the market path, cumulative losses could exceed £150 bn.

place. Securities purchases (both public and private) also provide an implicit subsidy to the sellers, since by design they bid up prices on secondary markets. Large 'excess' reserve holdings can also lead to material implicit taxes on the financial sector. Before the GFC, excess bank reserves and/or the imposition of lower-than-market interest on reserves were either rare or immaterial, at least in AEs.[23] With many

[23] Bank holdings of deposits were near zero so even a 1 percent "tax" on such balances was immaterial to central bank profitability.

commercial banks currently holding trillions of dollars or their equivalent in "excess" reserves at major AE central banks, the discussion of reserve remuneration has taken on a greater fiscal dimension. And even when reserves are remunerated appropriately, commercial banks holding large reserves may still be penalized if central bank reserves are included in the calculation of regulatory leverage ratios.

- ***Risks from legacy impacts on central bank balance sheets.*** Exiting from crisis interventions is not always straightforward, raising the risk of a large 'quasi-fiscal' central bank balance sheet persisting long after a financial crisis has ended. Even after financial markets stabilize, many of the crisis-related assets are likely to remain on a central bank's balance sheet. Long-term repos can have a duration of several years, while some may become non-performing loans, particularly if recoverable collateral is inadequate. It may be difficult to resell purchased securities without generating financial losses or generating market price volatility (such as 'taper tantrums') and so they may be held to maturity. The government may also pressure the central bank to not raise yields in longer-dated asset classes. Although a larger balance sheet can add credibility to central banks' proclamations that policy rates would be held lower for "longer" than had been the case in previous policy cycles (since the market may believe that the larger the balance sheet, the more difficult would be a quick reversal), it also carries several risks. There could be the potential for large operational losses as interest rates rise, which could make the central bank reluctant to raise rates, even if required by economic conditions. A larger balance sheet also makes it difficult to reduce excess bank reserves, which can weaken the central bank's control over the implementation of monetary policy.

While the above set of risks can apply to all central banks, there are additional risk factors for emerging and developing countries. Central bank interventions in emerging and developing economies (EMDEs) can sometimes lead to larger risks for fiscal accounts and fiscal policy, relative to advanced economies (AEs). For example, shallower financial markets can constrain central banks' ability to unwind interventions and shrink their balance sheets, since the collateral taken will likely be much more illiquid than that taken by AE central banks and hence harder to dispose of without creating market turbulence. This reality makes it much more likely that EMDE central banks will need to manage collateral for a longer time in more difficult situations than their AE counterparts, subjecting them to materially higher financial, operational and reputation risks. Fiscal constraints in developing countries can also lead to suboptimal monetary policy or macro-fiscal outcomes. In developing countries, government support is often insufficient to compensate risk owing to fiscal constraints and it is not uncommon for central banks to operate close to the margin, or with negative equity. Central bank financial weakness can impact its ability to achieve its core policy objectives and hence potentially also negatively impact macro-fiscal outcomes. Consequently, the closer a central bank is to financial weakness, the more likely a given intervention can lead to such negative feedback loops.

The ability for some central banks to operate with negative equity does not imply fiscal risks are reduced when crisis interventions are undertaken on the central bank balance sheet. Where losses from a central bank's non-core operations are large enough to generate an overall net operating loss, they may be financed through equity buffers (where sufficient) or with government transfers, both of which imply fiscal costs. Alternatively, a central bank may operate with negative equity but finance itself through issuance of additional central bank debt. However, this outcome can also lead to fiscal costs - for example, if it jeopardizes the central bank's ability to achieve its core policy mandates (so-called policy insolvency).[24]

[24] Although these issues go beyond the scope of this paper, there is an active debate on the extent to which central banks can continue to fulfill their core policy mandates in the presence of negative equity. See, for example, Stella (2008) who emphasizes 'Policy Insolvency' and Reis (2015).

Figure 3. Stylized Quasi-Fiscal Central Bank Balance Sheets during Systemic Financial Crises

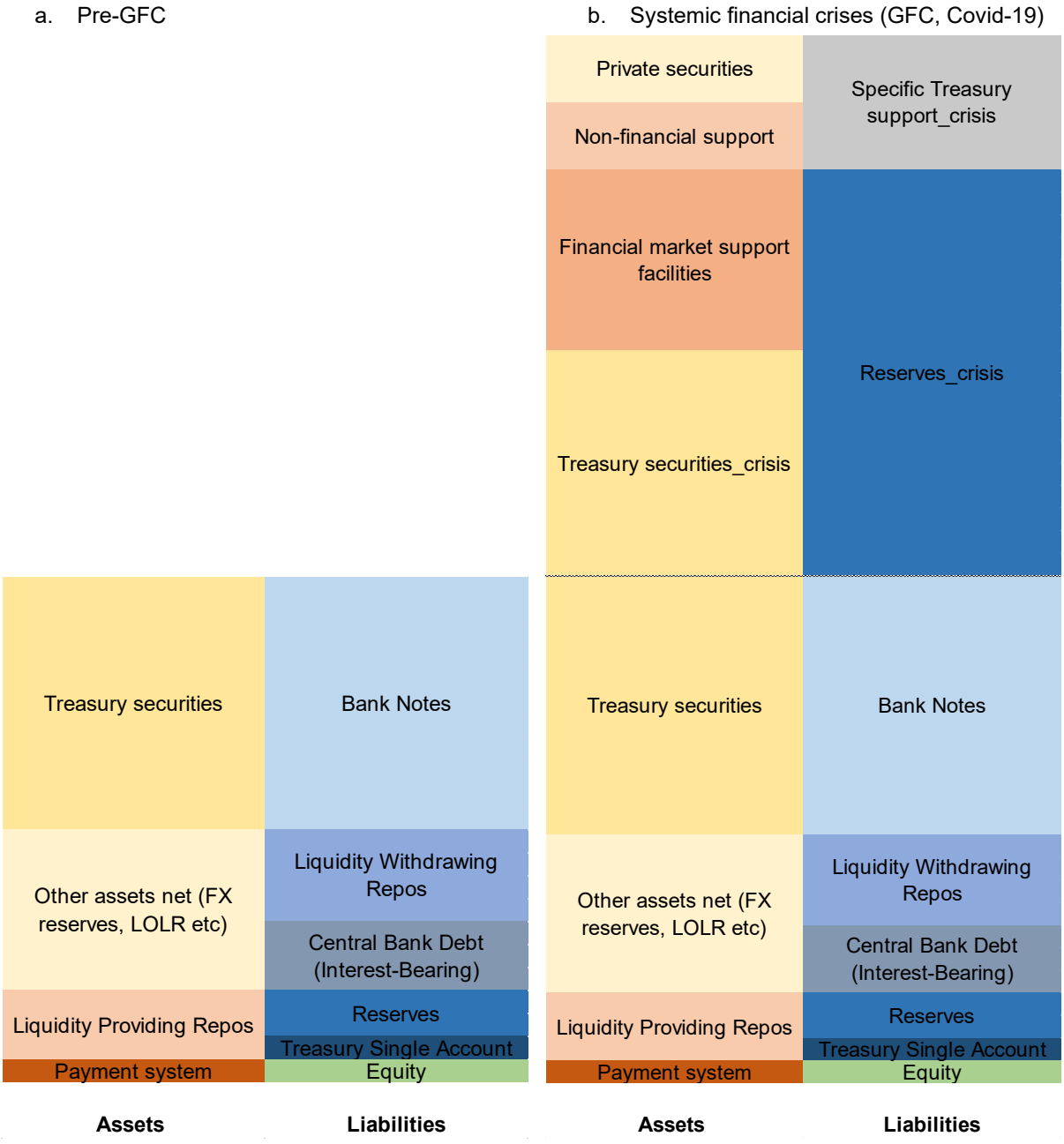


Table 2. A Typology of Fiscal Risks from Central Bank Interventions During Systemic Crises

Activity	Financial risk	Policy Risk
Purchases of private sector securities	Credit, market and interest rate risk. May be financed by (costly) interest-bearing debt.	Implicit subsidy (to issuer and seller). Potential preferential treatment.
Purchases of public sector securities	Market and interest rate risk. May be financed by (costly) interest-bearing debt.	Alters structure of consolidated public debt (if undertaken in large quantities), impacting debt management. If funded by reserves at ZLB, CB may be reluctant to raise interest rates. Large excess reserves may lead to implicit tax on financial intermediation.
Financial market support facility	Insufficient or low-quality collateral. May be financed by (costly) interest-bearing debt.	Implicit subsidy to borrower. Potential preferential treatment.
Non-financial sector support facility	Insufficient or low-quality collateral. May be financed by (costly) interest-bearing debt. Limited central bank expertise in assessing credit risk of non-financial sector.	Implicit subsidy to borrower. Potential preferential treatment.

III. Stylized Facts on Central Bank Interventions During the Covid-19 Crisis

This section presents a descriptive analysis of interventions undertaken by central banks in response to the Covid-19 crisis. The analysis is based on central bank balance sheet data and a survey of central bank announcements covering interventions during the Covid-19 crisis.

Central Bank Balance Sheet Data

We examine changes in central bank balance sheets during the Covid-19 crisis. For comparability purposes, annual data were taken from the IMF Monetary and Financial Statistics (MFS) database, with our sample covering 67 countries from 2005 to 2021.[25] The data provide a relatively good level of granularity, with claims broken down by counterparty and asset type. We normalize all balance sheet items by nominal GDP and adjust the change in net FX assets using the US dollar exchange rate to account for valuation effects.

The expansion in central bank balance sheets was much larger in the Covid-19 crisis relative to the GFC. The median central bank balance sheet increased by around 6 percent of GDP during the Covid-19 crisis

[25] Central banks submit balance sheet data directly to the IMF using a common reporting template, SRF-1SR. The 19 central banks belonging to the Euro Area Bank System are consolidated. For comprehensiveness, we also augment our dataset with the UK, which does not report using the SRF-1SR but where published national data provide a comparable level of granularity.

compared to 2 percent in the GFC (**Figure 4**), although there was large heterogeneity. For 90 percent of all central banks in our sample, the balance sheet increased by over 1 percent of GDP and in around 40 percent of cases, the balance sheet expanded by over 10 percent of GDP. The relatively larger central bank balance sheet expansion occurred across AEs, EMEs and LICs, although with some differentiation. Total assets for the median AE central bank increased by close to 10 percent in the Covid-19 crisis, compared to 6 percent for EMEs and 11 percent for LICs.

The increase in assets was also more frontloaded than in the GFC. Across AEs, EMEs and LICs, the bulk of the expansion in central bank assets occurred during the first year of the Covid crisis, while in the GFC, the response was more gradual for EMEs and LICs. For AEs, although the balance sheet expansion during the first year of the crisis was similar for the median central bank, the central banks of the largest economies stand out for deploying a much larger and quicker response relative to the GFC (Canada, UK, Australia, New Zealand, Euro Area, Japan). Although there were differences in the relative magnitude of the shock faced by each country across the two crises, the relatively faster response on average may also partly be explained by the learning experience from the GFC. During Covid-19, central banks deployed similar measures to those used during the previous crisis and so may have been more ready to use them given knowledge of their past effectiveness. In some cases, programs first deployed during the GFC were reintroduced or simply expanded, while in other cases newly introduced programs shared many similarities with GFC programs.[26]

Purchases of government securities drove central bank balance sheet expansion in advanced economies, while financial sector support was more important for EMEs (Figure 5). In AEs, the increase in central bank balance sheets in the Covid-19 crisis was driven by purchases of government securities (often in the context of expansions in QE programs) and support to the financial sector, funded by issuance of additional commercial bank reserves. The increase in central bank claims on the public sector was significantly smaller in EMEs and LICs, where the balance sheet expansion was driven by financial sector support and accumulation of FX assets, funded only partially by reserves and increases in currency in circulation.[27] Most non-AE central banks increased their holdings of government bonds only moderately, either because they were prohibited by law or because monetary policy was not constrained by the zero-lower bound. However, some EME central banks purchased government securities by activating emergency clauses in existing legislation (for example, Ghana), or amending legislation (Chile, Indonesia).[28]

Support to the financial sector in Covid-19 was large and mostly in the form of collateralized lending. The purpose of financial sector support varied across central banks but was typically to provide liquidity to the banking sector and capital markets, sometimes in the context of broader QE programs. Some central banks also extended loans and other facilities to the financial sector conditional on fulfilling lending commitments to the private sector (sometimes called 'funding-for-lending' schemes). The median increase in claims on the financial sector during 2020 and 2021 was 4½ percent of GDP for AEs and 1 ¾ percent of GDP for EMEs. Most central banks extended support through crisis lending facilities or repos, although a few central banks did

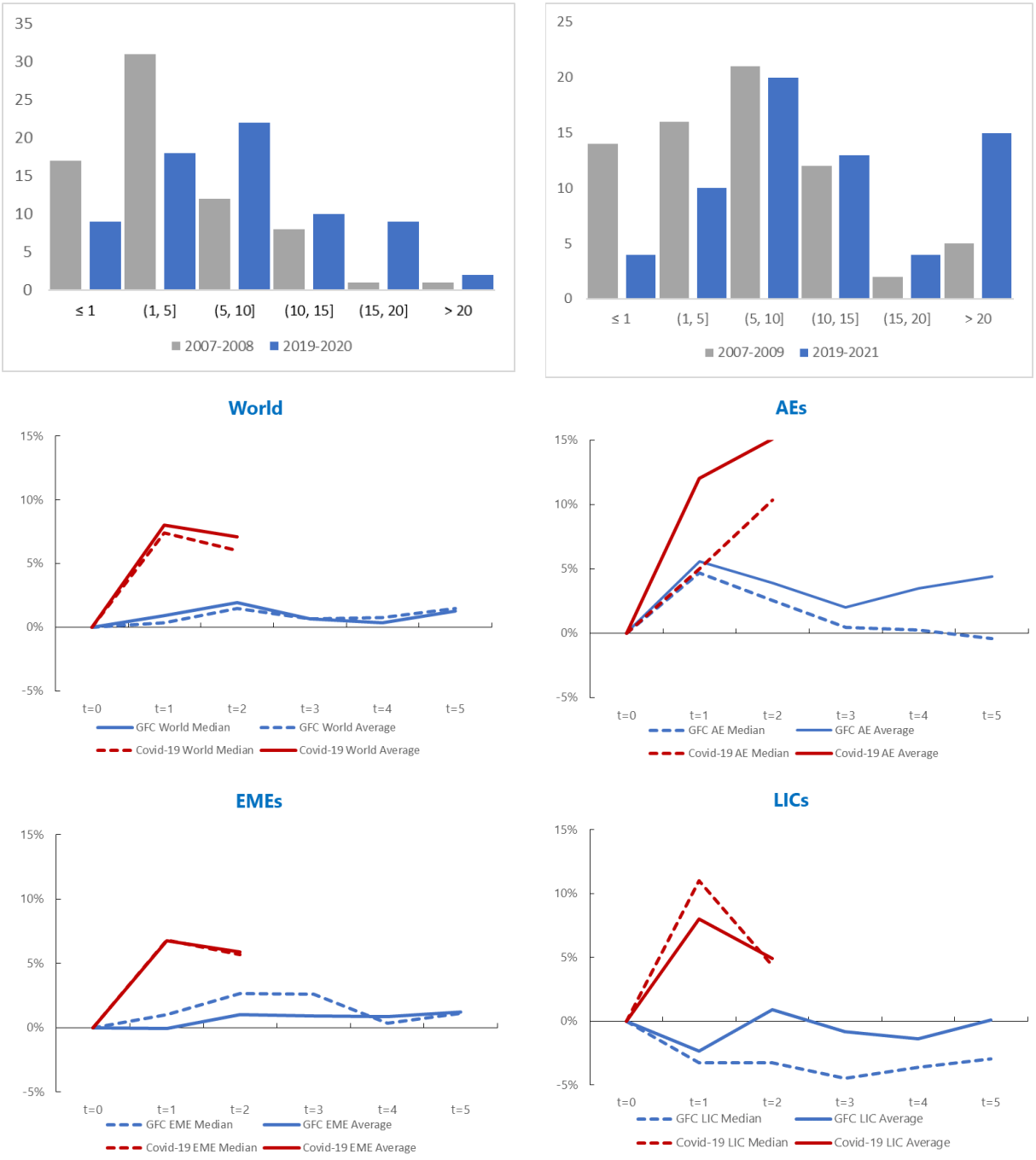
[26] For example, the ECB and Bank of England extended existing asset purchase programs (the APP and APF respectively). However, they also introduced new liquidity facilities (e.g., the PELTRO and CTRF respectively, which shared characteristics with programs introduced in the GFC.

[27] Although increases in currency in circulation lead to higher seignorage revenues, the associated impact on the fiscal accounts in the Covid-19 crisis was likely small relative to the impact from other balance sheet items whose changes were much larger as a percent of GDP (Figure 5).

[28] In Chile, the Constitution was amended in 2020 to allow the central bank to acquire government bonds in the secondary market, while in Indonesia, the central bank Act was amended to permit the purchase of government bonds through primary issues.

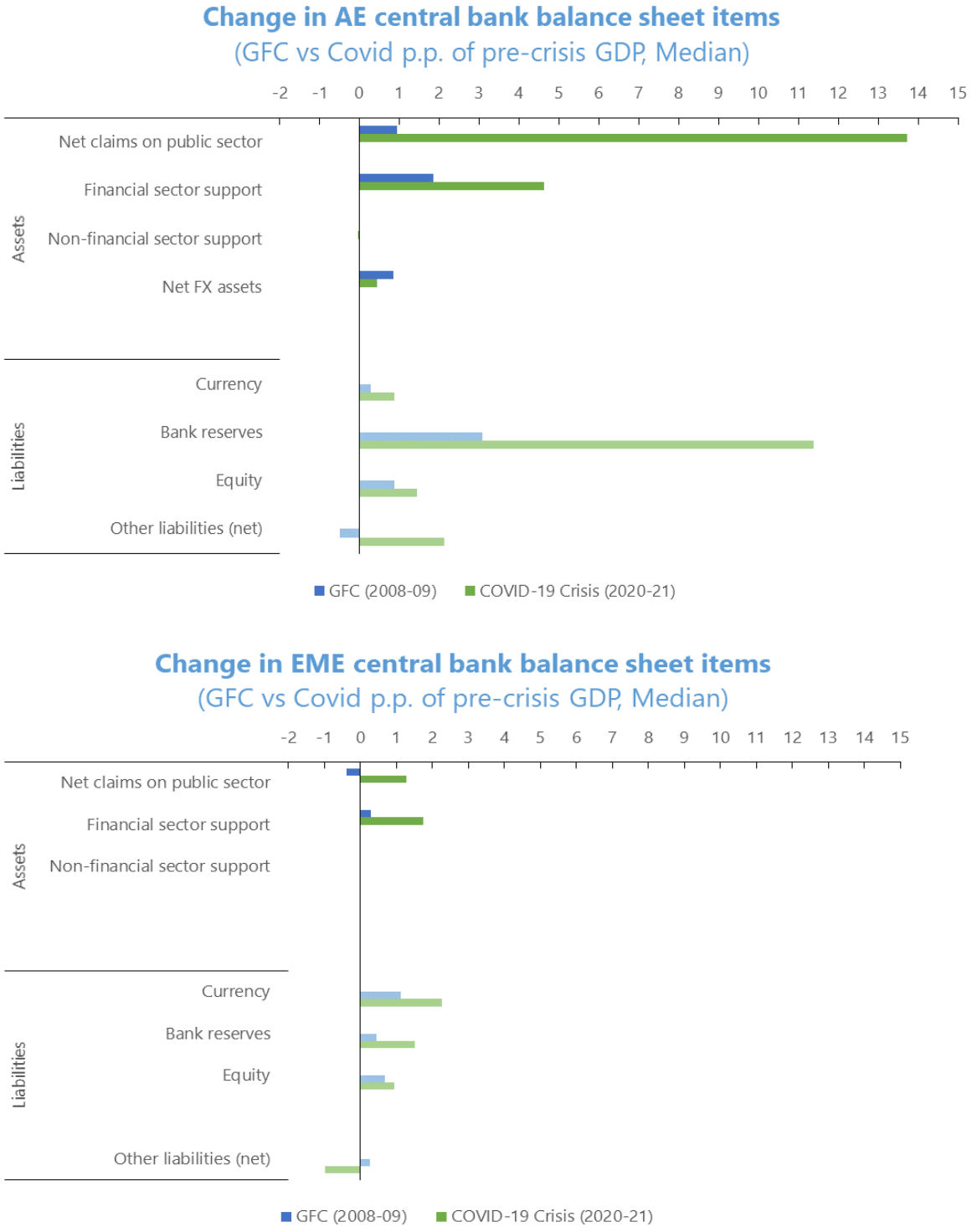
buy financial sector securities (Japan, Euro Area, Hungary, US, Poland). In six countries, additional support to the financial sector exceeded 10 percent of GDP (**Figure 6**).

Figure 4. Change in Central Bank Assets: Covid-19 vs GFC
(percent of GDP)



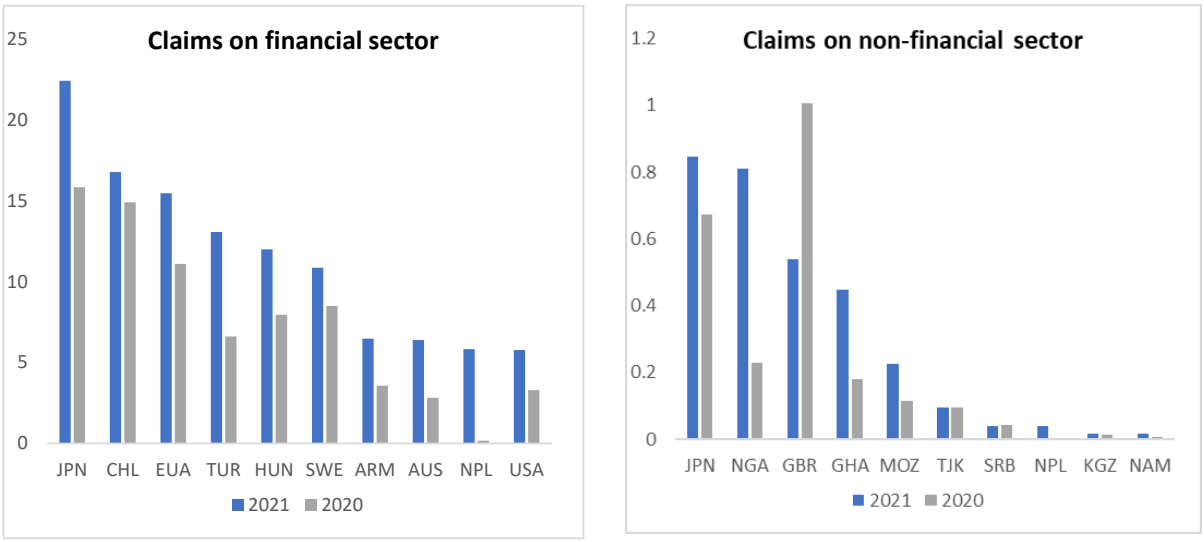
Sources: IMF Monetary and Financial Statistics, Bank of England and authors' calculations. Notes: t=0 indicates pre-crisis year: 2007 for GFC, 2019 for Covid-19.

Figure 5. Change in Central Bank Balance Sheet Items: Covid-19 vs GFC



Sources: IMF Monetary and Financial Statistics, Bank of England and authors' calculations.
For each balance sheet item, the median change is calculated across the sample, hence the total change in assets will not necessarily equal the total change in liabilities.

Figure 6. Change in Central Bank Claims on Financial and Non-financial Sectors (2019–2021)
(percent of 2019 GDP)



Source: IMF Monetary and Financial Statistics and authors' calculations.

Although direct support to the non-financial sector in the Covid-19 crisis was not widespread, it was still significant for some central banks. Several central banks provided support directly to the non-financial sector through loans or purchases of securities, to mitigate the effects of the COVID-19 supply shock on firms and households (**Figure 6**). However, the level of such support was typically very small; in only 4 countries in our sample did it exceed 0.1 percent of GDP. Central banks that extended the most additional support to the non-financial sector were the UK (1 percent of GDP) and Japan (0.8 percent of GDP) who undertook large secondary market purchase programs.[29] In many cases, however, announced support was not taken up—for example, in the US, new facilities such as the Primary Market Corporate Credit Facility and Municipal Liquidity Facility, received transactions amounting to a small fraction of their authorized amounts.

Central bank support to the financial and non-financial sectors remained high even after most of the Covid-19 programs had expired. Most of the new liquidity support programs introduced at the onset of the Covid-19 crisis were intended to be temporary, and some had sunset clauses that expired within a year. Although central bank claims on the financial sector in advanced economies did decline 12 months into the crisis (by around 2.5 percent of GDP between February and March 2021), they started to increase again from May 2021 (**Figure 7**). However, the subsequent increase was more gradual and further support was typically extended through central banks' regular lending facilities rather than the exceptional Covid-19 facilities. For EMEs, claims on the financial sector did not show a decline a year into the crisis but the overall level of support had been much smaller than in AEs.

The share of government debt held by central banks increased. Central banks in both AEs and EMEs steadily increased their holdings of government debt relative to GDP throughout 2020 and 2021. The average increase in the share of government debt held by the central bank was 1.3 percent of GDP in our sample,

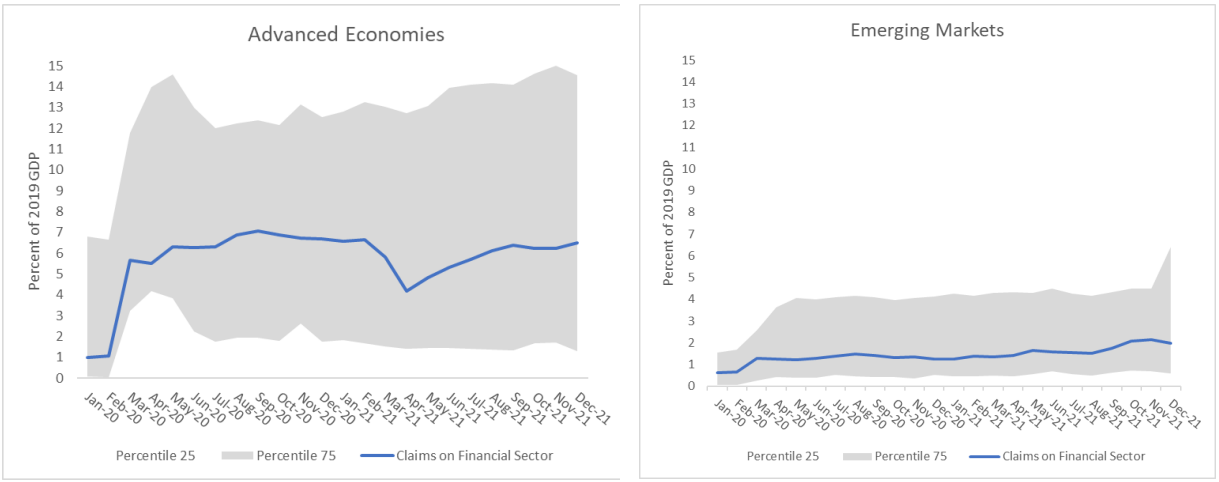
[29] These programs were the Covid Corporate Financing Facility (CCFF) in the UK and Special Program to Support Financing in Response to the Novel Coronavirus (COVID-19) in Japan. Note that our database does not allow us to identify indirect support to the non-financial sector (for example, through liquidity provided to banks conditional on increased lending to the non-financial sector); this would show up as financial sector support.

despite large additional issuance of government securities in several cases (**Figures 8 and 9**). Of those central banks that increased their holdings of government debt during Covid-19, net purchases represented more than 10 percent of the outstanding debt stock in 20 percent of cases.[30] The largest increases were in Sweden and New Zealand, where the central bank increased its holdings from 7 percent of total debt in 2019 to 22 percent and 18 percent respectively at end-2021. The Japanese and UK central banks held the largest share of government debt post-Covid, at 36 and 31 percent of total debt at end-2021 respectively, having increased from 28 and 20 percent in 2019.[31] At the same time, in around 20 percent of cases, central bank net purchases of government debt more than fully covered the government's additional net borrowing requirements during the Covid-19 crisis (**Figure 10,** left of the 45-degree line).

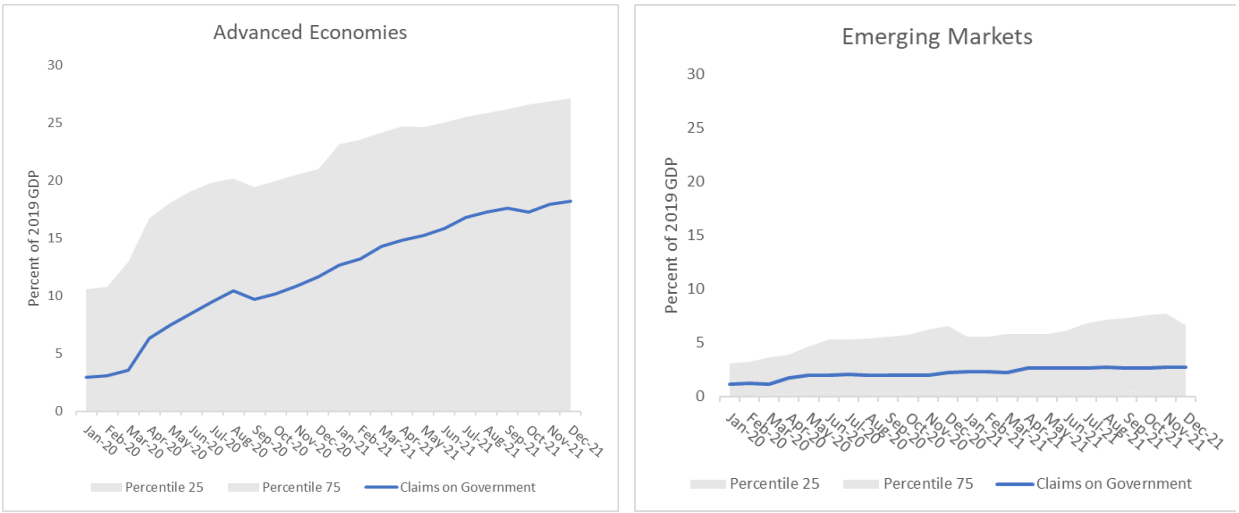
Figure 7. Central Bank Claims (2020-21)

(percent of 2019 GDP)

A. Claims on the Financial Sector



B. Claims on Government



Source: IMF Monetary and Financial Statistics, Bank of England and authors' calculations.

[30] During the 2012 Euro Area sovereign debt crisis, the ECB's holdings of Greek, Italian and Portuguese sovereign bonds also represented large shares of the total stock outstanding.

[31] The consolidated Euro Area central bank balance sheet also significantly increased its holdings of member country government debt, from 18 percent of total debt in 2019 to 37 percent in 2021.

There was a significant increase in new central bank reserves in several countries. 40 percent of central banks that increased their holdings of government debt during the pandemic fully financed them with additional issuance of commercial bank reserves, implying a dramatic shortening in the maturity of consolidated public liabilities and an increase in interest rate risk (**Figure 11**, left of the 45-degree line). **Box 1** discusses the interest rate risks related to these holdings in more detail.

Figure 8. Central Bank Holdings of Government Debt: 2021 vs 2019
(percent of total government debt)

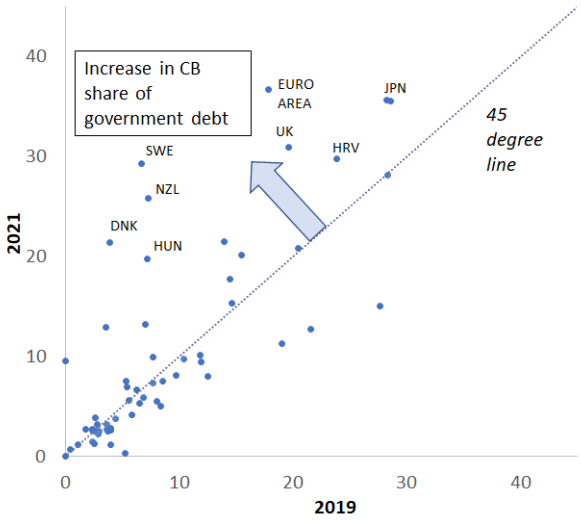


Figure 9. Gross Government Borrowing Through Marketable Debt
(percent of GDP)

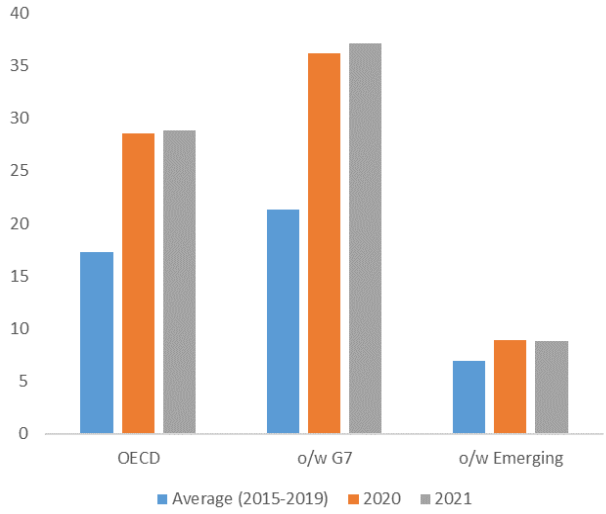


Figure 10. Government Deficit vs Change in Central Bank Claims on Government (2019–21)
(percent of 2019 GDP)

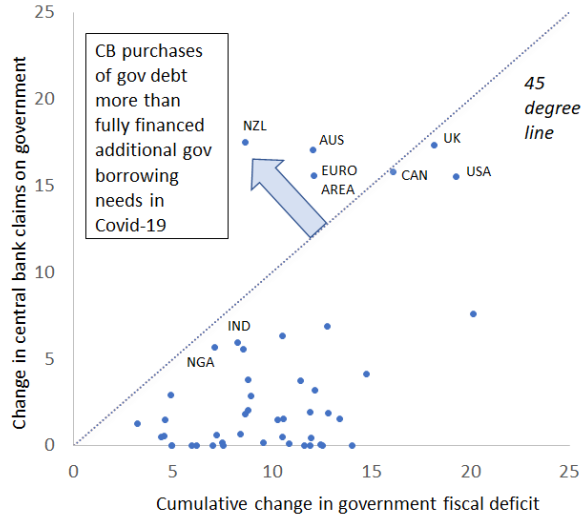
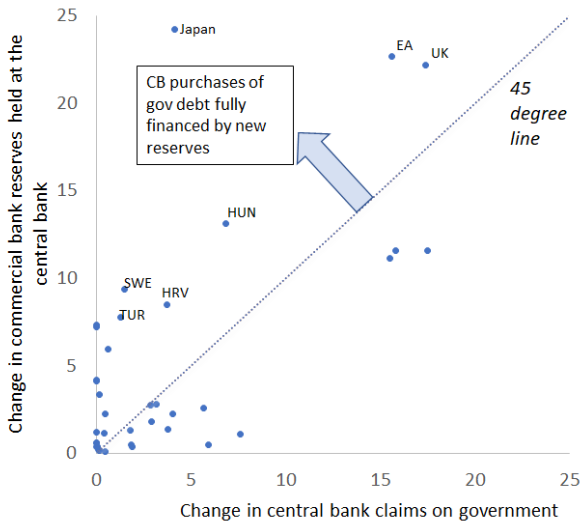


Figure 11. Change in Reserves vs Change in Central Bank Claims on Government (2019–21)
(percent of 2019 GDP)



Sources: Figures 8,10,11: IMF Monetary and Financial Statistics, Bank of England and authors' calculations. Figure 9: OECD Sovereign Borrowing Outlook.
Notes: In Figure 11, the cumulative change in the government deficit is calculated as the cumulative deficit in 2020 and 2021, minus the deficit in 2019.

Evidence from Intervention Announcements

To better understand the fiscal risks from central banks' crisis interventions, the balance sheet analysis is complemented by survey evidence of announced measures during the Covid-19 crisis. The Central Bank Interventions Database (CBID) was compiled by IMF staff and covers a total of 176 announcements of central bank interventions between March and December 2020 across 85 central banks.

Central bank interventions were categorized according to their potential financial risks and whether they involved implicit subsidies or impacted the structure of public debt. For each intervention, the information in the announcement press release was assessed for the presence (or lack) of provisions relating to mitigation of quasi-fiscal impacts from the intervention, including financial risks (credit, market and interest rate risk and insufficient or low-quality collateral); implicit subsidies (potential preferential treatment), and changes to the structure of public debt (non-market neutrality in government securities purchase programs).

The most common type of central bank intervention during the Covid-19 crisis was conventional liquidity support, where financial risks were typically mitigated through good quality collateral (Table 3). There were 57 cases of new conventional liquidity operations (those undertaken within the central bank's standard operational framework). Most central banks sought to offset the associated financial and implicit subsidy risks when providing liquidity in these formats, by lending against good quality collateral and avoiding preferential treatment. However, in over 10 percent of cases, risks were not fully eliminated.

New non-conventional forms of lending were less common but implied greater fiscal risks. Support to the financial sector outside of standard central bank operational frameworks (funding for lending-type schemes, direct lending and other unconventional liquidity provision) unsurprisingly implied greater financial risks, typically through easing of collateral eligibility or reduced haircuts for refinancing operations. Significant public subsidies to the banking sector were also common for liquidity support operations provided at below market rates.[34] The eligibility criteria for private sector asset purchases often included riskier assets, therefore implicitly transferring credit risk from the private sector to the central bank. Purchases of public securities carried market and interest rate risks, as well as other risks from resulting changes to the structure of public debt (only the ECB asset purchase frameworks included the market neutrality condition).

[34] In Hungary and Ukraine, for example, liquidity support operations were conducted at fixed rates which allowed borrowers to earn a significant term premium by investing in government bonds.

Table 3. Fiscal Risks associated with Central Bank Interventions during the Covid-19 Pandemic
(number of interventions)

			Potential quasi-fiscal risks			**Number of interventions (Total = 176)**
			Financial risks	Implict subsidy / potential preferential treatment.	Alters structure of government debt	
Liquidity provision	Conventional liquidity provision		8	6	0	**57**
	Unconventional	Unconventional liquidity provision	15	2	0	**18**
		Direct CB lending to private sector	1	2	0	**2**
		Funding for lending	7	45	0	**51**
Asset purchases	Private	Primary market private bond	3	3	0	**3**
		Secondary market private bond	13	11	0	**13**
	Public	Primary market government bond	2	2	0	**2**
		Secondary market government bond	30	0	29	**30**

Source: IMF Central Bank Interventions Database (CBID) and authors' calculations.
Notes: The sample includes 176 interventions across 85 central banks announced between March and December 2020. Potential risks were identified if no corresponding elimination measures were described in the press release announcing the intervention.

IV. Managing Fiscal Risks from Central Bank Crisis Interventions

This section seeks to identify some good practices for the management of fiscal risks from central bank interventions, drawing from the experiences of the Covid-19 and Global Financial Crises. Effective intervention design, underpinned by sound governance frameworks is essential to help mitigate and manage risks to public finances and preserve fiscal and monetary policy credibility. The discussion draws from the examples of central bank measures implemented during both the pandemic and the GFC across advanced and developing economies and is also supported by 4 detailed case studies in the separate Annex paper, covering Canada, Chile, the UK, and the USA. It is also informed by experience of arrangements governing 'conventional' central bank operations as well as the literature on fiscal risk management. The section covers four key elements of fiscal risk management of central bank crisis interventions: i) institutional delegation, ii) policy design, iii) governance frameworks (including coordination arrangements), and iv) facilitating exit.

Institutional Delegation

Selecting the appropriate public institution to implement a crisis intervention is an essential starting principle for effective fiscal risk management. While it is often assumed that the central bank has a

comparative advantage in undertaking financial market-based interventions such as liquidity support or securities purchases (for example, due to existing infrastructure and connections), this is not necessarily the case. During the GFC and Covid-19 crises, there were several examples of the same type of operation implemented by either the monetary or fiscal authority in different countries. For example, purchases of private securities were conducted entirely on the government's balance sheet in Norway and Australia and through a wholly-owned subsidiary of the central bank with full Treasury indemnification in the UK. In Canada, the institutional approach differed between the two crises: private securities were purchased through an expansion in activity by a Crown corporation during the GFC and directly by the Canadian central bank (with a government indemnity) during the pandemic. In the US, both the Treasury and Federal Reserve took MBS onto their respective balance sheets under different governance arrangements during the GFC but during the pandemic, purchases were conducted solely by the Fed.[36]

In certain cases, undertaking financial market interventions on the government balance sheet can be both effective and help the associated fiscal risks be more transparently and effectively managed. Although the issue of optimal delegation between fiscal authorities and central banks is beyond the scope of the paper, government implementation of certain financial market crisis interventions, where feasible, can have several advantages. It can help to limit the amount of assets on the central bank balance sheet that have quasi-fiscal components and hence help to safeguard the bank's operational autonomy to carry out its core monetary policy and financial stability mandates. Financing crisis interventions through the government's budget, rather than from the central bank balance sheet, can also help to ensure the fiscal authority directly bears the financial implications and more accurately reflects the quasi-fiscal nature of the interventions themselves. It can also help make the costs and risks of the interventions more explicit, promoting accountability in decision making. These considerations are perhaps particularly relevant for subsidized lending activities such as long-term financing operations, funding for lending schemes and purchases of private securities which can carry significant risks.

In other cases, the central bank may have a comparative advantage in implementing financial market interventions, though appropriate fiscal backstops and policy coordination are essential to mitigate fiscal risks. One reason why so many public financial support operations during the Covid-19 crisis were implemented by central banks, rather than fiscal authorities, was likely the speed with which they could be deployed, given the infrastructure and expertise already in place. Another factor may have been a desire to avoid further build-up of debt or explicit contingent liabilities directly on the government's balance sheet. While such constraints can, in principle, be addressed through other policies, this would likely take time and careful planning, and hence central banks often do have a comparative advantage in the moment of a crisis to implement financial market interventions, when timely execution is key. For interventions undertaken by the central bank, however, a government backstop is important to allow the central bank to use its expertise to execute the operation but not shoulder the financial risk, as examined in the following subsections.

[36] See Gjedrem (2009) and Norwegian Ministry of Finance (2020) for Norway's Government Bond Fund, Debelle (2009) and Australian Treasury (2020) for Australia's asset-backed securities fund (AOFM), Bank of England (2021) for the UK's Asset Purchase Facility (APF), Canadian Mortgage and Housing Corporation (2015) for Canada's national housing agency and GFC and Fernandes and Mueller (2023) for the Bank of Canada's securities purchases programs. For the US, see FHFA (2019), Federal Reserve Bank of New York (2021) and the case study in the separate Annex paper.

Policy Design

Mitigating the financial risks associated with central bank crisis interventions is a key part of effective fiscal risk management, though it does not imply it would be desirable to eliminate these risks fully. Section II highlighted the various forms of financial risk (credit, market, interest rate) associated with central bank crisis interventions. These risks are ultimately born by the fiscal authority, regardless of who bears the immediate risk, hence their mitigation is also part of fiscal risk management. In several cases, interventions deliberately transfer risk from the private to the public sector (purchases of corporate securities, for example), as a means of improving market functioning. When designing interventions, policymakers therefore need to balance risk mitigation with policy effectiveness, while also being mindful of the strength of the public sector's balance sheet. This subsection focuses on some design features that can help to limit such risks, including: i) preference for repos or swaps over outright purchases, ii) appropriate exposure caps and eligibility criteria, iii) sunset clauses, and iv) enhancing asset management capabilities.

Several design features helped to limit financial risks, including but not limited to the following:

- **Use of repos or swaps to limit outright ownership of securities.** Provision of liquidity to private securities markets through repos or asset swaps rather than outright purchases, can provide a useful way of limiting financial risks (e.g. Mexico).[37] For example, when a central bank provides a liquid security to a commercial bank (or other financial or non-financial entity) for use as collateral for repo financing in exchange for an illiquid security, the commercial bank retains fundamental ownership of the risky security offered as collateral and hence the risks (and rewards) remain on its balance sheet (if the bank remains solvent). Short maturities can also help to limit credit risk and bring policy flexibility. Outright purchases by the central bank, however, transfer the risks of holding a security to the public sector balance sheet, exposing it to additional financial risks.
- **Exposure caps and eligibility criteria to limit potential losses.** Important risk mitigation elements can include: caps on the aggregate size of interventions to limit the government or central bank's maximum exposure (e.g., Chile, Sweden[39]); establishing eligibility criteria to avoid supporting insolvent institutions or 'picking favorites'; setting appropriate fees and haircuts on higher-risk securities; and appropriate collateral requirements in the case of repos or other lending help to minimize potential losses (e.g., the Eurosystem, Chile).[42] However, trade-offs may exist: limiting exposure and restricting eligibility may hinder effectiveness in some cases.
- **Building in sunset clauses and use of repos to facilitate unwinding crisis assets.** Programs can have an explicit expiry date (many of the Covid-19 liquidity support operations expired within one year). Intervening in securities markets through repos, rather than outright purchases, can also make it easier for the central bank to unwind these holdings, reduce the size of its balance sheet and drain reserves as monetary and financial conditions normalize. For example, term repos can be rolled over at higher rates, if necessary, whereas fixed-rate coupon bonds remain on the central bank balance sheet in the case of asset purchases.

[37] For example, Mexico's central bank established the FRTC repo facility for short-term corporate debt securities.

[39] Chile's asset purchase program was capped at USD 8.0 billion, while Sweden's was capped at SEK 700 billion.

[42] The Eurosystem reduced collateral valuation haircuts by a fixed 20 percent, thus maintaining a consistent degree of protection across collateral asset types, while Chile's Central Bank expanded collateral pool included minimum credit ratings on private credit claims and bank bonds.

- **Enhancing asset management capabilities where the central bank holds complex portfolios of assets.** Typically, central banks lack adequate internal capacity to manage complex asset portfolios, particularly in the case of private sector securities. Options include ringfencing these assets to be managed separately under a distinct and different legal entity (for example in an SPV or VIE), with more sophisticated financial risk management. Similar approaches are often used for the management of large foreign exchange reserves; either setting up a Sovereign Wealth Fund or equivalent, or bringing additional expertise into the central bank.[44] During the Covid-19 crisis, for example, the US Federal Reserve brought in external operational assistance to help manage the CPFF.[45]

Fiscal Risk Management Frameworks

Financial Arrangements between Central Banks and Fiscal Authorities

For policy interventions conducted on the central bank balance sheet, there are strong arguments for the fiscal authority to directly bear any associated financial risks. Governments may sometimes face incentives to let the central bank bear the risks and costs from its crisis policy interventions, partly due to differences in the timing of loss recognition. And to the extent that the cost of financing these interventions is off-budget, governments may be tempted to allow such activities to remain, and even proliferate on the central bank balance sheet. But when associated losses eventuate, these impact central bank profitability and balance sheets, and in turn can jeopardize the conduct of monetary policy and undermine macro and fiscal stability. These institutional and policy risks from uncovered central bank losses can be mitigated, however, by the fiscal authority bearing the financial risks from the intervention, either by assuming the associated assets (and liabilities) onto the government balance sheet, or providing a guarantee mechanism to the central bank.

A 'fiscal backstop' for specific interventions has been provided in various ways in recent crises, including through government deposits, guarantees, an SPV, or loss provisioning mechanisms.[46] The modalities for providing government guarantees differ both across countries and within the same country for different programs. For example, the Bank of Canada indemnified some programs through injections of government deposits of around 3 percent of GDP, while the interest rate risk from its QE program was subject to derivatives agreements with the Government. In the US, of 13 credit facilities introduced by the Fed in 2020, the Treasury provided capital support amounting to 0.5 percent of GDP at end-2020 to the 9 structured as SPVs, while the other 4 facilities received support through the Treasury Exchange Stabilization Fund (ESF), or took fully government-guaranteed loan collateral.[47] In New Zealand, the Treasury provided an indemnity for the central bank's Large-Scale Asset Purchase Program, and in 2022 began payments to the central bank to offset net interest income losses related to bonds bought in 2021 and 2022. Establishing risk-allocation arrangements ex-ante ensures that the costs of (and responsibility for) central bank crisis interventions is made explicit up front, although in some cases, governments have agreed on responsibility after they have materialized (for example US Federal Reserve's Main Street Loan facilities).

[44] The IMF's Guidelines for Foreign Exchange Reserve Management provide guidance, including on risk management.
[45] In March 2020 PIMCO was selected as investment manager and State Street Bank as custodian and accounting administrator.
[46] The issue of central bank loss protection—how much and who decides is an important, yet complex topic. See Stella and Lonnberg (2008).
[47] An extensive discussion of the Main Street Lending Program is provided in Arseneau, et. al (2021). See also the US case study in the Annex paper.

A strong and established (financial) arrangement between the central bank and fiscal authority can help to ensure the central bank has sufficient financial strength to carry out its operations effectively. While sufficient fiscal backstops to cover specific interventions carried out on the central bank balance sheet are essential, these often do not cover all associated risks and so it is important these are also complemented by a clear framework for risk allocation between fiscal authorities and central banks.[50] Design of the framework should ensure that central banks have at least the minimum financial strength required to achieve their monetary and financial stability objectives. Several different financial arrangements are possible, for example, risk-based capital policy (as in the UK),[51] loss provisioning by the fiscal authority, or simply holding "excess" central bank capital. On the other hand, most central banks have limited buffers and weak or non-existent recapitalization frameworks.[52] Even in the US, the Federal Reserve purchased long-term Treasury securities without a fiscal backstop (as opposed to the Covid liquidity support facilities to the private sector which were backstopped by the Treasury and authorized by Congress).[53]

Central Bank Governance

Clear central bank mandates authorizing crisis interventions help to promote accountability. Transparency over central banks' public policy objectives can be strengthened by enshrining them in legislation and subsequently defining them in regulations or formal agreements between government and central banks. Existing central bank laws vary in the extent to which they explicitly allow or prohibit certain activities with a quasi-fiscal component. In cases where central banks undertake new interventions not explicitly specified in the relevant legislation or regulations, procedures for the conduct of emergency interventions can be defined (e.g., Canada). Policymakers authorizing a new mandate for an intervention (that may sometimes serve a tertiary objective of supporting the economic policy of the government), also need to ensure there is no conflict with the central bank's primary or secondary objectives.

Enhancing central bank governance for specific interventions can help to manage the costs and risks of crisis interventions more effectively. Where new crisis interventions or instruments are adopted, there may be a need to enhance internal oversight[55] to ensure the central bank is not exposing itself to financial and nonfinancial risks beyond the limits outlined in the central bank's risk appetite. Other measures could include more frequent involvement of the central bank's Board or non-executive directors in oversight of the way crisis decisions are taken and implemented, more frequent and in-depth review by relevant central bank departments (including the legal department, risk management, and internal audit).[56]

[50] In the case of central bank private asset purchases with government guarantee, only the credit risk is transferred from the central bank to the Treasury. The central bank remains exposed to the interest rate risk and the liquidity risk associated with the assets.

[51] In 2018, a new MoU revised the financial relationship between the Treasury and the Bank of England, so that capital transfers can be made to the Bank in the event of large valuation losses.

[52] Among less developed economies, the Bank of Jamaica is an example of a central bank that was recapitalized to restore its statutory (non-revaluation) capital.

[53] See the US case study in the separate Annex paper for more details.

[55] For instance, in Chile, the central bank increased the involvement of the Governor as well as other Board members in external communication on Covid-19-related measures, allowing not only for enhanced transparency but also close involvement of the central bank's key executive and nonexecutive decision-makers.

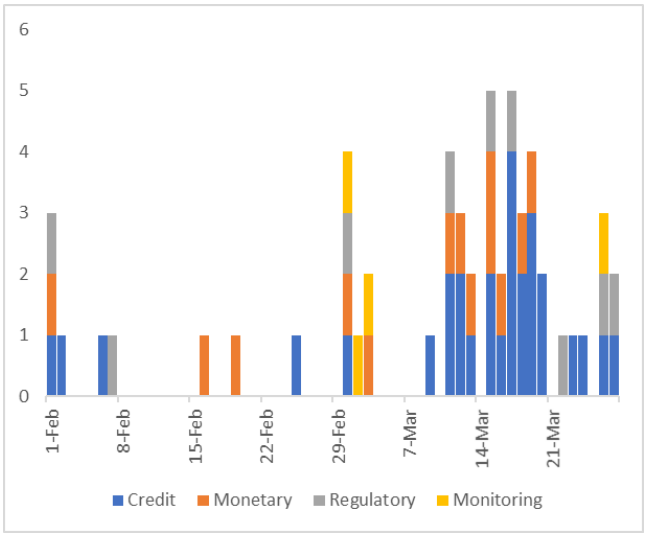
[56] See Bossu and Rossi (2019), Khan (2018) and (2016) for examples of good practices of internal central bank governance and risk management.

Transparent Reporting

Clear and timely disclosure by central banks of crisis support facilities and ex-post impact assessments promoted transparency and accountability. During the Covid-19 pandemic, many advanced economy central banks quickly and explicitly disclosed the measures, purpose, and details of their crisis interventions (**Figure 12**), while some emerging markets such as Chile also provided detailed disclosures.[57] The IMF's Central Bank Transparency Code outlines sound disclosure practices. These include publishing regular, timely, and easily accessible reports on the size and terms of interventions and their financial flows and impacts on, and potential implications for, the central bank's balance sheet, as well as information on official relations between the central bank and government.[58] Where the government explicitly bears the risks from crisis interventions, strong transparency and data-sharing arrangements can help the fiscal authority adequately assess these risks and their associated costs. And in the absence of a fiscal backstop, strong transparency and disclosure of the interventions by the central bank can help to exert pressure on the fiscal authority to cover potential losses.

Proper accounting treatment of risks according to internationally recognized standards can promote good risk management and credibility. This requires determining (ex-ante) the underlying nature of the operation – whether the central bank acts as an agent to implement it (in which case the assets and liabilities should be reported on the government balance sheet), or whether the assets are owned and controlled by the central bank (in which case they should be reported on the central bank balance sheet in accordance with IFRS).[59] If the assets are on the central bank balance sheet, the additional risks involved in crisis interventions will often warrant separate quantitative and qualitative disclosures in the financial statements of the relevant entity (e.g., central bank or SPV).[60] The IFRS framework, for example, requires a separate line item in the balance sheet and disclosures in the notes to the financial statements to explain the nature of the instruments involved, the associated risk management practices (including collateral and any fiscal indemnifications). However, only about a quarter of the world's central banks currently apply IFRS (IMF, 2021).

Figure 12. Publication of Covid-19 Policy Measures (BoE, BoJ, ECB, US Fed, PBoC)



Source: Staff calculations based on data from Peterson Institute for International Economics on central bank disclosures between February and March 2020.

[57] For example, the Chile central bank provided detailed assessments of the balance sheet impact of the expansion in peso-denominated assets during Covid-19. See the Chile case study in the Annex paper.

[58] The IMF's Central Bank Transparency Code (CBT) emphasizes the need for central banks to disclose all quasi-fiscal related activities, their governance, and outcomes as well as all official relations with the government (Pillar V, principle 5.1).

[59] The same principles apply to SPVs set up to implement or manage crisis interventions. Whether the SPV warrants consolidation into the central bank's accounts depends on whether the central bank or the sovereign controls the SPV, including who bears the risks and rewards.

[60] For example, the UK's APF produces separate financial statements according to IFRS.

Good disclosure practices by the fiscal authority would cover the potential fiscal impact and risks of all crisis interventions carried out by the central bank, as well as any implicit subsidies.[61] Where the assets and liabilities from crisis interventions with quasi-fiscal elements are reported on the central bank's balance sheet, the IMF's Fiscal Transparency Code recommends these to also be disclosed by the government.[62] Good practices include disclosure of support extended (reported in the financial statements as contingent liabilities where appropriate), any direct or indirect flows between the government and central bank and assessment of the fiscal impact (both actual and risks), with publication in a range of outlets, for example, budget documents, fiscal risk statements, and regular reports of the central bank.[63] For interventions involving implicit subsidies (even if as a byproduct), the original announcement can set out who will benefit and why, through clearly defined and transparent eligibility criteria and ex-post assessments (for example, who benefited and by how much). There were a wide range of practices regarding fiscal interventions during Covid-19. Some fiscal authorities such as the UK and New Zealand provided relatively comprehensive disclosure of the fiscal impacts and risks from central bank interventions during the pandemic, while others did not recognize interventions that involved large implicit risks or subsidies (Hungary's 'Funding for Growth Scheme', for example).

Oversight and Monitoring by the Fiscal Authority

The additional risks to the public sector balance sheet and implications for resource allocation from central bank crisis interventions provide a case for strong external oversight mechanisms, monitoring and data-sharing arrangements. Although financial risks from central bank crisis operations are ultimately borne by taxpayers, while the implicit subsidies or grants involved in can be considered a form of government spending, there is a very different – and typically weaker - oversight process for central bank 'spending' compared to government spending. [64] Typically, central banks are subject to oversight of their conventional activities, exercised by the Executive, Legislature and Judiciary, assisted in some cases by an external council, government commissioners, or Supreme Audit Bodies. But the additional fiscal implications of crisis operations provide a case for considering enhanced monitoring and oversight of specific operations through strengthening reporting requirements, data sharing and accountability arrangements, which may sometimes require updating legal and institutional frameworks. For example, in the UK, the accountability mechanisms for crisis interventions include the need for the BoE to apply to the Treasury for an increase in the indemnity associated with its asset purchase programs. In New Zealand, a new MoU was signed during Covid-19, clarifying the process for requesting indemnity from the Minister of Finance, while new principles were also developed for the design of central bank operations that included considering the impact on the public sector (Crown) balance sheet.

However, any greater external oversight of central bank crisis operations must be balanced against the need to retain central bank operational autonomy for monetary policy. The extent to which oversight arrangements may need to be enhanced will depend on the nature and strength of existing arrangements and the magnitude of risks from the specific intervention. However, it is important that enhancing oversight of the

[61] The IMF's Fiscal Transparency Code provides guidance for government disclosure, including describing the measures, their direct or indirect impact on fiscal flows or the balance sheet, and discussion and quantification of the potential associated risks.

[62] Differences in accounting standards across governments and central banks (particularly the case for many emerging countries and LICs) can also lead to an item reported on one entity's balance sheet but not on the other's.

[63] For example, New Zealand produces timely whole of government 'Crown' financial statements, which consolidate the central bank and provide analysis of changes driven by the RBNZ. For UK examples, see the case study Annex paper.

[64] The comparison of the US government MBS purchase program and the Federal Reserve's purchase program is illuminating in this regard. The Treasury's program required a law, Congressional oversight, and hence clear political consequences. The Fed implemented its program without the need to pass a law or keep to a debt issuance limit.

central bank by the fiscal authority does not infringe on the central bank's independence over setting of interest rates. An example of such risks is where large quantities of asset purchases are financed by reserves. As policy normalizes, the legislature may try to push back against raising interest rates on (remunerated) reserves, particularly if there is potential for financial market instability associated with this.[66] To mitigate risks to central bank policy independence, institutional and legal frameworks may sometimes need to be updated.

Coordination Mechanisms between the Central Bank and Fiscal Authority

There are strong arguments for the fiscal authority to have a say in the design and implementation of central bank operations that have quasi-fiscal components, for which the fiscal authority has explicitly provided some form of backstop. Even though it may be desirable for the central bank to have full operational autonomy in the execution of its crisis interventions, where these have fiscal implications, there is a potential case for involvement by the fiscal authority in their design and implementation. In fact, this principle has long been present in conventional liquidity support operations: where the government has a requirement (in law or de facto) to assume the eventual financial consequences of the operation, the Treasury often expresses its views on its design in close coordination or cooperation with the central bank. In the case of crisis interventions, coordination can involve the fiscal authority contributing ex-ante to the definition of eligibility criteria and establishing risk management practices, while the central bank can provide data and information to the fiscal authority to facilitate decision-making and monitoring. Some central bank interventions during Covid-19 were very likely designed by the fiscal authority (for example, the Colombian central bank's public debt swap with the government), though most interventions were formally carried out by or in conjunction with the central bank in one form or another (for example, in the case of the UK's the non-financial sector support facility, the CCFF).The fiscal authority may also be involved in high-level implementation decisions such as whether to terminate or extend the program.

As well as coordination on specific interventions, countries may benefit from adopting a comprehensive sovereign asset liability management framework to better manage the fiscal risks from crisis interventions. Some countries use a public sector balance sheet (PSBS) approach to inform fiscal management (such as Australia, New Zealand, and the UK), consolidating all the assets and liabilities that the government controls, including those of the central bank. Other countries use the PSBS approach specifically for debt management (such as Uruguay). The approach can have key advantages for mitigating the fiscal risks from central bank crisis interventions, including through better informed assessments of the interventions and their risks, providing transparency to markets and accountability to citizens (IMF, 2018).

Coordination on debt management may also be beneficial, particularly in the case of large central bank purchases of government securities. During the Covid-19 crisis, government securities issuance and central bank asset purchase programs sometimes had conflicting policy outcomes. Where such programs help to push down yields, governments face incentives to take advantage of the circumstances and act in the opposite direction by issuing long-term securities, while all the maturity risk ends up with the central bank. In Canada, for example, the central bank bought long-term securities to reduce their supply at the same time the government increased issuance of this tenor. In the US, the Federal Reserve took government securities out of the market,

[66] In the UK for example, two former BoE executives warned of the possibility that the government could try to intervene to stop the Bank paying interest on reserves as interest rates rise (which would impact on the dividend paid to the Treasury).

while at the same time, the Treasury overissued and accumulated large deposits at the central bank.[68] Coordination can help to improve policy outcomes; for example, where the primary objective of the central bank's asset purchases is to add policy accommodation, the Treasury could support this by adjusting its issuance activity temporarily in certain maturity segments. To avoid market fragmentation, coordination could involve the central bank and treasury to "split" the yield curve, with the central bank taking the shorter maturities. Alternatively, to avoid the coordination issues and challenges inherent in large-scale creation of new central bank debt, the Treasury could fund the central bank's asset purchases indirectly, through issuing T-bills and depositing them in its account at the central bank (typically remunerated at the policy rate).[69] Or the central bank could use government securities in its financing operations, though this would imply the need for additional government debt issuance, which in some cases may be difficult.

Different institutional arrangements can help to improve and formalize coordination, from leveraging existing bodies, to the creation of new structures. In some countries, coordination bodies between the fiscal authority and central bank established for financial stability purposes are also used for crisis management, with this role defined in legislation.[70] New entities (for example, a separate agency or committee) could also be set up for crisis management or for monitoring risks to the consolidated public sector balance sheet and providing advice to policymakers, or to coordinate debt management, as in the case of Uruguay.[72] Coordination does not necessarily require a separate body; in some countries it is defined through formal agreements, such as Memorandums of Understanding (MoUs) or Service Level Agreements (SLAs), while in others it is more informal and ad-hoc. Regardless of the coordination mechanism, however, it would be important to include arrangements to safeguard the autonomy of the central bank to carry out its core mandates effectively. In the UK, for example, the Chancellor has authority to extend or terminate the asset purchase program, but the Monetary Policy Committee (MPC) has decision making authority over its size, since it is financed by central bank reserves and so has a direct bearing on monetary policy.

Facilitating Exit

Subject to monetary policy priorities, winding down central bank holdings of 'crisis assets' promptly after conditions normalize can help to mitigate risks and enhance transparency. Macroeconomic stability is a first order priority for central banks after a crisis and monetary policy considerations should continue to guide the use of the central bank's balance sheet. However, subject to macroeconomic constraints, actively shrinking central banks' balance sheets promptly after a crisis - rather than holding assets to maturity - can have several potential advantages. Bringing crisis assets off the central bank's balance sheet helps them to be

[68] An alternative interpretation is that over-issuance by the Treasury was sensible given its sudden need to fund future expenditures while financial markets were in a very uncertain state and so it made sense for the central bank to take up a large part of this. The extent to which this was explicitly coordinated between the two institutions is unclear, however.

[69] Depending on the shape of the yield curve, this remuneration rate can be different from the Treasury's cost of funding. A downward sloping yield curve (longer government bond yields are lower than the short-term policy rate) will result in net interest transfer from the central bank to the Treasury if the cash balance becomes permanent.

[70] North Macedonia's Financial Stability Committee (FSC) serves as a policy coordination body for macroprudential policy and crisis management - with decision-making powers resting with the respective agencies, and not with the FSC itself.

[72] The entity could play a role in monitoring risks related to individual central bank crisis assets and their financing (liability side) and risks for the central bank and the public sector. The entity would make asset liability management recommendations to mitigate balance sheet risks, for example restructure the asset (and/or liability) composition of central bank or consolidated public sector, alter the size of the public sector balance sheet (see also Das and others, 2012). In Uruguay, a Public Debt Coordination Committee was set up to monitor and shape risk management across the wider financial public sector balance sheet.

transparently recorded and any losses recognized, enhancing transparency and credibility.[73] It can also help to protect central banks from interest rate risks on large holdings of securities as policy normalizes and helps to reduce the distortive effects of large quantities of excess reserves on private sector financial intermediation and sovereign debt management. Lastly, it can mitigate concerns and lack of clarity on possible central bank exit strategies, thereby limiting legal and reputational risks to the central bank.

While a comprehensive discussion of central bank exit strategies (and their communication) is beyond the scope of this paper, some policies that can be used to facilitate exit from crises include:

- **Transferring private sector assets to the government's balance sheet for their gradual liquidation.** In some cases, central banks have been able to exit easily without making a loss or even making a profit. In others, however, the central bank has faced difficulties in disposing of assets or collateral that are highly illiquid without triggering large financial losses.[74] In cases where the central bank cannot unwind private sector asset holdings quickly, consideration can be given to transfer such assets to a special purpose entity for gradual liquidation. Asset-liability swaps between the central bank and Treasury provide one option for protecting the central bank balance sheet from exit risks. In the case of risky private sector loans or securities, the assets can be exchanged for government debt of the same maturity, so the fiscal authority assumes the credit risk (subject to any constraints from gross government debt sustainability). In cases where the assets are held in an SPV but on the central bank balance sheet, the assets and liabilities can be transferred to the government's balance sheet (with the Treasury taking over funding).[75] Regardless of the exit strategy, however, valuation losses on asset portfolios should be accounted for properly in the fiscal accounts**.**
- **Gradual conversion of central bank holdings of government securities into short-term bills.** Central bank holdings of government securities (typically concentrated in less liquid tenors) can be swapped with the Treasury for more liquid T-bills, leaving the Treasury's better placed debt management office (or equivalent) with responsibility for disposal. This can lessen exposure to interest rate risk and facilitate exit. Conversion could either be through reinvesting proceeds from maturing bonds into new bills, or an asset-liability swap.[76] In New Zealand, for example, the central bank began to sell government bonds to the Treasury starting in 2022. With a portfolio in short-term bills, the central bank would then have flexibility to accelerate shrinking the balance sheet by allowing those bills to roll-off much sooner (although it does not have to: it could ultimately roll over short-term bills continuously for many years should the monetary policy stance so warrant). A portfolio in short-term bills would also make active shrinking of the balance sheet easier, since T-bill markets are typically deeper than markets for longer-dated securities, dampening the price impact from asset sales.
- **Transparency over duration of liquidity provision to mitigate moral hazard**. One of the longer-term risks from central bank crisis interventions is moral hazard: if markets expect liquidity support will be provided more easily in future this could generate additional macro-financial risks. Effective transparency and communication

[73] Note that actively bringing crisis assets off a central bank's balance sheet does not imply selling them on the secondary market, which can sometimes increase losses if it drives yields higher. Alternatively, the central bank can swap or sell securities to the Treasury.

[74] This is the case particularly for EME central banks, where shallower/more illiquid financial markets make it difficult to subsequently dispose of LOLR collateral and shrink their balance sheets, while lack of fiscal space can make Treasury recapitalization difficult.

[75] Although the US Treasury in 2009 expressed its intention to remove the various Maiden Lane LLCs from the Federal Reserve's balance sheet when circumstances allowed (see Board of Governors of the Federal Reserve System (2009)), it has yet to do so.

[76] See Stella (2020) for a discussion of how other countries have financed large central bank balance sheets through government over-issuance and the maintenance of large government deposits at the central bank.

over the duration of liquidity provision, including the conditions under which it would be extended, can help to reduce these risks.

V. Conclusion

Central bank crisis interventions can, and often do, result in improved macroeconomic outcomes but can also lead to potentially large fiscal risks, as illustrated most recently in the Covid-19 crisis. A balance sheet approach, such as the one used in this paper, can help to show why the creation of new central bank claims on the private sector and government can create several risks for the public sector and how these risks can be magnified when they are financed by central bank reserves. In Covid-19, there was an unprecedented expansion in central bank assets with quasi-fiscal characteristics and this expansion was larger and more widespread relative to the Global Financial Crisis.

Managing the risks from these interventions effectively requires careful policy design and strong governance frameworks, with important roles for the fiscal authority and central bank before, during and after implementation. The Covid-19 crisis provides several examples of effective risk mitigation mechanisms and governance practices. However, risks were rarely fully eliminated, and assets remained for the most part on central banks' balance sheets after the crisis subsided. In preparation for future crises, central banks should seek to improve the design of risk mitigation mechanisms, strengthen oversight mechanisms and enhance fiscal monetary coordination arrangements, though in a way that does not infringe on central banks' autonomy to fulfill their core monetary and financial stability mandates. Stronger consideration could also be given at the outset to institutional delegation and whether the central bank is the most appropriate implementing agency. Fiscal risks may sometimes be more transparently and effectively managed if a policy intervention is undertaken by the fiscal authority. The relative merits of implementing crisis interventions through the government's balance sheet versus the central bank's, could hence be a useful area for future research and policy debate.

Annex I. Quasi-Fiscal Concepts

In general, a central bank activity can be considered to have a quasi-fiscal component when it impacts materially the fiscal accounts, and/or affects other aspects of fiscal policy (tax, spending, financing), either directly, or in the future. This concept is similar to Mackenzie and Stella (1996), which considered quasi-fiscal activity as policies by public institutions (financial and non-financial) that affect the overall public sector balance without affecting the budget deficit as conventionally measured. Some central bank activities always have a quasi-fiscal component; others may, or may not, depending on how they are implemented.[1] An illustration of these concepts is shown in **Figure AI.1,** focusing on the case of crisis interventions. The fiscal effects may not always be immediate or obvious; they may cause future fiscal outcomes to deviate from expectations or forecasts, or they may only have the potential to impact fiscal accounts or fiscal policy.

Central bank activities impact (negatively) the fiscal accounts mainly when they create financial losses for the central bank, leading to lower dividends for the government, or the need for the Treasury to recapitalize the central bank. Some activities of central banks can significantly change the composition or size of the central bank balance sheet and increase their exposure to financial risks. When central bank equity is positive, a decline in the profitability of the central bank impacts the fiscal accounts by reducing the transfer of dividends to government.[2] When equity is negative, dividends are usually suspended, but the treasury may face a need to recapitalize the central bank. Losses can be actual or future (particularly when an activity entails creation of a contingent liability).

The impact on fiscal accounts can also be indirect; for example, if activities lead to an erosion of central bank autonomy. If a central bank activity constrains the autonomy a central bank has in conducting monetary policy; it may contribute to an increase in inflation, capital outflows, and depreciation, particularly in countries where monetary policy credibility is not solid. If a central bank activity affects the cost of financing public debt it can also increase the public sector's exposure to financial risks. These more institutional risks can jeopardize central bank credibility, and ultimately its policy effectiveness, if markets believe the central bank may be unable or unwilling to pursue appropriate policy when sovereign vulnerabilities materialize (Stella, 2005).

A central bank activity can also affect fiscal policy if it creates implicit taxes and subsidies, affecting resource allocation in the economy and leading to distortions. Central bank activities conducted at non-market prices or that involve differential treatment of individual firms or sectors affect the allocation of economic resources, conventionally the mandate of fiscal policy. If such implicit taxes and subsidies and/or grants are not clearly quantified and accounted for, they can reduce the efficiency and transparency of fiscal policy. When subsidies and/or grants are on the central bank balance sheet it does not allow direct comparison of expected

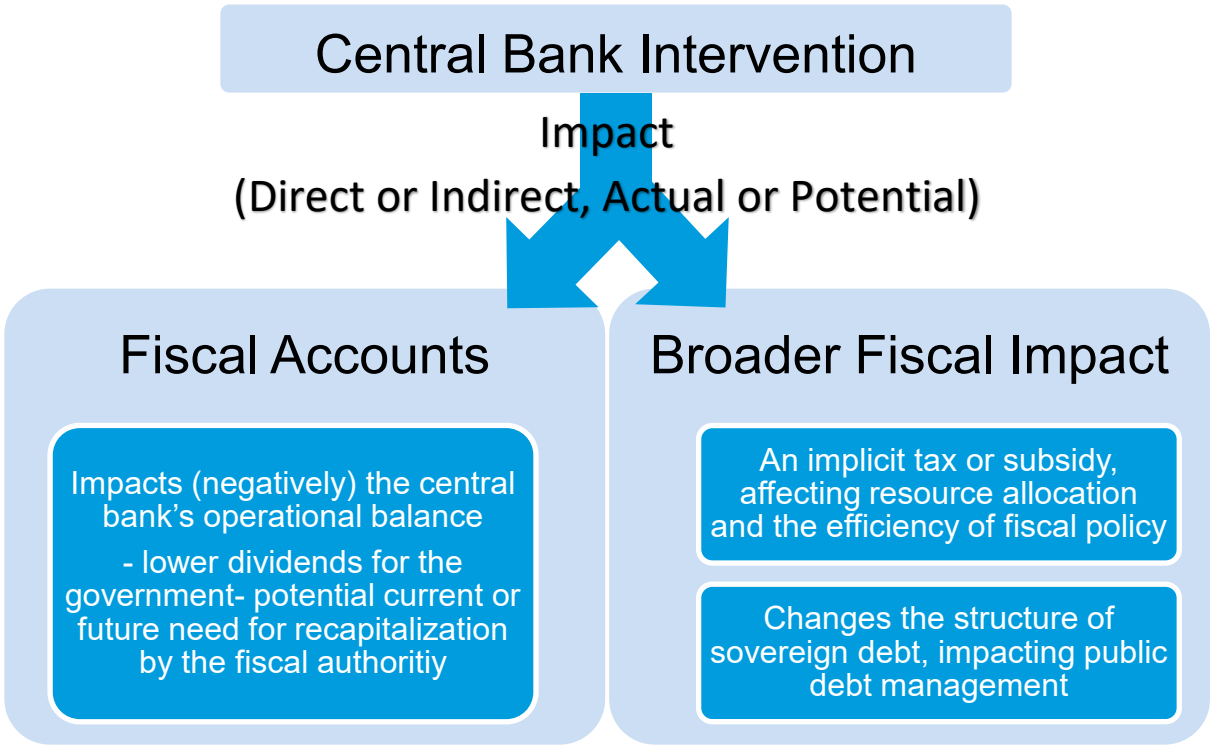
[1] We do not focus on the potential quasi-fiscal implications of conventional monetary operations in this paper. Although conventional monetary operations can have both a marginal impact on the dividend received by government and distributional effects, these should both be small in non-crisis times and above the zero-lower bound. Moreover, the focus of the paper is on the quasi-fiscal components of crisis-specific central bank interventions. The paper also does not consider bank recapitalizations; while these have sometimes been carried out by central banks in the past, they more often go through the government's budget (IMF (2022)).

[2] The degree to which such losses are passed through to the government budget differs from country to country. Losses may be covered by the fiscal authority (for example, through guarantees, reduction in government deposits, recapitalizations), or they may instead be absorbed by a deterioration in central bank equity.

future cost and utility of that spending compared to other budgetary expenditure items. There is therefore an additional institutional risk that the fiscal authority loses control of expenditure and budgetary priorities.

Some central bank activities can also affect fiscal policy by altering the structure of public debt or market for government securities, impeding the effectiveness of sovereign debt management. Governments typically set their debt management strategy to minimize financing costs subject to a given level of risk; hence changes in the debt structure resulting from central bank actions can affect achievement of that objective (if they are uncoordinated with the Treasury), although they can also help ease government financing conditions, particularly in the case of quantitative easing programs. If the central bank issues its own debt securities, they can potentially compete with government securities in the market for risk-free assets.

Annex Figure AI.1. Illustration of a Central Bank Crisis Intervention with a Quasi-Fiscal Component



Annex II. Stylized Central Bank Balance Sheet Tables

This Annex presents stylized balance sheet tables that underpin the figures in Section II.

'Non-quasi-fiscal' core central bank balance sheet

Annex Table AII.1. A Stylized Non-Quasi Fiscal Central Bank Balance Sheet

Assets		Liabilities	
Treasury Securities	TS = B+A	CB Banknotes Outstanding	B
Liquidity Providing Repos	LPR = R+TSA	Bank Reserves	R
		Treasury Single Account	TSA
Payments System Infrastructure	P	Equity (Treasury)	E = P + A
Total Assets	TA	Total Liabilities	TL

Where A = cumulative previous operational balances OB = i(TS) - dP – W and W = wages and other operating expenses.For simplicity, we assume the interest rate on LPR is the same as interest paid on R and TSA, while the interest rate on TS > interest on B (=) and demand for B is stable.

The set of 'core' central bank functions considered in **Table AII.1** includes:

Interbank payment system. Central banks operate payment systems to facilitate wholesale (interbank) payments. Banks participating in central clearinghouses hold their reserve accounts at the central bank, facilitating final interbank settlement.

Banknote issuance. Central banks issue paper money at par to commercial banks to facilitate retail payments, backed typically by government securities.

Banker to the government. Central banks are often the "banker to the government" and play an important role in clearing and settling government securities auctions (having all the settlement accounts on the balance sheet of the central bank is convenient). More recently, many treasuries have advanced toward holding a "treasury single account" (TSA), enabling the consolidation of funds held throughout the public administration into a single small account thereby reducing costs and increasing efficiencies.

Implementing monetary policy. Most central banks have a core price stability objective, achieved through controlling the interest rate in the interbank market. In normal times, and when not at zero lower bound, the central bank steers interest rates by conducting passive monetary operations to ensure there is equilibrium in the market for reserves at the targeted rate.

The first step imagines the state granting the central bank a payments system technology (P), in exchange for an equity claim (also P). To participate in the payments system, banks must obtain deposits at the central bank for settlement purposes. This is shown as an acquisition of reserves (R) provided in the form of a repurchase

operation from the central bank (a short-term collateralized loan), denoted here as liquidity providing repo (LPR).[1] Banknotes (B) are exchanged with commercial banks for reserves, which are then replenished and fund an increase in the central bank's holdings of treasury securities (TS). The addition of the TSA leads to an increase in LPR (the treasury reduces its bank account balances by moving funds to the TSA, reducing bank reserves that are replaced by an increase in LPR). Monetary policy is implemented by setting a short-term interest rate target—usually for the interbank rate—and steered by altering the interest rate charged on LPR.[2] The basic balance sheet is also complemented with an adjustment (A) to initial central bank equity to account for operating profits or losses.

The balance sheet is small and driven passively from the liability side. Total assets are determined by the market demand for banknotes (B) and reserves (R), given the government's choices for TSA and P. Central banks provide banknotes (B) in exchange for bank reserves on demand while the quantity of reserves (R) is determined by banks in the context of the rules, regulations, and operational parameters of the domestic payments systems. Monetary operations are passive in that they aim to keep the supply of reserves equal to the perceived demand at the target rate.

'Pre-GFC' Quasi-Fiscal Central Bank Balance Sheet

Annex Table AII.2. A Stylized Conventional Quasi-Fiscal Central Bank Balance Sheet with LOLR and FX Reserves

Assets		Liabilities	
Treasury Securities	TS - γL	CB Banknotes Outstanding	B
Liquidity Providing Repos	LPR - αL	Bank Reserves	R + L
LOLR to Bank Z	LOLR = L	Liquidity Withdrawing Repos	LWR + βL
FX reserves	FX	Other Interest-bearing Liabilities	CBD + δL
		Treasury Single Account	TSA
Payments System Infrastructure	P	Equity (Treasury)	P + A
Total Assets	TA	Total Liabilities	TL

NB α + β + γ + δ = 1 assuming the CB aims to leave R unchanged, B, E & TSA exogenous.
Offsetting measures, if temporary follow sequence, α, β, γ, δ.

[1] Real Time Gross Settlement (RTGS) systems effect final (irreversible) transfers of funds held by participants in central bank electronic ledgers. Usually, participation is limited to licensed banks and the national treasury. Banks' settlement account balances are called "reserves", a term dating from the period when various monetary liabilities were convertible into precious metal.

[2] As with the case of any monopoly, the central bank may choose the quantity or price at which it "sells". By the 1980s, virtually all AE central banks set the "price" at which they supplied the amount of base money (reserves and banknotes) desired by the market at that price. See Bindseil (2004).

Pre-GFC central bank activities with potential quasi-fiscal components considered in **Table AII2** include:[3]

Lender of last resort (LOLR). Historically, LOLR loans have been the primary source of risks to the fiscal accounts from central bank activities. LOLR, or emergency liquidity assistance implies much greater financial risk than LPRs since credit is provided when a bank cannot obtain it on normal market terms (as such it can also be considered as an implicit subsidy). Although most central banks are constrained by policy or law from knowingly lending to insolvent banks, during a financial crisis—either individual or systemic—the line between illiquidity and insolvency is difficult to discern and indeed depends in great part on the evolution of factors at the time unknowable. While collateral is invariably acquired, and haircuts imposed, the form and quality of collateral is likely to be unconventional and uncertain (if the bank had first tier unpledged collateral it ought to have obtained financing from the market without difficulty). Since credit is provided to a specific institution on non-market terms, LOLR also raises questions of resource allocation (and hence risks to fiscal policy): whether the lending is preferential- designed in a way to help a particular bank (and its shareholders), or whether the choice of that institution over others is preferential.

FX reserves. Low-yielding FX assets can lead to financial losses for central banks. Many central banks, typically in EMEs, hold considerable foreign exchange assets on their balance sheet, for purposes of exchange rate management or as a buffer against balance of payments pressures. Although in some countries, FX reserves are on the government balance sheet, and/or are negligible (particularly in many AEs), in many EMEs limited fiscal space means they are often managed and funded by the central bank. Assets held are typically low-yielding and can lead to financial losses since they are often funded by more expensive interest-bearing debt. Exchange rate fluctuations can also lead to valuation gains and losses that can impact on profitability and ultimately dividend flows to the government.

‘Systemic Financial Crisis’ Quasi-Fiscal Central Bank Balance Sheet

Table AII.3 shows the case where the central bank is operating at the ZLB and hence there is no need to ensure that $\Delta R = 0$ and unconventional activities can be funded by creation of new bank reserves. We consider the potential impact on the CB balance sheet of new crisis-scale interventions (purchases of private and treasury securities (PS, TS)) and support facilities to the financial and non-financial private sectors (FMS and NFS), conducted at the ZLB, assuming that all other policy assets also increase in this scenario (TS, LPR and LOLR to individual banks). On the liability side, the assets may be funded by a mix of liquidity-withdrawing repos (LWR, issuance of central bank debt (CBD) and money (R + H) and specific treasury support (STS) if the government supports an unconventional activity by providing equity. For example, in the case of interventions involving large-scale asset purchases, the amount of securities held is chosen by the central bank and the liabilities to finance those purchases exceed the amount desired by the market.

When a central bank operates above the ZLB, increases in central bank assets from unconventional operations need to be offset by other measures to maintain reserves in equilibrium (otherwise it would accept a loss of control over money market interest rates or the exchange rate). Hence, new unconventional assets must either be financed by reductions in other assets (sales of existing treasury securities, for example, if these are held in sufficient quantities), or by increases in liabilities other than commercial bank reserves. However, in systemic crises, the increase in unconventional assets is likely to be greater than the amount of existing assets able to

[3] See Mackenzie and Stella (1996) for a more comprehensive list.

be sold, in this case the Treasury may provide funding, or the central bank may need to issue interest-bearing debt instruments. Alternatively, the central bank could coordinate policies with the Treasury so that the latter absorbs the additional liquidity created from new unconventional assets (for example through issuance of additional treasury bills).[4]

Annex Table AII.3. Central Bank Crisis Interventions at Zero Lower Bound (ΔR = H > 0)

Assets		Liabilities	
Treasury Securities	$TS + TS_{crisis}$	CB Banknotes Outstanding	B
Private Securities	PS	Bank Reserves	R + H
Liquidity Providing Repos	$LPR + LPR_{crisis}$	Liquidity Withdrawing Repos	LWR + α(X - H)
LOLR to Bank Z	$LOLR + LOLR_{crisis}$	Other Interest-bearing Liabilities	CBD + β(X - H)
Financial Market Support Facility	FMS	Treasury Single Account	TSA + γ(X - H)
Nonfinancial Support facilities	NFS	Operational Balance (in-year)	OB
Net other assets (inc FX reserves)	$NOA + NOA_{crisis}$	Specific Treasury Support	S + δ(X - H)
Payments System Infrastructure	P	Equity (Treasury)	E
Total Assets	TA	Total Liabilities	TL

NB α + β + γ + δ = 1 with ΔR = H and B, OB & E exogenous. $X = TS_{crisis} + LPR_{crisis} + LOLR_{crisis} + PS + FMS + NFS$
Note that if H = X, then there is no other net expansion in liabilities and interventions are financed entirely by reserve creation.
FMS denotes financial market support facilities, NFS denotes non-financial market support facilities, PS denotes purchases of private securities, TS denotes purchases of government securities.

[4] For example, although the US Federal Reserve absorbed the liquidity created at the outset of the GFC with securities sales, following the Lehman insolvency in September 2008 it no longer held sufficient US Treasury securities to absorb the liquidity it subsequently created. The resultant surplus caused interbank money market rates to trade significantly below target, leading to an arrangement whereby the US Treasury absorbed that liquidity by issuing short-term US T-bills.

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