

A TAXONOMY OF MACRO-FINANCIAL RISKS AND POLICIES TO ADDRESS THEM

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Abstract

We propose a taxonomy of systemic risks relevant for economic growth, with a particular focus on those impairing the normal functioning of the financial system. We also discuss the variety of existing policies – micro- and macroprudential, fiscal and monetary – to address them. Additionally, we analyse their potential combinations and how they can be enhanced under the established governance frameworks. Finally, we review the experience of recent systemic events at the global level and provide descriptive evidence that illustrates how the different policies were used and combined in dealing with these systemic crises.

Keywords: policy effectiveness, systemic crises, policy space.

JEL classification: G01, G20, G28.

Resumen

En este trabajo se propone una taxonomía de los riesgos sistémicos relevantes para el crecimiento económico, con un énfasis especial en aquellos que afectan al funcionamiento normal del sistema financiero. También se estudia la variedad de políticas existentes para abordarlos: microprudenciales, macroprudenciales, fiscales y monetarias. Además, se analizan sus posibles combinaciones y las formas de mejorar su efectividad mediante las estructuras de gobernanza establecidas. Por último, se examina la experiencia de los últimos eventos sistémicos globales y se proporciona evidencia descriptiva que ilustra el uso de diferentes políticas y sus combinaciones para afrontar estas crisis sistémicas.

Palabras clave: efectividad de las políticas, crisis sistémicas, margen de actuación de las políticas.

Códigos JEL: G01, G20, G28.

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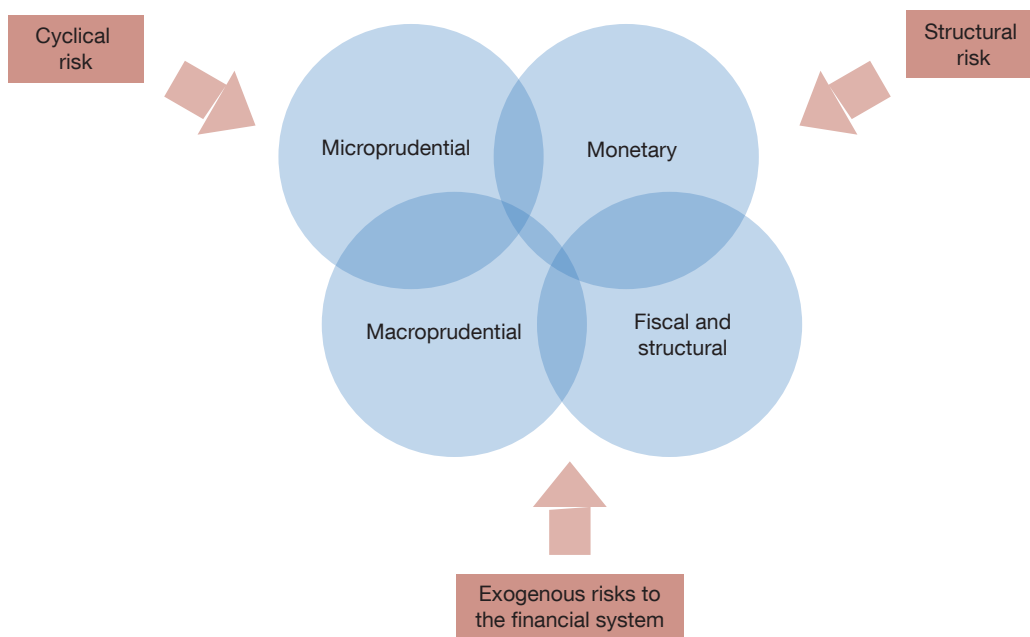
1 Introduction

Since 2008, there has been a concatenation of several systemic crises of European and global scopes. All these events have been qualified as systemic, as they have not only caused large disruptions in the financial sector, but they have adversely affected the whole economy and significantly reduced its growth. This has led, on the one hand, to the development of new policy instruments, and on the other, to a greater awareness of the need to fully understand the interaction between the different available policies (Cecchetti, 2018). In particular, the experience of the Global Financial Crisis (GFC), which began in 2008, was a key determinant in the development of macroprudential policy. This policy seeks to strengthen the financial system as a whole, as opposed to microprudential policy, which focuses on risks and resilience of individual institutions, markets and infrastructure. Subsequently, the sovereign crisis in the euro area and more recently the Covid-19 pandemic required the combination of monetary, prudential and fiscal measures, which were applied from March 2020 in the latter case, to maintain financial stability and mitigate the economic effects of the pandemic.

In turn, the lessons learnt from these crises also led to substantial improvements in terms of international governance, to strengthen the financial system as well as to improve coordination in the face of future systemic events. Thus, after the global financial crisis, the European System of Financial Supervision was established in Europe, which led then to the creation of the European Systemic Risk Board (ESRB). In terms of global financial governance, the Financial Stability Board (FSB) was also launched around this time. The sovereign crisis in the euro area also led to the establishment of the banking union, with common supervision and resolution in the euro area, although still without a complete crisis management framework, in particular lacking a common deposit insurance scheme (EDIS). Finally, at the national level, many countries have developed macroprudential authorities to coordinate the oversight of the financial system and macroprudential measures among sectoral supervisors.

Given this proliferation of measures and institutional developments of a diverse nature in the last 15 years, it is relevant to assess the completeness of the policy toolkit, by mapping the set of systemic risks with the potential to materially impair economic activity to the instruments that can avoid this damage. This risk mapping exercise is potentially useful to study the strengths and weaknesses of the policy toolkit, as well as to analyse the need for coordination between different policies, and even between different public institutions, depending on the governance of each tool, as well as between countries at the global level.

The literature has previously attempted to map systemic risk and its related vulnerabilities to different macroprudential tools (see, for example, CGFS, 2010, and ESRB, 2014). However, the aforementioned experience of the last crises shows that limiting this analysis to macroprudential policy offers a partial perspective, due to the importance of other policies, such as microprudential, fiscal or monetary policies, in the face of systemic vulnerabilities. In this sense, Estrada and Saurina (2016) analyse the case of Spain during the first 15 years of the euro-area monetary union, illustrating the importance of a good coordination between different policies.



SOURCE: Devised by authors.

It is therefore essential to take into account the interaction between these policies. In this sense, as Santos (2022) points out, although the Tinbergen' rule (Tinbergen, 1952) requires as many instruments as objectives, it does not establish that these have to be used independently or that they are fully orthogonal (see Schema 1). The existence of such commonalities across policies shows that adequate coordination between different policies is a key element for their successful application. In fact, it can be argued that the space for each policy to pursue its own primary goal is enlarged when the other policies are effectively carrying out their own tasks.

From the point of view of risk identification, some efforts have already been made to integrate the most relevant indicators for monitoring a broad set of risks for the financial system (see Banco de España, 2021; and Estrada et al., 2024). In this sense, the objective of the current work is to connect this type of risk identification exercise with the prudential, economic and fiscal policy instruments available to address them. Likewise, we will also analyse the historical evidence on the combined application of these instruments in a wide set of countries, to try to identify good practices in the coordinated application of different tools.

The rest of the paper is organised as follows. Section 2 proposes a taxonomy of risks to economic activity. Section 3 discusses the tools available to address these risks. Then, section 4 analyses the governance framework at the European Union (EU) level to coordinate different policies. Section 5 provides a deep dive in the experiences of combining policies during recent historical systemic crises and finally Section 6 concludes.

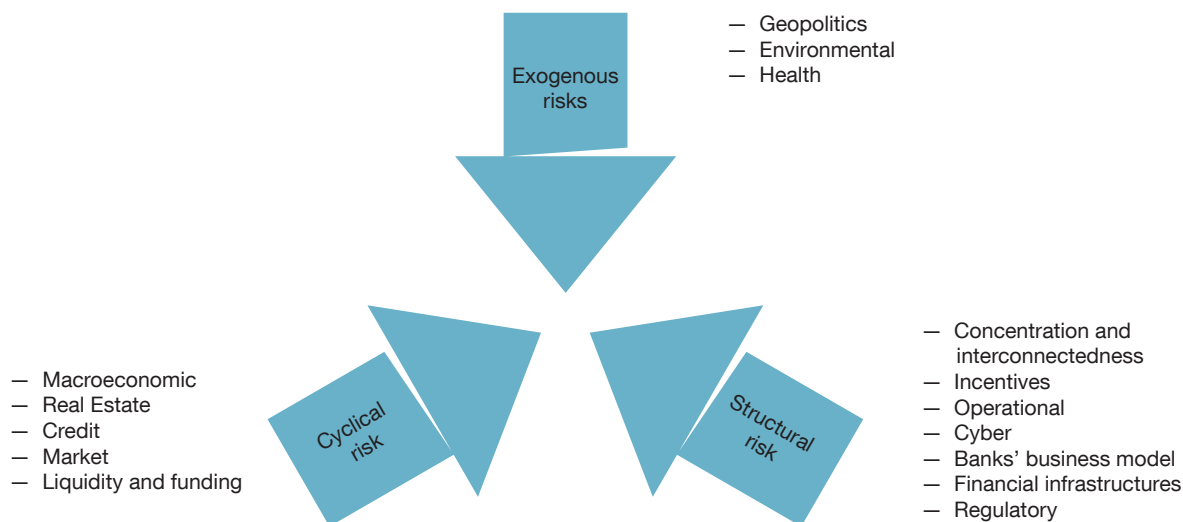
2 Overview of systemically relevant risks to economic activity

The objective of this paper is not to make an exhaustive and indiscriminate list of all possible risks for the financial system. This would be a difficult task to undertake, largely because many risks are unknown unknowns until they first materialize. Hence, we will follow a more pragmatic approach, mainly focused on the known risks of greater relevance to the real economy for which a malfunction of the financial system can amplify their impact. Within the financial system, we will pay particular attention to the banking sector, due to its preponderant role in the Spanish economy, something that also occurs to a large extent in Europe as a whole, and also given the fact that it is the main focus of the Banco de España as a supervisory authority.

Given the variety of existing systemic threats, it is appropriate to structure them into some broad categories to facilitate their classification and analysis. In particular, we propose to classify risks into three broad groups: cyclical, structural and exogenous (see Schema 2). Cyclical risks are directly related to variables that measure the evolution of the economic, credit and financial cycles, such as indicators of the speed of growth during booms or the intensity of the contraction during busts. In contrast, structural risks affect the economy beyond a specific cycle, although it can also affect economic cycles. For example, a more efficient legal framework may reduce the general volatility of business cycles (see e.g. Lucio and Mora-Sanguinetti, 2022). Furthermore, we differentiate cyclical and structural risks from exogenous ones because they are generated by the activity of the financial system itself. On the other hand, the additional category of risks exogenous to the financial system is composed of those risks that are likely to generate systemic disturbances on the financial system, but whose origin is external to it. This latter category covers several dimensions, such as geopolitical, environmental and health related risks. A detailed list of risks is shown in Annex I, which we describe more succinctly in Schema 2.

We define cyclical risks as those whose intensity fluctuates significantly over time, usually following a pattern, comparable to that of business cycles. A basic question is why we should be concerned about these oscillations. In this sense, there are multiple definitions of economic and financial cycles, but the most relevant aspect for our purposes is that the interactions between agents usually lead to economic fluctuations, and that these can be amplified according to existing perceptions about financial risks (Borio, 2012). Cyclical risks are composed of macroeconomic and financial risks, where financial risks are in turn composed of credit, market and liquidity risks, as well as any other threat on financial institutions.

Structural risks, on the other hand, by their very definition do not tend to co-move with financial cycles, although cyclical shocks can be amplified by the presence of structural risks. In fact, structural risks tend to be persistent and they would remain unchanged over time in a steady-state economy. However, this is not usually the situation of any economy, so these risks usually present some variation over time, but generally of much lower frequency and unrelated to the economic cycle. For example, the risk generated



SOURCE: Devised by authors.

by financial infrastructures has undergone notable changes over the last decade, largely due to the obligation to clear a set of derivatives operations through central counterparties (CCP). These changes have reduced the risk to the financial system from over-the-counter (OTC), or non-centralised, transactions, but in turn they have significantly increased the systemic importance of CCPs. However, these changes have been structural, in the sense that they have not been correlated with the evolution of GDP or other cyclical variables, even though they may improve long term growth if, as expected, clearing through CCPs improves financial stability. Therefore, structural variables may change over time, but these variations are not expected to fluctuate in line with financial cycles.

In addition to risks related to financial infrastructures, structural risks would also cover those due to the concentration of activity in certain sectors, financial institutions or companies, as well as to the network of interconnections between the components of the financial system. Weaker or more vulnerable financial infrastructures and networks may not trigger on their own a systemic shock, but they could act as contagion channels and amplifiers during a systemic shock.

Structural risks may also arise due to the existence of inappropriate incentives for the managers of financial institutions, especially the most systemic ones (for example, moral hazard problems and other inappropriate incentives for managers of institutions that are “too big to fail”), or due to the persistence of unsustainable business models in the financial sector. Additionally, we also include operational risks in this category, which would

consist of risks arising from legal uncertainty, reputational and misconduct risks and cyber risks. Finally, regulatory risks would also mostly fall into structural risks: possible adverse effects of regulatory uncertainty, and risk of regulatory arbitrage and adverse effects of new regulations.

3 Tools available to react to systemically relevant risks

Having described the list of potential threats to the financial system, it is useful to consider the available policy toolbox to address these risks. In this way, it could be possible to assess to what extent the available instruments adequately cover the risks, as well as, if not, to identify the need to introduce additional ones.

Starting with cyclical risks, a first approximation indicates that monetary and microprudential policies can have a significant effect on them (see Schema 3a as an illustration). In the case of monetary policy, although its main objective is price stability, not to directly address any of these risks, it is clear that it has effects on all of them. According to Jeremy Stein's well-known statement, "*monetary policy gets in all the cracks*". An additional interesting element of monetary policy is a relatively faster speed of implementation and transmission, compared to other policies, although it can vary depending on different factors.¹ At the same time, though, monetary policy is a blunt tool to deal with systemic risk (Bernanke, 2011), so it is very difficult to tailor this policy for a targeted intervention in a specific dimension of systemic risk.

In contrast, fiscal policy can have a very significant impact macroeconomic risks, but more limited effects on the other cyclical risks. Intuitively, fiscal policy can shift public spending from upturns to downturns, thus reducing the volatility of economic cycles.

Microprudential policies accumulate notable historical experience in the treatment of credit and market risks at the individual bank level, whose prudent management is a pre-condition for the stability of the financial system as a whole. It should be noted, however, that microprudential liquidity requirements are relatively recent. Also, by its own design, microprudential policy does not deal with the externalities that the individual actions of banks impose on the whole financial system.

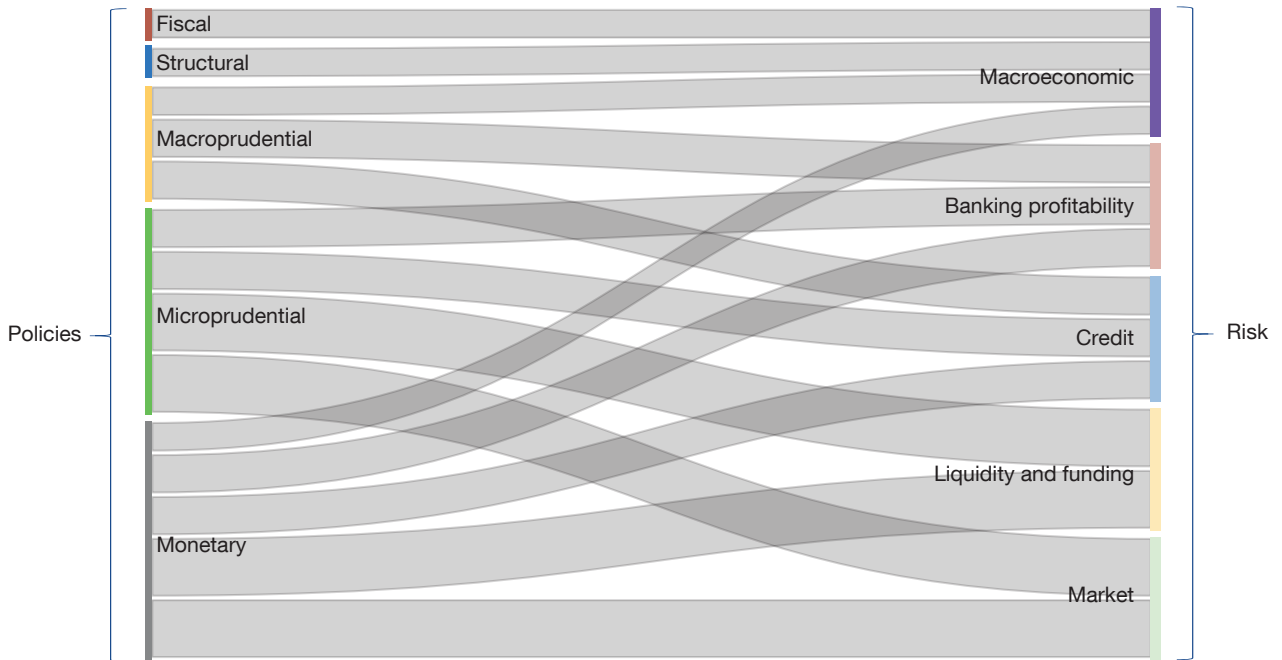
The case of macroprudential policy is different, as it was explicitly created to address systemic risk, rather than producing collateral effects on them, as in the case of monetary policy. However, macroprudential policy is still relatively new and it has been so far applied with a narrow scope. This explains why we interpret in Schema 3a that macroprudential policy today mainly affects credit and macroeconomic risks, although it can also indirectly have an impact on banking profitability. However, we consider its impact on market risks more limited, given that the scope of this policy is currently limited for non-bank financial intermediaries.

Some qualifications can be made on the limited scope of macroprudential policy. First, the fact that macroprudential policy has currently a direct impact on fewer risks does not reduce its importance. Indeed, the experience of the GFC showed the insufficiency of existing policies at the time, and in particular microprudential policy. For example, as already

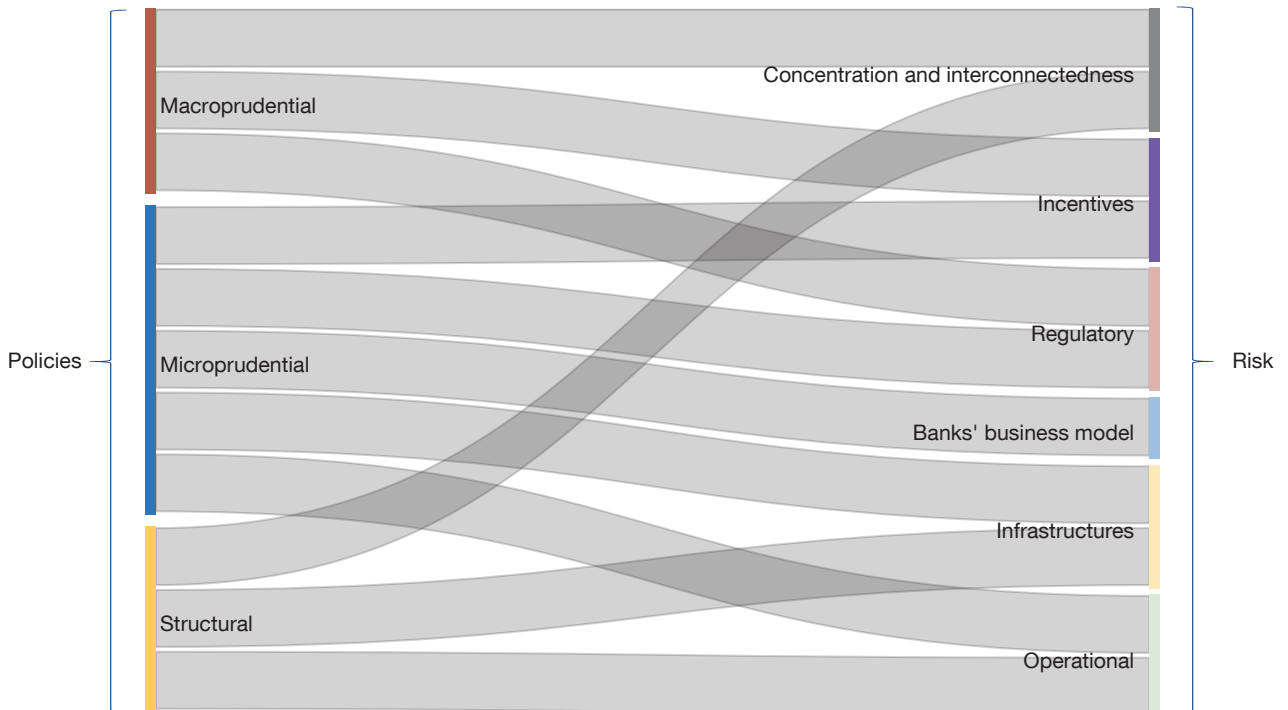
¹ For instance, the transmission of a given a monetary policy measure may be slower for a better capitalised banking system.

Sankey diagram of the linkages between policies and risks

3.a Cyclical risks



3.b Structural risks



SOURCE: Devised by authors.

mentioned, microprudential policy is aimed at adequately managing the credit risk of specific institutions, but it is not designed to limit the build-up systemic credit vulnerabilities, which go beyond a limited set of institutions. Second, the scope of macroprudential policy could be substantially expanded in the coming years. Specifically, so far macroprudential policy has been developed primarily on the banking sector, but there is a growing consensus on the possibility of extending its scope to other financial subsectors (ESRB, 2016). This reform could ensure that the same financial activity is treated prudentially in a more homogeneous manner, regardless of which financial institution carries it out. Likewise, the possibility of introducing macroprudential elements on liquidity requirements is also on the agenda.

Schema 3a may show at first sight a relatively optimistic assessment of the policy toolkit, given that there are tools available to address all the risks identified. Unfortunately, if we take a closer look at these risks, some elements are not so well covered. For example, given that macroprudential policy instruments are currently not available on some segments of the non-bank financial sector, this policy may turn out to be ineffective to mitigate market risks. This situation could pose problems if a disturbance such as that which led to significant and simultaneous withdrawals from investment funds in March 2020 were to occur, which in turn led to adverse effects on the prices of various financial assets. In that context, the burden of stabilization efforts fell on monetary policy, which could face more restrictions to act in this role in other types of scenarios.

In this vein, although relaxation of monetary policy can have positive effects, in particular in the short-term, on a broad set of risks, it should not be assumed that the measures taken by the monetary authorities will always be optimal for the correction of these risks, given that their main objective is price stability. In addition, due to its already mentioned blunt and wide-ranging effects, monetary policy may be ill-suited when risks are circumscribed to one particular dimension from Schema 3a, as it will affect all other dimensions at the same time.

With regard to structural risks, these are currently addressed primarily through micro- and macroprudential policies (see Schema 3.b as an illustration). Microprudential policy is responsible for addressing a broad set of bank structural risks, in particular those related to business models and operational risk. However, macroprudential policy plays a key role in covering some risks for which microprudential policy is not suitable. In particular, the development of capital buffer requirements on global and domestic systemically important institutions addresses concentration and interconnection risks, as well as possible misaligned incentives on the part of the managers of systemic institutions.

Finally, exogenous risks can be the most difficult to deal with, due to the difficulty in predicting their occurrence and intensity, limiting the ability to set-up ex-ante policies. The outbreak of the Covid-19 pandemic and the start of the Russian invasion of Ukraine provide recent dramatic examples of the potential high impact of these events. National policies are usually only partially effective in this case: they can be useful to enhance the loss-absorption capacity of the domestic economy and, when a systemic shock occurs, mitigate its effects

on the domestic economy and financial system. In any case, domestic policies cannot easily address the source of the shock when it is external to the domestic economy. For this reason, international coordination of measures can be essential when facing common global shocks, as those observed since 2019, related to the global health crisis and heightened geopolitical tensions.

4 Governance and coordination of economic policies

The governance of the different stabilization policies is a particularly relevant aspect, which affects their effectiveness. The risk oversight framework and the decision-making process have a direct impact on the capacity to timely identify risks and adopt the most appropriate measures with the needed speed. Within the European Union, the existing arrangements are highly dependent on the specific policy.

On one side, monetary policy is set by a single authority, the ECB, in the euro-area. Even if national central bank governors are voting members of its governing council, clearly this policy is driven by the goal of controlling inflation in the whole euro-area, and not by national domestic developments unless they affect the common inflation 2 % target.

At the other extreme, fiscal policy is still a fundamentally national policy. The EU budget only represents about 2% of EU public expenditure, according to the European Commission. In fact, despite the increased common spending generated by the Next Generation EU funds, the main source of revenues of the European Commission are still national contributions². Hence, national authorities define their fiscal policies with relative flexibility. However, this flexibility is limited in the European Union by the existence of common fiscal rules. In fact, a new fiscal governance framework that enter into force in 2025 will place a greater emphasis on public debt sustainability and the preparation of medium-term budgetary plans. In particular, these plans imply that high-debt, Member States would need to adjust their budgets, so that public debt levels measured as a ratio over GDP, follow a permanent downward path towards the 60% threshold, and budget deficits decrease below 3% of GDP over the medium term.³ This context could significantly limit the fiscal space of some national authorities, and, therefore, the capacity of fiscal policy to absorb systemic shocks in the coming years.

Structural policies can be developed at both the national and European levels. However, these policies generally require a broad political consensus, as they involve changes with effects that go beyond a specific four-year legislative period. Unfortunately, the increasing polarisation and fragmentation of the political space in Europe has limited the scope to engage in structural reforms over the last years. In this sense, it is worth praising the significant set of legislative packages that have been approved at the EU level to foster a series of structural goals, such as reducing dependence on fossil fuels, and encouraging the green and digital transitions, among others⁴.

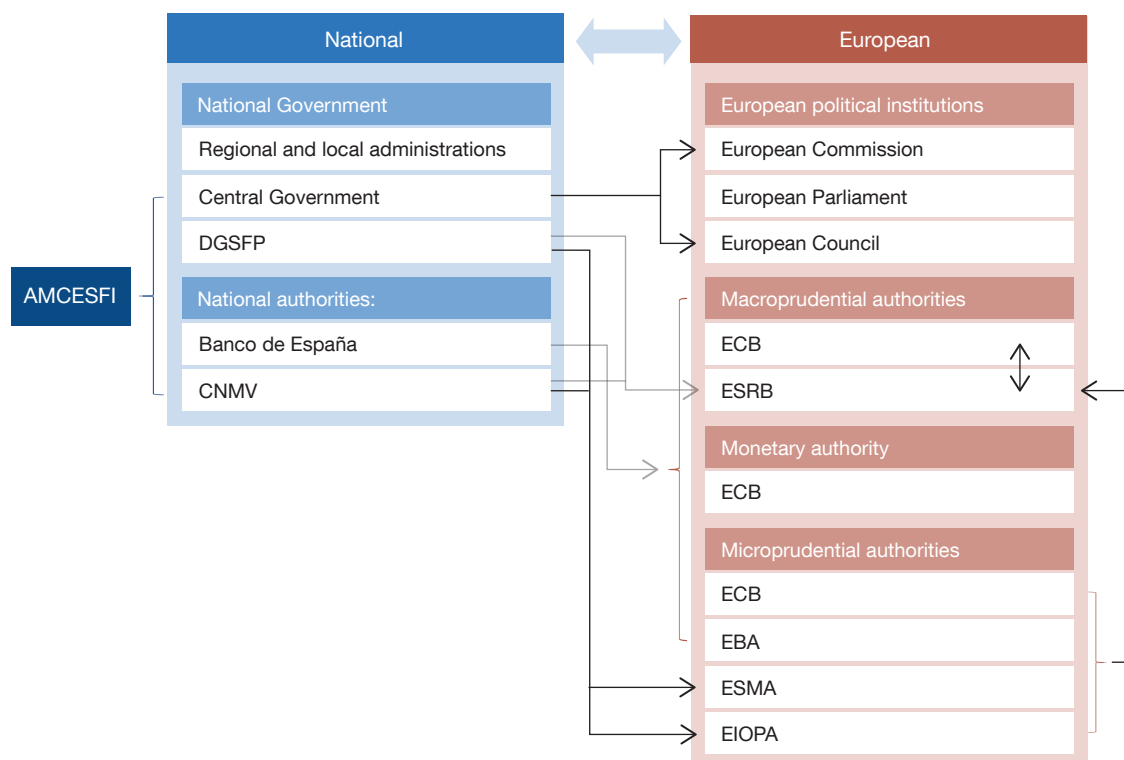
The governance of prudential policies (both micro and macroprudential) is currently at an intermediate situation. It is not fully homogenised, as monetary policy in the euro-area, but at the same time its coordination through European institutions is stronger than in the

² EU budget in the future: questions and challenges.

³ For more details, see Banco de España (2024).

⁴ Operationalised through different initiatives: Next Generation EU, RePowerEU, fit-55-package etc.

Governance. Interaction of the Spanish authorities with the European institutions



SOURCE: Source: Devised by authors.

NOTE: DGSFP stands for “Dirección General de Seguros y Fondos de Pensiones”, which is the insurance and pension funds supervisor in Spain. CNMV stands for “Comisión Nacional del Mercado de Valores”, the supervisor of the securities markets in Spain.

case of fiscal policy. Their frameworks are conditioned by the need to coordinate the activity of the different national authorities with that of the European ones (see Schema 4). Within the euro-area, the banking union ensures a common treatment with regard to microprudential policy, and with regard to key areas of macroprudential policy the ECB has the possibility to disagree with national decisions and adopt a tougher decision (what is known as “top-up”). These additional layers of common oversight can significantly reduce the risk of inaction bias. This coordination undoubtedly poses challenges due to the multiplicity of existing institutions, which must be informed, and in some cases may even object to a given measure proposed by another institution.⁵ However, these drawbacks are more than offset by other advantages in the European framework. Specifically, jointly monitoring and comparing financial stability risks across all member states helps to more clearly identify risky situations in a particular country, or to identify common unsustainable developments across the whole or parts of the EU.

⁵ In particular, the macroprudential instruments in the Capital Requirements Directive (CRD) and the Capital Requirements Regulation (CRR) are all subject to top-up powers by the ECB for countries within the Banking Union. Additionally, for all EU member states, some of these instruments need to be consulted to the European Commission before their application, a process that in turns also requires opinions by the European Systemic Risk Board and the European Banking Authority. In contrast, the instruments developed under the national legislation, as borrower-based instruments, only involve a formal authorisation/consultation process at the national level.

5 International experience on the use of policy tools in the face of systemic events

As discussed, at a given point in time, a negative systemic shock could trigger the materialization of previously accumulated imbalances leading to major disruptions in financial intermediation. These disruptions then rapidly spread across the financial system and ultimately hit the real economy causing sharp economic downturns and damaging the welfare of economic agents. Over the last two decades there have been two major global systemic events: the Global Financial Crisis (2007-2009), directly followed by a connected episode of sovereign crisis in the euro-area (2009-2012), and the COVID-19 pandemic (2020-2023).

The unprecedented circumstances faced during these two events presented fundamental challenges to the policymakers and put at trial the existing policy toolkits. This section reviews the historical evidence on large-scale policy instruments applied to mitigate the effects of these systemic events, in order to gain a better understanding of their application, interaction and effectiveness. The focus is to examine the role of key fiscal, monetary and prudential policies and their combined effects in supporting the economies on the path to recovery.

Another relevant example of a systemic event that is worth mentioning before delving deeper into more recent examples is the Nordic crisis. That is, the simultaneous occurrence of a banking and a currency crisis that took place in the late 1980s - early 1990s in Norway, Sweden and Finland. Although this crisis was more local, it illustrates how imbalances between different types of policies could amplify and propagate systemic events.

The emergence of the Nordic crisis had its roots in the process of financial liberalization that led to a massive capital inflow, uncontrolled credit expansion and real estate boom, that ultimately turn out into a bust (Drees and Pazarbasioglu, 1998).⁶ Several factors contributed to the amplification of the crisis. On one hand, the weak prudential framework and insufficient supervision standards were not able to ensure banks' resilience (Honkapohja, 2014).⁷ On the other hand, the pre-existing structural vulnerabilities and inadequate internal risk management contributed to the propagation of the crisis throughout the financial system. Finally, at the macro-level, procyclical monetary policy during and after financial deregulation contributed to a conflict between internal and external stability.⁸

The available evidence suggests that the loss absorption capacity of banks in Nordic countries would have been stronger if the prudential requirements had been

6 This bust was characterised by capital outflows, widespread bankruptcies, falling employment, declining investments, negative GDP growth, systemic banking crises and currency crises (Jonung (2010)).

7 The prevailing banking law from 1969 was focused on solely legalistic monitoring of banks. The rules and practices in prudential regulation and bank supervision were left unchanged in the financial liberalization process. Only later in 1991 when the depression had already begun these were tightened.

8 The process of liberalization was implemented while the exchange rates remained fixed. The follow-up bust forced the central banks of Finland, Norway and Sweden to move to flexible rates in the fall of 1992 in order to avert the depression (Jonung (2010)).

stricter before the deregulation process, like in the case of Denmark (Honkapohja, 2014). In particular, monetary policy would have had more room to manoeuvre, and would have faced fewer constraints from financial stability considerations to deal with the impact from the crisis.

5.1 The Global Financial Crisis (GFC)

Between late 2007 and 2009 the global economy experienced the most significant downturn since the Great Depression of the 1930s. The evolution of the GFC has been widely discussed in the literature (see e.g. Estrada and Saurina (2016); Ramskogler, 2015; and Riet, 2010). After the subprime crisis⁹ that started between mid-2007 and 2008 in the U.S., the EU and OECD countries experienced systemic events characterized by a materialization of a number of cyclical risks: significant asset price corrections, including that of real estate, that triggered credit and liquidity risks including significant bank runs, drastic increases of non-performing loans and bank liquidations. These events led to the deterioration of the macroeconomic environment, credit supply and public finances, and the emergence of sovereign risk (Beirne and Fratzscher, 2013), which ultimately affected the stability of the financial system.

The response to the GFC was multifaceted and encompassed a variety of policy actions in an effort to support the financial system, but also to alleviate the impact on the real economy. The speed and intensity of these policies varied substantially across countries and monetary areas. We discuss mostly policy interventions involving the financial sector. These could be broadly grouped into fiscal and monetary measures (Riet, 2010, Taylor, 2014, Ramey, 2019)¹⁰.

The fiscal measures include significant government guarantees on bank liabilities and liquidity support by national treasuries (Laeven and Valencia, 2020).¹¹

The monetary interventions were not limited to conventional ones; such as changes in the interest rates. Specifically, along the course of the GFC, when the potential of these measures was exhausted, the major central banks opted for some unconventional monetary

9 This crisis refers to the collapse of the subprime residential mortgage market in the United States. It was a consequence of the expansion of mortgages to high-risk borrowers that started in 2002, coupled with rising in house prices. This led to increases in debt and a creation of a leverage cycle (Dell'Ariccia, Igan and Laeven, 2012). The subsequent mortgage defaults led to losses at U.S. subprime loan originators and spread to the rest of the world through exposure to U.S. real estate assets, in particular via institutions holding derivatives of securitized subprime mortgages. This contributed to a period of turmoil in financial markets that led to severe contraction of liquidity in global financial markets (Federal Reserve Bank of St. Louis).

10 The macroprudential policy did not exist at the time, at least not the toolkit that we identify as the core of macroprudential policy today.

11 A significant government guarantee on bank liabilities includes significant financial sector commitments relative to the size of the corresponding economies. In particular, either a full protection of liabilities has been issued by the government or government guarantees have been extended to non-deposit liabilities of banks. Actions that only raise the level of deposit insurance coverage are not included. The liquidity support includes central bank claims on other depository institutions and liquidity support directly provided by the national treasuries. It also captures the impact of currency swap lines among central banks, agreed during the global financial crisis, to the extent that they were used to inject liquidity in the financial sector. Asset purchases are considered as a part of monetary policy, and therefore are not considered in this category. For more details, see Laeven and Valencia (2020).

policies, such as quantitative easing (QE).¹² However, there were significant differences in the pace and sizes of these extraordinary monetary measures across countries that complicates their formal comparison.¹³

We consider a sample of 41 countries that include all the OECD and the EU member states.¹⁴ On Chart 1 we plot the number of countries that adopted these measures between 2007:Q3 and 2008:Q4.¹⁵ By the end of 2007 only two countries had entered the acute stage of the crisis, but no fiscal measures were taken yet. By mid-2008, 19 countries were experiencing the crisis and employed stabilization policies and, by the end-2008, all of them had adopted at least one of the fiscal measures mentioned above.¹⁶ Notably, these comprehensive support packages were largely expansionary, so that, together with increased unemployment and tax revenue losses, have resulted in sharp increases in budget deficits (Bozio et al., 2015). In addition, fiscal consolidation, which aimed at restoring the financial sustainability of public finances, was implemented very early, in particular in the EU, in the context of a distressed banking system, subdued credit activity and still fragile economic growth.¹⁷

In regard to the monetary policy response, the speed of rate change varied across the affected countries. In the US, as economic conditions began to deteriorate starting in late 2007, the US Federal Reserve (Fed) steadily reduced interest rates over the course of the following year. Then, following the bankruptcy of Lehman Brothers in September 2008 and the subsequent financial meltdown, the interest rates were cut to ultra-low levels that ended up persisting over the course of the following decade. In contrast, the European Central Bank continued to raise interest rates at the start of the financial crisis in 2007

12 The quantitative easing refers to large-scale purchases by central banks of large-maturity assets from the market, such as government bonds or mortgage-backed securities, in order to reduce their yields, to restore market confidence and financial stability. This is expected to boost economic activity by injecting additional liquidity, and bring inflation back to target. Following the experience of the Bank of Japan in 2001, the Federal Reserve and the Bank of England started with the asset purchase programmes in November 2008 and March 2009 respectively. The ECB did not embark on quantitative easing formally until March 2015, but effectively was engaged in purchasing assets via its Covered Bond Purchase program (CBPP) and its Securities Markets Programme (SMP) introduced in June 2009 and May 2010 respectively, as discussed in Ashworth (2016). The Swiss National Bank and the Sveriges Riksbank also introduced QE in 2013 and 2015 respectively.

13 The main aim of the Federal Reserve (Fed) and the Bank of England (BoE) interventions was expanding overall liquidity in the system, while that of the ECB was to support an improvement in functioning in some asset markets (Giannone et al. (2012)). The size of these operations was also relatively small compared with that of the ECB's balance sheet. In addition, the Fed and the BoE were able to undertake QE relatively quickly because of the availability of a single riskless asset (e.g. sovereign bonds), while the existence of 17 sovereign bond markets in the Eurozone was an important institutional barrier (Ashworth (2016)). These disparities across the main participants complicate the formal comparison of QE across countries.

14 Please see the Appendix II for the complete list of countries by measure type. The GDP data for Greece was not available prior to 2015 in this data source.

15 We use Laeven and Valencia (2020, 2013) Systemic Banking Crisis Database for the identification of banking crisis. For several Eurozone members states the GFC culminated with the emergence of sovereign debt crisis, therefore we consider the time horizon up to end of 2008 in order to minimize the overlap.

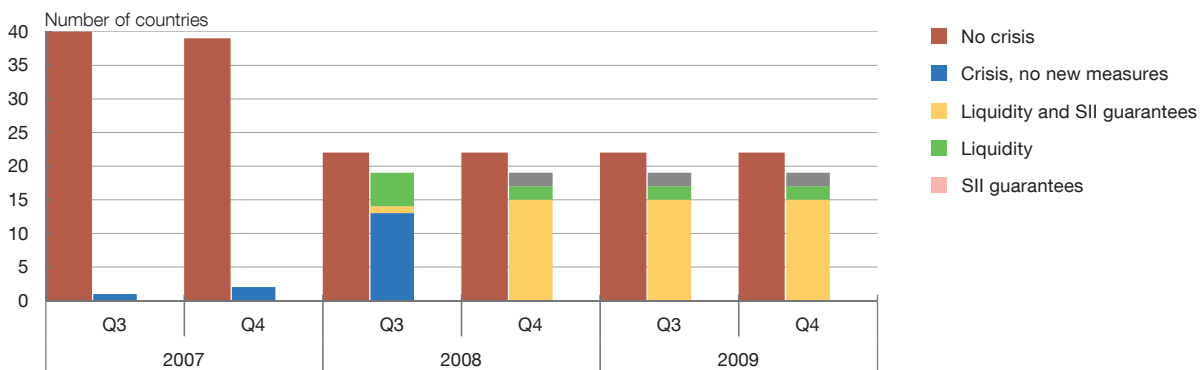
16 Two countries adopted only liquidity measures, another two countries only significant bank guarantees, and 15 countries adopted both.

17 When comparing with the pandemic, it is important to emphasise that the GFC was endogenous and preceded by multiple financial imbalances (Nier and Merrouche. (2010)), while the pandemic was purely exogenous shock unrelated to credit developments and affecting economies in a much more balanced situation. The support measures in both cases were different and not comparable neither in design nor in duration.

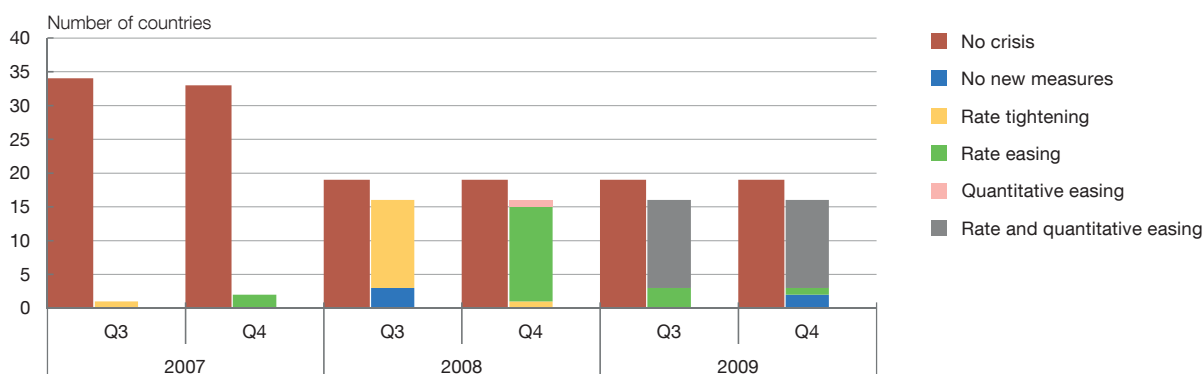
Chart 1

Fiscal and monetary measures adopted during the GFC

1.a Fiscal measures



1.b Monetary measures



SOURCES: Laeven and Valencia (2020), Datastream and own elaborations.

a The chart on fiscal measures displays cumulative measures adopted, while the chart on monetary measures summarises policy changes introduced in each quarter.

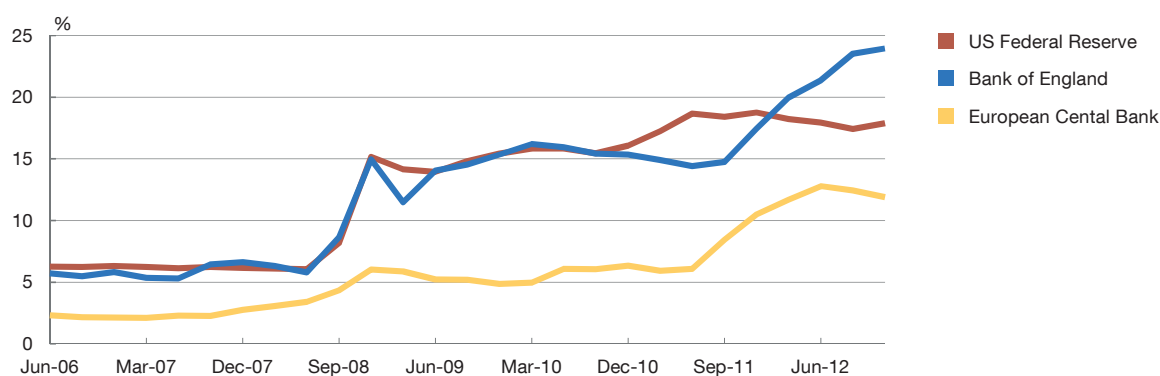
and only began to seriously cut rates in November 2008¹⁸. The Bank of England (BoE) also significantly reduced their rates at the end of 2008.

Having used up most of their room for rate easing, the Fed and BoE engaged into quantitative easing by the end of 2008 and the beginning of 2009 respectively. The ECB started to partially adopt QE by mid-2009, however the main advances were not made until the instalment of the sovereign debt crisis and the “whatever it takes” expansionary

¹⁸ With the Sovereign debt crisis at their doorstep, in 2011 the ECB actually raised interest rates twice, before quickly reversing course and then lowering their rates again later that year. In 2012, the ECB deposit rate was reduced to 0.00%. In June 2014 the ECB then became the first major central bank to introduce negative interest rates in 2014, and they have stayed negative up to mid-2022. Other major central banks also moved into negative rates territory along 2014-2016: The Danmarks Nationalbank (DN) on 5 September 2014, the Swiss National Bank (SNB) on 18 December 2015, Sveriges Riksbank on 18 February 2016, and Bank of Japan (BoJ) on 29 January 2016 (Bech and Malkhozov (2016)).

Chart 2

Central bank balance sheets, % of GDP



SOURCES: ECB Statistical Data Warehouse, Bank of England, Federal Reserve data and own elaborations.

monetary policy announcement.¹⁹ This is reflected on Chart 2 where we compare the size of three major central banks' balance sheets during this period.

The role of these measures in supporting the real economy in countries affected by the GFC is illustrated on chart 3. We plot the biannual GDP growth between 2007 and 2009 for different combinations of these policies. On chart 3, panel 1 we group countries according to the fiscal policies they adopted: i) liquidity and significant bank guarantee measures; ii) only significant bank guarantees; iii) only liquidity measures, and iv) not yet adopted fiscal measures. The size of the bubble corresponds to the number of countries in each group.

Since the onset of the crisis, the average growth was rapidly declining in the countries directly affected by it. From 2008:Q3, several authorities started implementing fiscal support measures that helped to recover the aggregate growth within a year. However, there were differences across countries depending on the type of the policy in place. It appears that on average the countries that resorted only on liquidity support measures were able to restore output growth faster than those that applied other combinations of fiscal policies. However, it should be noted that this observation is likely to be endogenous, as the severity of the crisis experienced in each country also affected the type and the number of policies implemented. A more severe crisis in a given country is associated both to a more negative effect on GDP growth and higher need for a broader set of measures.²⁰

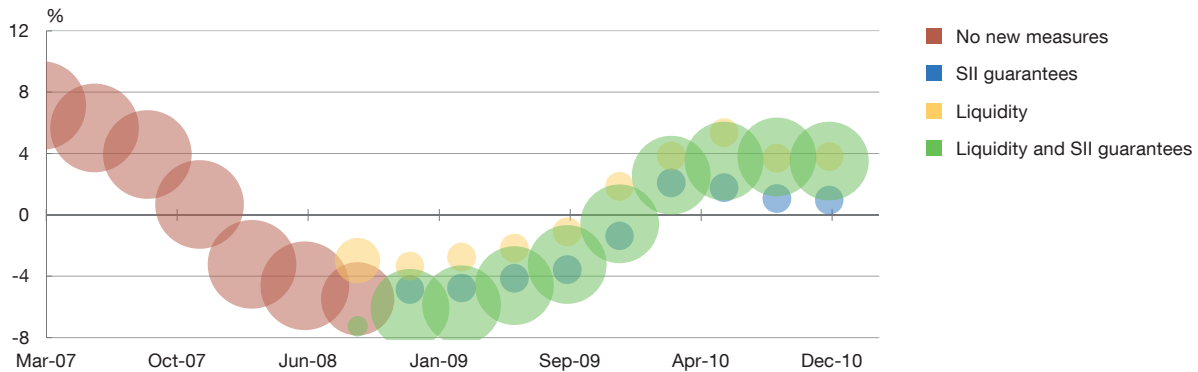
¹⁹ On July 26, 2012, the ECB president Mario Draghi delivered a speech where he expressed a strong commitment to provide unlimited support to financial institutions, markets and countries in the euro area. It was aimed to send a signal to financial markets and the private sector that the ECB was determined to do whatever it takes to fuel a sustainable economic recovery. In particular, the ECB announced the outright monetary transactions programme (OMT) tool that is today widely considered to have marked the turnaround of the euro crisis.

²⁰ In particular, a presumably higher biannual GDP growth in the countries that adopted liquidity measures only compared to those that adopted liquidity and significant bank guarantees could be a result of a less severe crisis and therefore lower amount of measures required to tackle it.

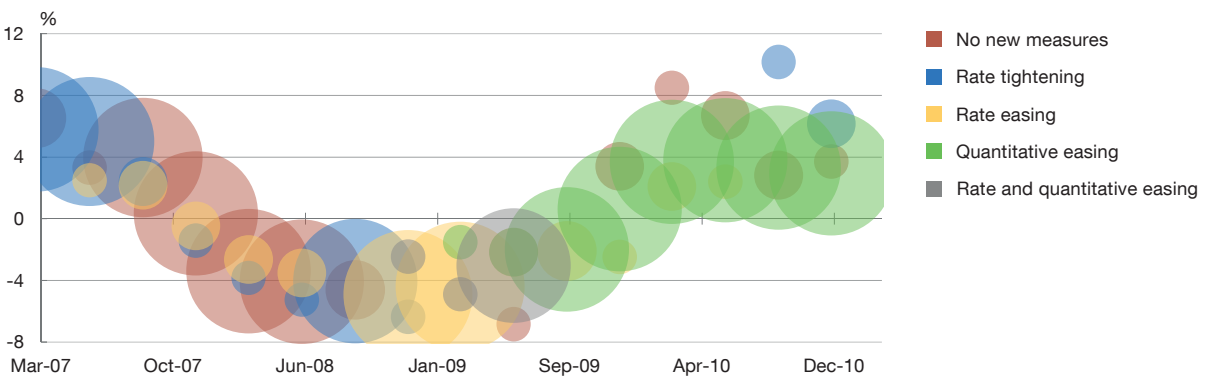
Chart 3

Impact of fiscal and monetary measures on real GDP growth during the GFC

3.a Fiscal measures



3.b Monetary measures



SOURCE: Laeven and Valencia (2020), Datastream and own elaborations.

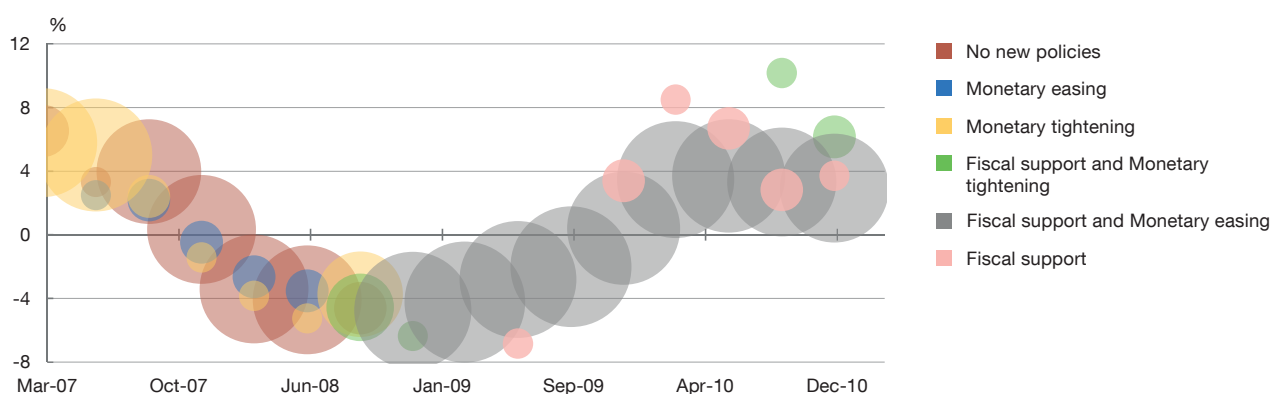
NOTE: The Y-axis labels reflect the average biannual GDP growth for the corresponding group of countries. The X-axis labels refer to the time period. The size of the bubbles corresponds to the number of countries that adopted each measure. The flow of new monetary measures and cumulative fiscal measures are considered at each date.

In Chart 3, panel 2 we group countries according to monetary policy measures they introduced in response to the GFC in each given quarter: i) rate tightening; ii) rate easing; iii) quantitative easing; iv) rate and quantitative easing, and v) no change in monetary policy. Unlike fiscal policy, that operated as a one-off in different countries, the monetary policy response varied from quarter to quarter. The timing of the start of the crisis was crucial: the US was the first country to focus on easing monetary policy, followed by the UK and EU, but not until the 2008:Q3. The data suggests that the course towards a more expansionary monetary policy that aimed to stimulate the declining GDP was ultimately successful.

Finally, on Chart 4 we analyse the combined impact of both types of policies, and it appears that the coordination of fiscal support and accommodative monetary stimulus helped to support a solid rebound in the global output by 2010. As already mentioned, the decision of combining different policies was clearly endogenous to the situation of each country, as it was very likely that those countries experiencing the most severe crises were more impelled to combine different policies.

Chart 4

Impact of combinations of policy measures on real GDP growth during the GFC



SOURCE: Laeven and Valencia (2020), Datastream and own elaborations.

NOTE: The Y-axis labels reflect the average biannual GDP growth for the corresponding group of countries. The X-axis labels refer to the time period. The size of the bubbles corresponds to the number of countries that adopted each measure. The flow of new monetary measures and cumulative fiscal measures are considered at each date.

A key element to regain market confidence and restore financial stability was a stress test – public credible assessment of banks’ need for recapitalisation –. This test was initially performed by the Fed for the US banks in spring 2009 and became one of the critical turning points in the financial crisis. The EU-wide stress test, first performed by the Committee of European Banking Supervisors (CEBS), was set as a regular microprudential tool to assess the resilience of the banking sector, coordinated by the European Banking Authority (the successor of the CEBS) with the close involvement of the national supervisors and the ECB. However, as subsequently emphasised, stress-testing itself could be insufficient, unless they are followed up with appropriate action (IMF, 2011a). In particular, there was a call for recapitalization of European banks and considerable restrictions on their dividends, deleveraging, and capital instruments. The window of opportunity following the GFC also prompted to a creation of a more formal macroprudential policy framework across the globe. Prior to this systemic crisis, however, different advanced economies had a range of macroprudential tools at their disposal. In particular, credit-related measures, such as caps on the loan-to-value (LTV) ratio, caps on the debt-to-income (DTI) ratio, caps on foreign currency lending and ceilings on credit or credit growth.²¹ These measures aimed at limiting risky exposures of financial institutions to the household and corporate sectors. However, the design and calibration of these instruments was based on discretion and judgment principles, as opposed to rules (IMF 2011b), that were revised in the aftermath of the GFC.

Another set of tools are capital-related measures that, among others, include the leverage ratio and dynamic provisioning²². Caps on leverage were imposed in the US (1991, 2004), Canada (1991) and Switzerland (2008), and, while primarily intended to

²¹ Please see IMF (2011) Appendix 7 for a complete list of countries and measures adopted prior to the GFC.

²² Dynamic provisioning is not a direct capital measure, but it affects the solvency of banks over the cycle, as it regulates accumulation and release of provisions, in turn affecting the amount of profits available for distribution or retention.

limit risk at individual banks, also helped to prevent the build-up of excessive risk-taking in aggregate terms. The dynamic loan loss provisioning, as used in Spain (2000, 2004), regulated how the amount of provisioning varied with the economic cycle (Jiménez and Saurina, 2006). The aim of this tool is to smooth provisions through the business cycle, so that buffers are created during the expansion, and provisions will not need to be increased as much in downturns. This was accomplished by dynamically changing the percent of provisions that could be claimed during the business cycle every quarter. This concept is similar to that underlying how countercyclical capital buffer (CCyB) operates (Jimenez et al. 2017).

5.2 The euro-area sovereign debt crisis

Despite the great variety of policy responses adopted to tame the GFC, a new spiral of instability appeared in the euro area between late 2009 and mid-2012. The combined impact of domestic recessions and banking-sector distress in several member states (Southern countries and Ireland) triggered a major reassessment among investors of the sustainability of public deficits in these countries, as they had become much larger after the GFC. In countries with the greatest reliance on international short-term funding, such as Ireland, the crisis dried up cross-border financial flows, triggering a severe banking crisis that forced the government to support and bailout banks (Lane 2012). In other cases, such as Greece, the scale of the recession caused a surge in public deficit, that had almost immediate effects on the country-specific fiscal risks (Mody and Sandri 2012).²³

These adverse developments were reflected in the widening of sovereign bonds spreads and fuelled the sovereign debt crisis in the euro area. Consequently, Greece was the first severely impacted country requiring a bail-out in May 2010, followed by Ireland in November 2010 and Portugal in April 2011. By June 2012, concerns over the sustainability of public imbalances had also arisen in Cyprus, Italy and Spain. In fact, Spain was finally granted a financial support package to conduct a recapitalisation of a part of the banking system.

Finally, from the monetary policy side, the situation was significantly improved after Mario Draghi, the ECB president at that time, vowed in July 2012 to do “whatever it takes” to save the euro.²⁴ This was shortly followed by the introduction of an ECB outright monetary transactions programme (OMT), by which the ECB started to buy euro-area sovereign debt in the secondary market, immediately diminishing the turbulences in this market.

This crisis demonstrated the acute need for the fiscal policy coordination, as well as harmonization of banking supervision practices across the member states. As earlier with the GFC, the combination of fiscal, monetary and prudential policies served to this purpose.

²³ Notably, there was an important increase and persistence of macroeconomic, financial, and fiscal vulnerabilities in Greece prior to the GFC. The key elements were domestic credit boom and current account imbalances. In particular, a very large external deficit, and an elevated and underreported public debt, that made it vulnerable to large and sudden capital flow reversals that lead to output contractions, rising unemployment, and asset price declines.

²⁴ The [speech](#) was delivered at the Global Investment Conference in London.

Firstly, in order to reduce macroeconomic imbalances, a range of structural reforms were performed. In particular, unsustainable fiscal and labour market policies were reversed with the introduction of Macroeconomic Imbalances Procedure, which provided a more favourable institutional context.²⁵ Secondly, the Single Supervisory Mechanism (SSM), along with and the Single Resolution Mechanism (SRM), two of the pillars of the Banking Union, were established precisely to break the link between sovereigns and banks and to mitigate the effects of banking crises on home countries. Thirdly, all monetary policy instruments – unprecedentedly low policy rates, covered bond purchase programme, long-term refinancing operations (LTROs) and outright monetary transactions (OMTs) – were fully deployed. Finally, a sovereign crisis management system – European Stability Mechanism (ESM) – was established to provide conditional financial assistance and to safeguard financial stability for euro area countries.²⁶ These measures have made the European Monetary Union more robust and greatly reduced the risk of a new build-up of a sovereign over-indebtedness. Moreover, although it took some time to reach a consensus at the European level to implement the politically more sensitive measures, the experience from this period was very useful to react much more quickly in the next crisis, caused by the COVID-19 pandemic.

5.3 The COVID-19 pandemic

After the GFC, global financial and banking systems were strengthened by the financial reforms and updated standards introduced in order to withstand the next potential financial downturn (BCBS, 2011).²⁷ This included the introduction of a macroprudential toolkit, albeit mainly limited in scope to the banking sector. However, the period of economic expansion ended unexpectedly in early 2020 with the outbreak of the COVID-19 pandemic. Unlike the GFC, where the global recession was caused by endogenous problems within financial systems and markets, the COVID-19 outbreak was an exogenous shock that resulted in an unprecedented global public health crisis. It began in December 2019, and by March 2020 the World Health Organization declared it to be a pandemic. As cases of COVID-19 were surging and propagating all over the world, the authorities started implementing widespread containment measures aiming to restrain the spread of the virus, prevent healthcare systems from collapse, and minimize the number of COVID-19 cases and deaths.

²⁵ In particular, the Six Pack (2011) amended the Stability and Growth Pact (SGP) by reinforcing sanctions and introduced new rules. The Fiscal Compact (2012) have strengthened national budgetary processes by implementing the balanced budget rule in respective national legislation. Finally, the Two Pack (2013) put in place a surveillance mechanism and conferred on the European Commission the capacity to issue an opinion on the draft budgetary plans prior to their parliamentary approval.

²⁶ Participation in the ESM is a fundamental requirement to access the OMTs. Under OMTs, the ECB can purchase a potentially unlimited amount of sovereign bonds on the secondary market of the country under the stress. For more details, see Box 2 in Alloza et al. (2021).

²⁷ Basel III regulatory framework (BCBS, 2011) encompasses a set of reforms that address a number of shortcomings in the pre-crisis regulatory framework and provides a foundation for a resilient banking system that will help avoid the build-up of systemic vulnerabilities. Accordingly, the capital requirements have increased. Greater focus has been placed on loss-absorbing resources in the form of Common Equity Tier 1 (CET1) capital. The risk-weighted framework has been overhauled to enhance risk capture and improve comparability in banks' reported capital ratios. A leverage ratio complements this framework by constraining excess leverage in the banking system. Macroprudential buffers – capturing both cross-sectional and time-varying risks – provide an overlay against system-wide risks. As for liquidity instruments – The Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) are aimed for mitigating excessive liquidity risk and maturity transformation.

These measures, however, abruptly altered the global economy and costed more than 3% of the global GDP in 2020 according to the World Bank. In response to the COVID-19 recession, unprecedented policy actions and support measures were taken in order to contain the economic fallout (Kirti et al., 2023). These encompassed monetary stimuli, fiscal support, as well as micro- and macroprudential measures developed since the GFC.²⁸ In regard to the monetary policy decisions, these were heavily influenced by experiences during the GFC. As a result, monetary policy was already accommodative before the pandemic and there was not much room for further easing through interest rates reductions. Therefore, in response to economic impacts stemming from COVID-19, few countries were able to change policy interest rate, and most central banks significantly expanded their emergency liquidity facilities and launched a range of asset purchase programs to keep markets functioning and credit flowing.

On the fiscal side, the swift and ample support programs provided the necessary liquidity to contain corporate insolvencies and to sustain the soundness of the real economy. However, the size, timing and magnitude of fiscal support differed across countries and included previously tested interventions, e.g. direct stimulus payments to the households and firms, grants, tax deferrals and tax reliefs, but also more specific loan-based instruments, moratoria, and public guarantee schemes targeted at the most vulnerable and affected sectors.

Finally, one relevant difference with respect to the GFC was that in 2020 an extensive macroprudential toolkit was available. Unfortunately, the pre-pandemic accumulated macroprudential space was generally scarce, and heterogeneous across countries, determining the extent these could be of service to support the economy. Not all countries had releasable capital buffers in the banking sector, such as countercyclical capital buffer (CCyB), to help sustain lending under stress conditions. Under the existing exceptional circumstances at that time, structural capital buffers – such as Systemic Risk Buffer (SyRB) and Other Systemically Important Institutions (O-SII) buffers – were relaxed by a few countries that had previously activated them at relatively high levels to provide the necessary cushion for the banking sector. However, going forward it should not be expected that structural buffers will be released during crisis periods, as this is not their purpose.

Below, we discuss how fiscal, monetary and macroprudential policies and their combinations affected economic recovery following the Covid-19 shocks.²⁹ On Chart 5, panel 1 we plot the number of countries that adopted these measures between 2020:Q1 and 2020:Q4. In 2020:Q1 27 countries introduced fiscal and monetary measures, 2 only fiscal, 2 fiscal and prudential, and 5 introduced all three types of measures. By 2020:Q3 all but one country in addition to fiscal also had in place another measure: monetary, prudential

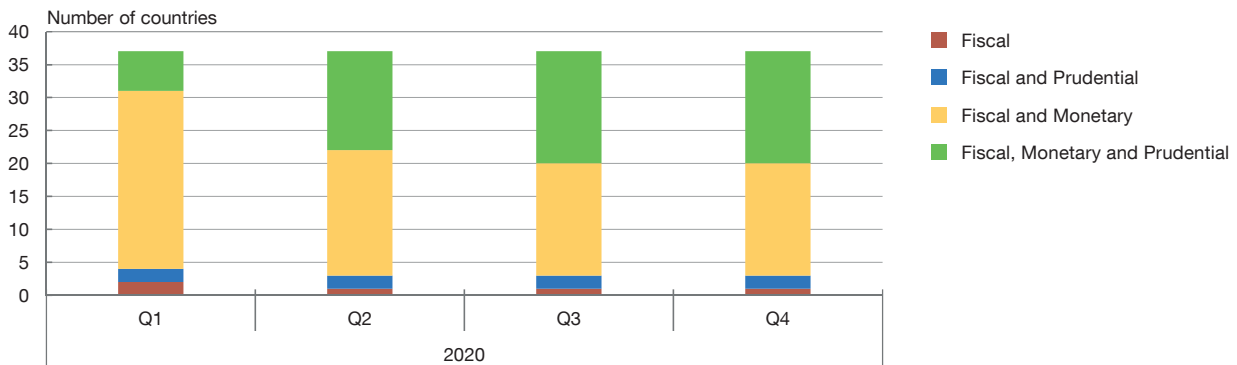
²⁸ The measures were deployed for a limited amount of time, however, large fiscal transfers and monetary policy easing increased aggregate demand to the point of overheating the labour market. These developments were aggravated by the shocks to food and energy prices, as well as shortages caused by supply-chain disruptions, that contributed to the sharp rise in inflation during the COVID-19 period and remained substantial through the end of 2022. For more details, see Blanchard and Bernanke (2024).

²⁹ We do not discuss their interactions with monetary policies, as qualitatively they followed the post-GFC experience already discussed in the previous sub-sections.

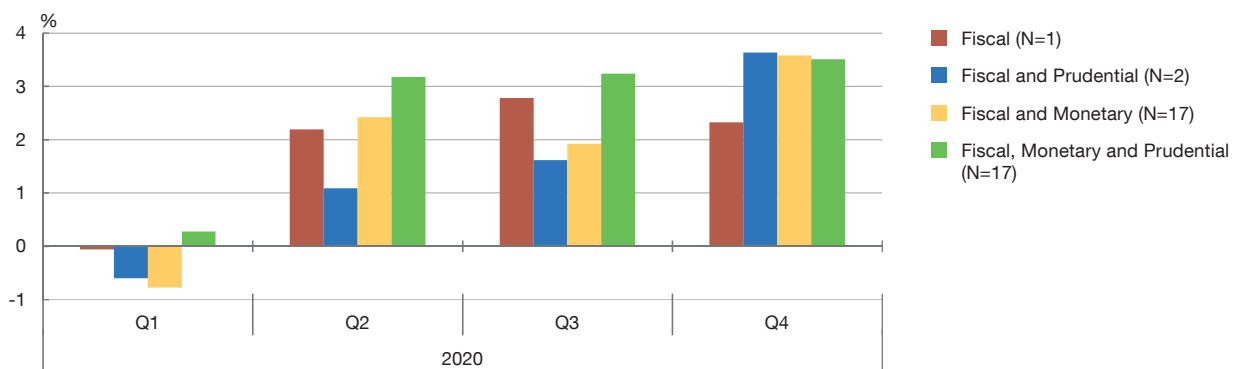
Chart 5

Policy measures adopted during the COVID-19 pandemic

5.a Countries that applied policy measures during the COVID-19 pandemic



5.b Biannual GDP growth during the COVID-19 pandemic



SOURCES: IMF Announcement-Level Database from Kirti et al. (2023), European Systemic Risk Board and own elaborations.

NOTE: The Y-axis labels reflect the number of countries in each group. Fiscal measures include Public guarantee schemes, grants, tax reliefs, tax deferrals and moratoria. Monetary measures include Asset Purchases Programs and changes to policy rates. Prudential measures include easing or release of macroprudential buffers.

or both. Specifically, 2 countries continued relying on fiscal and prudential support, another 17 on fiscal and monetary, and remaining 17 had all three measures. On Chart 5, panel 2 we compare these four groups.

It appears that the group of countries that introduced all three types of measures at the initial stages of the pandemic showed better biannual GDP compared to the other three groups. This difference, however, quickly decreased afterwards relative to countries that applied a more limited set of measures. In particular, relative to countries that applied macroprudential policy tools, on top of the fiscal measures.³⁰

³⁰ The intensive margin of the support is not discussed here. In particular, one of the two countries that applied only two measures was Denmark. However, its pre-crisis level of GDP growth was higher than in the group of countries that applied all policies, that gave more space for fiscal policy manoeuvre. Furthermore, its successful management of the pandemic at the very early stages and fast vaccine rollout enabled the removal of shutdown restrictions and an early re-opening (OECD, 2021).

This result illustrates the benefits of the use of available economic policy space, which would have been greater if more releasable bank capital buffers had been available, making the case to enhance the macroprudential space in the near term³¹. However, the implications of different combinations of policies during the pandemic cannot be formally established from a causal perspective, as there were other confounding factors operating at the same time: different intensity of COVID-19 infections and different degrees of dependence of the economy on vulnerable sectors, among other factors. Additionally, the combinations were limited by the pre-existing policy space, and in the case of fiscal stimulus determined whether these were pursued through on-budget measures or more financial measures, such as loans, equity, and credit guarantees (Bergant and Forbes (2023)). Further research will be needed to guide the optimal coordination of economic policies in the future.

³¹ See Bedayo and Galán (2024), for further analysis on the impact of the release of macroprudential capital buffers during the COVID-19 pandemic.

6 Conclusions

In this paper, we explore the taxonomy of risks that can endanger growth and overall welfare in the economy, taking a primary focus on those risks impairing the functioning of the financial system. We then assess whether the existing economic policies have sufficient instruments to address those risks. Our main conclusion is that, while the existing policies can indeed tackle the main potential risks sources, a still insufficient development in some policies, notably macroprudential ones, may leave a disproportionate fraction of the burden to other policies, like fiscal and monetary policies for some risk materialisation events. In this sense, we believe that it would be essential to develop the macroprudential toolkit that improves the macroprudential policy space for the banking system and extend its coverage to other non-bank financial intermediaries, so that the other policies have more leeway to focus on their own goals. In this respect, Banco de España has recently initiated the procedure to change to the CCyB framework to enhance the releasable macroprudential space against cyclical systemic risks (see Banco de España, 2024, and Estrada et al., 2024).

In the final part of the paper, we have analysed the more recent systemic event of the outbreak of the COVID-19 pandemic, in order to draw some conclusions on the combination of different policies. Although it is not possible to draw causal lesson on the best practices in combining different policies, the limited available evidence does suggest that systemic events are generally best tackled through a combination of policies, as specific policies on their own generally prove insufficient. However, the exact combinations may be restricted by the pre-existing and available policy space. Depending on the moment in which a shock arrives, fiscal, monetary and prudential policies may be more or less limited by the existing public debt levels, the level of interest rates and the accumulated buffers, respectively. Looking forward, when a systemic event occurs, these policies will need to be adapted to the nature of the risk that materialises. Hence, it is crucial that public finances are maintained on a sustainable medium-term path, especially in a changing world with emerging and unknown risks. And, in a context of limited fiscal space, the space available at the other policies will significantly affect the capacity of public authorities to mitigate systemic shocks. Finally, due to data limitations, in particular the short and limited history of macroprudential interventions, the development of theoretical models will be very useful to understand better the interaction of different policies to address systemic vulnerabilities.

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Annex I A taxonomy of risks

1 Cyclical risks

- A. National Macroeconomic Risks
 - i. Growth
 - ii. Labour market
 - iii. Inflation
 - iv. Public debt sustainability

- B. Real Estate market
 - i. Residential Real Estate
 - ii. Commercial Real Estate

- C. Credit Risk
 - i. Quality of the loan portfolio
 - ii. General credit cycle
 - iii. Credit for construction and real estate activities
 - iv. Other credit to non-financial companies
 - v. Mortgage credit
 - vi. Other credit to households
 - vii. Financial sector
 - viii. Public sector

- D. Market Risk
 - i. Interest rate/risk and term premiums
 - ii. Exchange rate risk
 - iii. Valuation risks
 - iv. Volatility risks

- E. Liquidity and Funding Risk
 - i. Maturity mismatches
 - ii. Asset liquidity risks
 - iii. ECB financing and MREL needs

- F. International Risks (distinction between countries with and without Spanish banking exposure)
 - i. Economic
 - a. Growth
 - b. Inflation
 - c. Public sector indebtedness
 - d. Private sector indebtedness
 - ii. Financial
 - a. General credit cycle

- b. Real estate market
- c. Non-bank financial sector

2 Structural risks

- A. Concentration and interconnections between financial institutions
 - i. Direct
 - ii. Indirect
- B. Misaligned incentives (moral hazard): e.g. TBTF, market power.
- C. Operational
 - i. Legal
 - ii. Reputational
 - iii. Risks of Bank Employee Misconduct
 - iv. Cyber risks
- D. Cyber risks
- E. Banking business model (includes potential competition from new entrants, Fintech, Bigtech, Crypto-assets)
- F. Financial infrastructures (payment systems, CCP)
- G. Adverse effects of regulation
 - i. Regulatory uncertainty
 - ii. Regulatory arbitrage, for example, due to differences in national regulations
 - iii. Adverse reaction to new regulations

3 Exogenous risks to the financial system

- A. Geopolitical risks (external and internal)
 - i. Social tensions
 - ii. Political tensions
 - iii. Terrorism
 - iv. War
- B. Environmental risks
 - i. Transition risks
 - ii. Physical hazards
- C. Health risks

Annex II List of countries considered for the empirical analysis in section 5

The Global Financial Crisis

Fiscal policy measures (41): Australia, Austria, Belgium, Bulgaria, Canada, Chile, Colombia, Costa Rica, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Malta, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

Monetary policy measures (35): Australia, Austria, Belgium, Bulgaria, Canada, Chile, Colombia, Costa Rica, Czech Republic, Cyprus, Denmark, Finland, France, Germany, Hungary, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Malta, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom, United States.

The COVID-19 crisis

Countries (37): Australia, Austria, Belgium, Bulgaria, Canada, Chile, Colombia, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Mexico, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

Annex III List of measures

Table A3.1

The Great Financial crisis measures

Policy	Measures	Definition	Countries that implemented
	Liquidity support	Central bank claims on other depository institutions and liquidity support directly provided by the national treasuries. It also captures the impact of currency swap lines among central banks, agreed during the global financial crisis, to the extent that they were used to inject liquidity in the financial sector	All, but Hungary and Portugal
Fiscal	Significant government guarantee on bank liabilities	Significant financial sector commitments relative to the size of the corresponding economies. In particular, either a full protection of liabilities has been issued by the government or government guarantees have been extended to non-deposit liabilities of banks. Actions that only raise the level of deposit insurance coverage are not included	All, but Denmark and Switzerland
	Policy rates	Changes in the policy interest rate	All
Monetary	Asset Program Purchases (APP)	Includes purchases of securities, such as bonds, stocks, and commercial paper in the secondary market by the national central bank (ECB in the case of euro zone countries)	All Euro zone countries, United Kingdom, United States

SOURCES: Laeven and Valencia (2020), Datastream and own elaborations.

Table A3.2

The COVID-19 crisis measures

Policy	Measures	Definition	Countries that implemented
Fiscal	Public guarantee schemes (PGS)	Include public guarantees, public loans, grants and equity participations.	All, but Hungary and Portugal
	Grants	Central government spending that directly or indirectly related to Covid-19, including transfers to firms or households, health spending, transfers to local governments, subsidies to social safety nets.	All, but Denmark and Switzerland
	Tax relief	Refers to any type of taxes where the amounts covered do not need to be repaid in the future, as well as contributions to social security and fees paid to the government	All
	Tax deferral	Direct or indirect deferrals of any type of taxes.	All Euro zone countries, United Kingdom, United States
	Moratoria	include (i) debt moratoria; (ii) suspension of non-debt payments, including rents, insurance premia, utility fees, etc.; (iii) suspension of bankruptcy	All, but Denmark, Finland and Japan
Monetary	Pandemic Asset Program Purchases (APP)	Includes purchases of securities, such as bonds, stocks, and commercial paper in the secondary market by the national central bank (ECB in the case of euro zone countries).	All, but Bulgaria, Czech Republic, Denmark, Mexico, Norway and Switzerland
	Policy rates	Changes in the policy interest rate.	Australia, Canada, Chile, Colombia, Costa Rica, Czech Republic, Hungary, Mexico, Israel, Korea, Norway, Poland, Romania, Turkey, United Kingdom, United States
Prudential	Macroprudential buffers	Include easing or release of the countercyclical capital buffer (CCyB) and/or the systemic risk buffer (SyRB).	CCyB: Belgium, Bulgaria, Costa Rica, Czech Republic, Denmark, France, Germany, Ireland, Lithuania, Norway, Slovak Republic, Sweden, United Kingdom; SyRB: Estonia, Finland, Hungary, Netherlands, Poland, Canada

SOURCES: IMF Announcement-Level Database from Kirti et al. (2023), European Systemic Risk Board and own elaborations.

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