

Schuknecht, Ludger

**Working Paper**

**Fiscal-financial vulnerabilities**

SAFE White Paper, No. 62

**Provided in Cooperation with:**

Leibniz Institute for Financial Research SAFE

*Suggested Citation:* Schuknecht, Ludger (2019) : Fiscal-financial vulnerabilities, SAFE White Paper, No. 62, Goethe University Frankfurt, SAFE - Sustainable Architecture for Finance in Europe, Frankfurt a. M.,  
<https://nbn-resolving.de/urn:nbn:de:hebis:30:3-509241>

This Version is available at:

<https://hdl.handle.net/10419/201847>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

Ludger Schuknecht

# Fiscal-Financial Vulnerabilities

SAFE White Paper No. 62 | August 2019

**SAFE | Sustainable Architecture for Finance in Europe**

A cooperation of the Center for Financial Studies and Goethe University Frankfurt

House of Finance | Goethe University  
Theodor-W.-Adorno-Platz 3 | 60323 Frankfurt

Tel. +49 69 798 33684 | Fax +49 69 798 33910  
[policy\\_center@safe.uni-frankfurt.de](mailto:policy_center@safe.uni-frankfurt.de) | [www.safe-frankfurt.de](http://www.safe-frankfurt.de)

# Fiscal-Financial Vulnerabilities\*

Ludger Schuknecht, OECD

July 2019

Abstract

*The paper analyses the linkages from financial developments to public finances. It maps and discusses the transmission channels to fiscal variables. These channels include asset prices, financing conditions, balance sheets of banks, non-banks and central banks and international linkages. The study argues that the fiscal effects via each and all these channels can be very serious in magnitude and can put the sustainability of public finances at risk. However, there is an only limited in-depth analysis of these channels and risks.*

## I. Introduction

In the global financial crisis that started in 2007, industrial country governments experienced what had previously only occurred to developing and emerging economies: huge bank bailout costs, abrupt and major increases in financing costs and even sudden stops in market access. Fiscal deficits in some cases worsened by over 10% of GDP in 2 or 3 years and public debt ratios rose by 50 or even 100% of GDP.

These developments reflect the linkages between public finances and financial developments. However, they are only the “visible” parts of the fiscal-financial vulnerabilities “iceberg” against which several governments shipwrecked. Despite the obvious “real world” relevance of fiscal-financial vulnerabilities, and much literature on certain aspects, there is no systematic mapping and analysis of the transmission channels from the financial to the fiscal sphere.

This paper, therefore, provides a “risk map”, for fiscal financial vulnerabilities, discusses the channels and assess what we know and what we do not know. The paper argues that there are five channels that link the fiscal and financial sphere.

- 1) Direct effects on budgets from higher financing costs and changes in asset prices.
- 2) Indirect effects via the real economy, through automatic stabilizers, guarantees and growth effects.
- 3) Fiscal obligations from the bank and non-bank financial sector difficulties.

---

\*SAFE policy papers represent the authors’ personal opinions and do not necessarily reflect the views of the Research Center SAFE or its staff.

4) Risks with central banks, and

5) International obligations either via international credit exposure or via international bailout programs. The Figure below provides a simple graphical representation of this risk map.

## Fiscal-Financial Risk Map

---



It is worth referring to some of the key literature at the outset. The IMF Autumn Fiscal Monitor (IMF 2018) provides a conceptual framework and much data for the assessment of the balance sheet of governments and related budgetary risks. This is the most far-reaching and systematic assessment of governments' balance sheet situation.

At the same time, the Fiscal Monitor does not cover a number of the risks from asset price changes and from contingent and implicit liabilities discussed here. The IMF GFSR (2018, 2019) discusses some of the financial sector risks but does not make the link to fiscal balances. Borio and co-authors and the BIS and Schuknecht and co-authors went furthest in analyzing and linking financial and fiscal vulnerabilities.

The following sections discuss the fiscal situation, and risks and vulnerabilities via the different channels. The concluding section looks at some implications for further work and policy.

## II. Budgetary risks from financing cost and asset price changes

There are important fiscal risks for government budgets from changes in financing costs and asset prices that can significantly impinge on deficit and debt dynamics. However, before discussing such risks, it is worth starting with a look at the fiscal situation of countries, and their buffers to absorb risks.

Government liabilities mainly include gross debt (debt securities and loans), pension obligations to the public sector, and guarantees. But governments do not just have liabilities, they also have assets.

Financial and non-financial assets, natural resource assets and public corporation assets should be set against liabilities. Especially non-financial assets in the form of infrastructure and public building, natural resources and public corporations can be very large and reach several hundred percent of GDP (IMF, Fiscal Monitor, 2018).

From a long term perspective, the assessment of fiscal sustainability can include certain government non-financial assets, not only because they may be sellable but also because they may contribute to growth prospects (like infrastructure). From a short to medium term perspective, government non-financial assets are not likely to be very liquid. Various attempts to achieve major privatization receipts in advanced countries during the global financial crisis bear witness to this. Government financial assets are rather limited in most advanced countries.

Public debt and deficit are, therefore, still very relevant indicators of fiscal resilience and buffers. The numbers show that buffers before the global financial crisis were already limited but they were even more limited a decade later (Table 1). Fiscal deficits in 2007, after many years of boom, were still considerable in a number of advanced countries, such as the USA, Japan, the UK, France and Italy. Average deficits in the G7 stood at 2.2% of GDP. Gross general government debt in the G7 averaged 80.6% of GDP with a peak of 175% in Japan. Italy and Belgium were the two other advanced countries with public debt not much below 100% of GDP.

By 2017, fiscal buffers were much smaller, despite several years of recovery in all advanced countries and a decade of growth in some of them. Fiscal deficits averaged 3.4% in the G7 in 2017 and exceeded 4% in Japan and the US. The other G7 countries except Germany posted deficits between 1 and 3% of GDP (with a projected rise above 3% in France and towards 3% in Italy in 2019).

**Table 1 Fiscal Buffers: General Government Deficit and Debt (% of GDP)**

	2007		2017			
	Deficit	Debt	Deficit	Debt	Deficit	Debt
	Change (pp) 2017-2007					
USA	-2.9	64.6	-4.6	107.6	-1.7	43
Japan	-3.2	175.4	-4.2	236.4	-1	61
Canada	1.8	66.8	-1	89.8	-2.8	23
United Kingdom	-2.6	41.9	-2.3	86.9	0.3	45
Germany	0.2	63.7	1.1	63.7	0.9	0
France	-2.5	64.4	-2.6	97.4	-0.1	33
Italy	-1.5	99.8	-1.9	131.8	-0.4	32
G7	-2.2	80.6	-3.4	118.6	-1.2	38

Source: Ameco

More worryingly perhaps, public debt was much higher in 2017 than in 2007. G7 debt had increased by an average of 38% of GDP to almost 120% of GDP. The increase was greater in Japan, the US and the UK. All G7 countries except Germany posted public debt ratios near or above the ratios that Italy

featured in 2007. The IMF Fiscal Monitor (2018) also finds a significant decline in government net worth between the financial crisis and 2018.

Another indicator of fiscal buffers is the country rating. Rating agencies have downgraded the sovereign debt of most countries over the past decade and sometimes very rapidly. In 2009, half of advanced country sovereign debt showed AAA ratings. With one rating agency, this share declined to 10% by 2018. In 2009, about 20% of public debt was rated A or worse. This share had doubled to over 40% by 2018 (Buck and Schuknecht, 2017; Schuknecht 2018).

### **1. Financing Costs and Needs for Government**

Higher deficits and debt and lower ratings are a fact. However, whether this implies lower buffers depends also on the borrowing costs of government. In the late 2010s, these were much lower than a decade earlier, so that the interest payments/GDP had also declined. This induced some observers to argue that higher debt did not necessarily mean lower buffers (Blanchard, 2019). More extremely, the adherents of the New Monetary Theory argue that debt does not matter anymore, as the interest rate on public debt was likely to stay below the economic growth rate for a long time, if not forever.

The flaw of the argument is twofold. First, interest rates on government debt, though down, are not lower than economic growth rates in some high debt countries. Fuest and Gros (2019) show this for Portugal and Italy.

Second, government financing costs are not static but they are endogenous. They are vulnerable to changing investor sentiment in the short run. Higher deficits and debt (and other factors) go hand in hand with stronger shifts in financing conditions during risk-off periods, especially when the country does not have a credible own monetary policy. Higher deficits and debt, especially when financed at short maturities, also imply higher refinancing and rollover risk. In the global financial crisis, in a very short time span, deficit and debt-related spreads increased by the factor four and eight, respectively and jumped several hundred basis points (Schuknecht, von Hagen and Wolswijk, 2010).

In addition, there is no certainty that inflation, equilibrium interest rates and governing financing costs will remain very low in the long run. Demographic change and the very low interest environment may change the saving behavior of people. And that inflation is dead just because it has not been around for a while is not assured.

Finally, it does matter whether a country has its own currency and monetary policy or not. An own currency means that interest rates and other central bank measures can be better fine-tuned to the economic and financial situation of a country. This is a major difference between, say Japan and Italy. Therefore, the need for fiscal buffers is larger in monetary union than outside. Safe-haven status of

the currency and country may further push out the boundary of what governments can finance. However, the loss of this status may come at an even greater vengeance. The limits to public debt differ, but they are endogenous and depend on governments maintaining credibility.

A number of countries feature high financing needs (IMF, 2018). The sum of maturing debt and current deficits in 2018 exceeded 10% in many cases. In a few countries, it exceeded 20 or even 40% of GDP (Table 2). A 100bp (or 1%) interest rate increase—which can happen in days—implies a 0.1% of GDP higher interest burden after 1 year for every 10% of GDP of financing needs. Italy, for example, would face an increase in the interest burden by almost ½% of GDP if the average interest rate for one year increased by 2% ( $0.22 \times 2$ ). In 2009-2012, interest rate spreads on public debt increased by significantly more within months.

**Table 2 Government Gross Financing Needs, 2018**

	Maturing debt	Deficit	Total financing need
<b>Euro area</b>			
Austria	5.9	0.3	6.2
Belgium	17.0	1.3	18.3
Finland	6.3	1.4	7.7
France	10.4	2.4	12.8
Germany	5.0	-1.5	3.5
Greece			
Ireland	6.6	0.2	6.8
Italy	20.6	1.6	22.2
Netherlands	7.4	-0.6	6.8
Portugal	12.7	1.0	13.7
Spain	15.9	2.5	18.4
<b>Other EU</b>			
Denmark	4.0	0.8	4.8
Sweden	4.1	-1.1	3.0
UK	6.7	1.8	8.5
<b>Other advanced economies</b>			
Australia	1.6	1.7	3.3
Canada	8.5	0.8	9.3
Japan	37.2	3.4	40.6
Korea	2.6	-2.0	0.6
New Zealand	1.4	-1.1	0.3
Singapore			
Switzerland	2.1	-0.4	1.7
US	18.7	5.3	24.0
<b>Averages</b>			
Average (unweighted excl. KOR&SGP)	10.1	1.0	11.2

Source: IMF Fiscal Monitor October 2018

Moreover, and worse, markets dried up making it very difficult or even impossible for governments to get financing. In such a situation, one could argue that this is “merely” a liquidity issue. But if a country

has high debt, further implicit or contingent fiscal risks and starts paying very high spreads, one can hardly ignore sustainability concerns.

The stability of government financing cost does not only depend on the level of debt, the duration of government financing and interest rate stability. Transparency of debt financing is essential so that adverse surprises and volatility from uncertainty over the “true” extent of government liabilities become less likely. Exposure to derivatives may reduce debt service costs in the short term when swapping long term for short-term payments. However, they also increase rollover risks. This is particularly problematic when derivative exposure is hidden, as it was the case in Greece in the early 2000s.

## **2. Asset Price Changes**

Fiscal risks from higher government financing costs are well-known and easy to simulate. This is much less the case for budgetary risks arising from asset price changes. If asset prices, especially house prices or stock prices, change significantly, this can have significant effects on the budget. First, a government will get more revenue from transaction taxes if housing and stock markets boom because of tax revenue benefits from high valuations and higher turnover. When markets plunge these effects reverse.

Second, governments get revenue from capital gains taxes, in some cases when they are realized, in other cases already when they are on the books. This typically shows up in higher income and profit taxes. Third, higher asset values imply higher consumption taxes from wealth effects. All these positive effects reverse when an asset price boom turns to bust (Eschenbach and Schuknecht, 2004).

The extent of revenue windfalls and reversals depends very much on the tax system and the degree of asset price adjustment. It can be very large in some cases and much smaller in others. Morris and Schuknecht (2007) estimated that a 10% increase/decrease in house and stock prices typically led to an improvement/a worsening of the fiscal balance by ½% of GDP over the average of the euro area for the 1980-mid-2000s period (Table 3). The house price effect tends to be the more important one.



**Table 3 Asset Price Related Budget Sensitivities, 1982 - 2005**

	Total
Belgium	0.75
Finland	0.62
France	0.33
Germany	0.57
Ireland	0.62
Italy	0.45
Netherlands	0.55
Spain	0.79
Weighted average	0.53
Euro area aggregate	0.28

Source: Richard Morris and Ludger Schuknecht, 2007.

Total refers to the sum of the effect from a 10% stock and real estate price change on the budget balance via direct taxes on corporations/households, indirect taxes and transaction taxes.

The asset price effect comes on top of the “normal” effect from automatic stabilizers (see below) as asset price booms/busts tend to coincide with strong or weak growth. However, risks tend to be asymmetric: fiscal losses during large downturns tend to be bigger than windfalls during strong booms (Eschenbach and Schuknecht, 2004). The literature focuses on the 1980s to the mid-2000s period. An update with more recent data would be useful to assess whether budgetary sensitivities changed.

Given that real estate and in particular stock prices can adjust by much more than 10% during boom and bust, and that budgetary elasticities are larger than “normal” during such periods, it is not surprising that fiscal aggregates tend to display seemingly surprising features. This is illustrated in Table 4, which compares the fiscal developments of six European countries during the first years of the financial crisis.

**Table 4 Post-Crisis Expenditure and Revenue Developments, 2007 - 2009**

	Expenditure	Revenue
Ireland	11.1	-2.8
Spain	7.0	-6.1
United Kingdom	6.4	-1.2
France	4.6	-0.1
Germany	4.8	1.3
Italy	4.4	0.6

Source: OECD

Budgetary expenditure ratios rose significantly in all six countries as economic growth plunged, automatic stabilizers kicked in and fiscal stimulus further increased spending. At 11% of GDP in Ireland, this effect was huge. At such magnitudes, expenditure effects on deficit and debt dynamics alone can be strong enough to plunge countries into fiscal turmoil.

Revenue developments, however, were also a “shock” in a number of countries. “Normally”, the revenue ratio tends to stay relatively constant over the business cycle as revenue rises and falls with economic activity. By contrast, revenue ratios declined significantly in the countries that had featured a strong housing boom followed by a bust during the crisis. The Irish revenue ratio declined by almost 3% of GDP, the Spanish one by about 6% of GDP and UK revenue declined by over 1% of GDP, largely because revenue windfalls from the boom years reversed. By contrast, France, Germany and Italy, which did not feature strong house price falls after 2007, did not experience a decline in the revenue ratio. This cross-country pattern, hence, makes a lot more sense when considering asset price effects on fiscal balances.

### **III. Real economy linkages**

#### **1. Automatic stabilizers**

The most well-researched channel to fiscal balances is the real economy. The literature refers to automatic stabilizers when it argues that the changing economic environment affects fiscal balances via broadly stable expenditure and rising/falling revenue. Progressive taxes and social benefits can further increase the stabilizing effect of public budgets but this effect tends to be limited.

The size of automatic stabilizers is closely correlated with the size of government. If public spending is around 40 or 50% of GDP, an economic downturn of 1% tends to imply a worsening of the fiscal balance by about ½% of GDP. A recession, therefore, tends to go hand in hand with quite a significant fiscal deterioration without a government engaging in any activist policies.

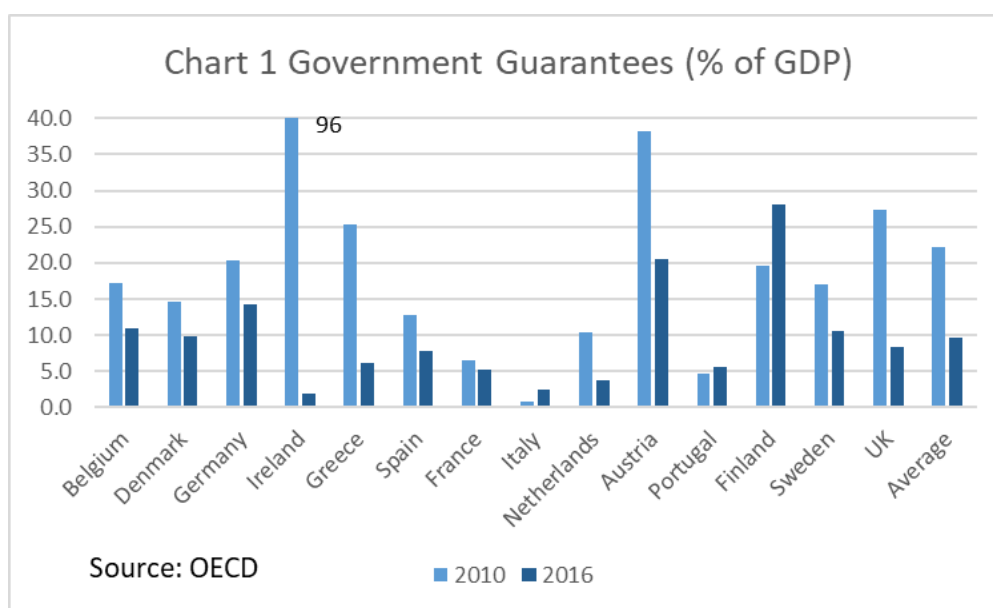
There are two reasons why real economy risks to budgets via this channel may be larger than expected. First, strong domestic demand and methodological issues for calculating the standard output gap tend to misrepresent the cyclical and fiscal position of a booming country. In a boom, the output gap tends to be more positive than assessed in real time. Therefore, underlying fiscal positions (as measured for example by the cyclically adjusted balance) also tend to look better in real time than they really are seen ex-post (Jaeger and Schuknecht, 2007). This was the case after Lehman but also in earlier boom-bust phases.

Second, downturns triggered from the financing side can be quite strong and much stronger than deteriorating financing conditions alone would suggest. Confidence effects, for example, were very important post-Lehmann for the global economy and also in the context of the European fiscal crisis post 2009. Although we do know that unsustainable credit and asset price dynamics were at the root of the post-Lehmann crash (amongst other factors) and that financial sector problems coupled with

vulnerable public finances provoked the European fiscal crisis, we do not understand well if and when such “non-linearities” set in and how strong they will be.

## 2. Guarantees

Financial stress in conjunction with large recessions can trigger further adverse fiscal effects via government guarantees. Governments have very differing degrees of contingent obligations from government guarantees but in some cases they are very large (Chart 1). They are usually granted to state-owned (financial and non-financial) enterprises, public projects or public private partnerships. Ireland had extended its stock of guarantees to 96% of GDP in 2010. In several other countries, guarantees exceeded 20% of GDP before coming down thereafter.



The stock of guarantees would normally be limited and the conditions should be such that they do not fall due (or else Parliaments/Governments would not grant them). However, sometimes guarantees secure projects where the underlying financial and economic assumptions are not robust.

Moreover, the stock of guarantees may increase “at the stroke of a pen” for political reasons. Governments tend to extend guarantees in bad times to “soothe” the public, banks, industry or all of them. The extension of blanket guarantees of bank deposits in Europe in the global financial crisis presumably increased the bailout costs of banks. The next section comes back to this challenge. Implicit government guarantees for state-owned enterprise losses and public private partnerships (PPPs) may materialize especially in bad times.

As a result, a number of countries experienced increases in fiscal imbalances in the context of the global financial crisis due to guarantees falling due. In the non-financial sector, public-private partnerships were often hard hit and went bankrupt at times. However, there is neither clear account

of losses due to the calling of guarantees or failing PPPs, nor any literature that looks at the vulnerability of governments to such risks in relation to real and financial sector developments.

Finally, there is a further little-explored channel from financial developments to the real economy and, thereby, indirectly to fiscal risks. Boom-bust cycles such as the global financial crisis and the preceding boom can undermine long term growth prospects (Borio, Kharroubi, Upper and Zampoli, 2015). In boom periods with rapid credit growth, labor and capital tend to migrate into the booming sectors. In Spain or Ireland, too many workers went into construction, which is a low productivity sector by itself. The job opportunities there kept some young people from continuing their studies. In Ireland and the UK, the financial sector displayed similar patterns. When the boom ended, much capital and labor became redundant.

There was hence be a negative effect from both these effects on productivity and potential economic growth. At some point, when capital is reallocated the country may return to its former growth path, but it can take quite some time. Negative long-term growth effects, if undetected, risk undermining fiscal balances if the fiscal position is seen as stronger than it really is and if expenditure dynamics do not adapt to weaker economic dynamism.

#### **IV. Financial Sector Risks — Banks**

Financial sector risks for fiscal balances are well known and well-documented in as much as they relate to banking crises. The latter often follows asset price surges, credit expansion and the tightening of financing conditions as much BIS work has demonstrated.

The costs of the financial crisis can be huge. The IMF reported a gross impact for banking sector support of between 4 and 36% of GDP in the global financial crisis until 2015 (IMF, 2015) (Table 5). Greece and Ireland experienced the highest costs. When looking at fiscal costs relative to banking assets at the height of the crisis in 2009, there is slightly less divergence as the costs were highest in countries with large banking systems such as Ireland and the Netherlands (an exception is Greece).

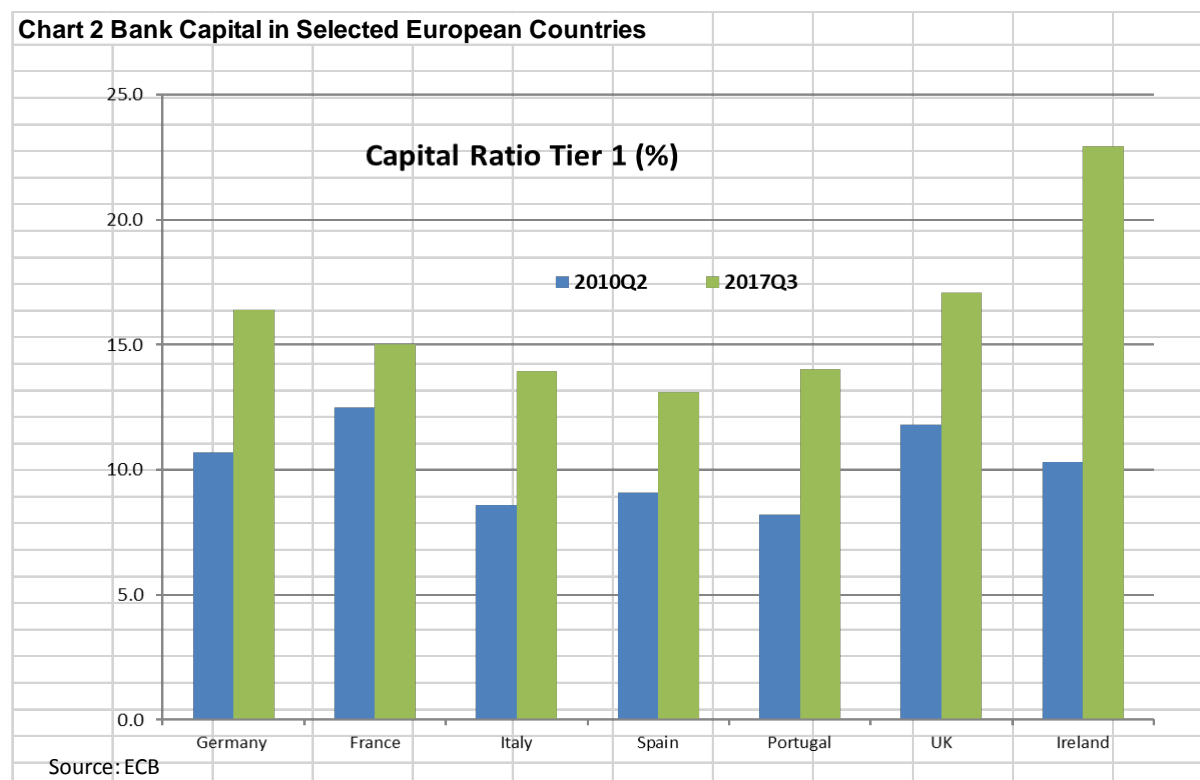
**Table 5 Financial Crisis Support post 2009**

	Gross Impact (% of GDP)	Gross impact in % of end 2009 Banking Assets
Austria	6.2	5.6
Belgium	7.2	8.9
Cyprus	20.0	..
Germany	12.3	10.4
Greece	34.9	33.1
Ireland	36.3	20.4
Netherlands	17.3	13.5
Slovenia	12.0	13.2
Spain	7.4	3.9
United Kingdom	11.6	5.9
United States	4.3	6.4
Average	7.4	..
US\$ Billions	2114.0	

Source: IMF, Fiscal Monitor, April 2015; World Bank, Global Financial Development Database

Definition: Total assets held by deposit money banks as a share of GDP. Assets include claims on domestic real nonfinancial sector which includes central, state and local governments, nonfinancial public enterprises and private sector. Deposit money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits.

The global crisis was very costly also because bank buffers were very low. Hence, the risk of bailouts in the future depends on future buffers versus risks. Bank buffers increased substantially after the crisis. Tier 1 capital in early 2010 averaged less than 10% in the countries displayed in Chart 2. By late 2017, capital had increased to about 15% and exceeded 20% in Ireland. This was a considerable improvement although many observers argued for further increases (Admati, DeMarzo, Hellwig, and Pfleiderer, 2013).

**Chart 2 Bank Capital in Selected European Countries**

During the global crisis, banks got into trouble because they did not hold enough subordinate debt, they were short of liquidity and their long term funding was not secure. In all these areas, international regulation became stronger and implementation progressed (FSB, 2019). By 2019, banks generally fulfilled minimum capital, liquidity and funding requirements. Moreover, there was agreement on a minimum leverage ratio of capital relative to total assets (3% of assets) and on a minimum loss-absorbing capacity (8% of assets). Banks had developed resolution plans so that bank failure would not plunge themselves and (through contagion) the banking system into chaos.

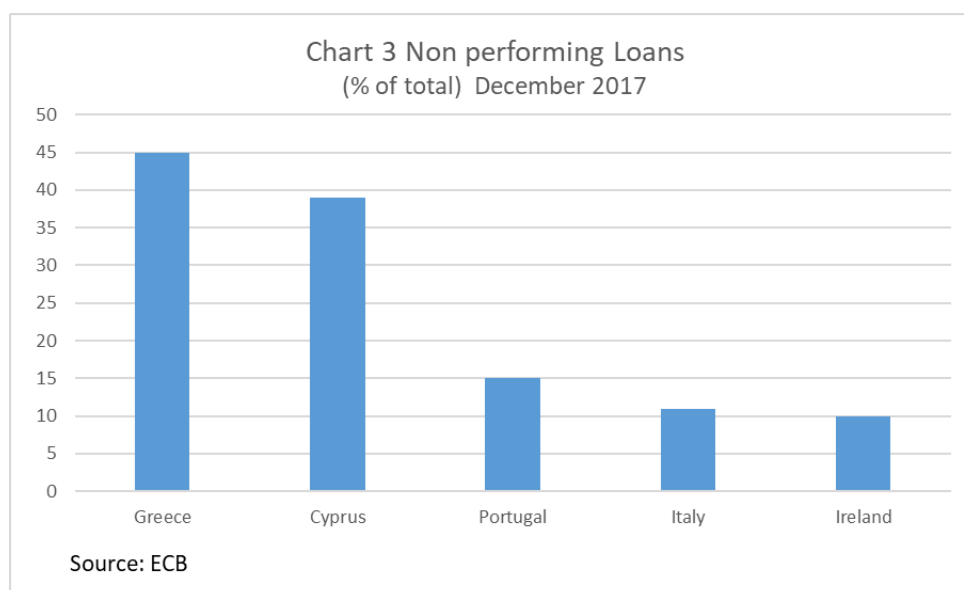
These changes should reduce the risk of future bank bailouts, given that the literature has identified shortcomings in these areas as correlated with fiscal costs of the crisis. Fiscal costs tended to be higher when countries had large banking sectors when they relied on external funding, when debt in the private sector was high and when government guarantees propped up banks in crisis (Amaglobeli, End, Jarmuzek and Palomba, 2015).

Fiscal and economic costs also tended to rise when a banking crisis mutated into a fiscal crisis (Laeven and Valencia, 2013). Fiscal costs increased when governments committed to blanket deposit guarantees, open-ended liquidity support, debtor bail-outs and regulatory forbearance (Honohan and Klingebiel, 2003). The last point contrasts the experience of the Nordics (rapid resolution) with Japan (forbearance) in the 1990s and certain European countries (forbearance) in the 2010s.

Borio, Contreras and Zampolli (2019) found that the fiscal costs of a banking crisis were correlated with the level and growth of credit to the private non-financial sector. Foreign exchange reserves (emerging economies) and higher bank capitalization went hand in hand with lower public debt increases. De Mooij, Keen and Orihara (2014) and Langedijk, Nicodeme, Pagano and Rossi (2015) found a positive correlation between tax policy induced debt biases and the costs of financial crises.

### **1. Risks from Non-Performing Loans and High Private Debt**

In light of these experiences and findings in the literature, it is interesting to assess banking-related risks and vulnerabilities in advanced countries looking forward. In the late 2010s at the time of writing of this paper, there was still a significant amount of non-performing loans (NPSs) on bank-balance sheets (Chart 3). In five European countries, these exceeded 10% of total loans; in two of them, they exceeded one third of all loans.



Many observers saw excessive private sector debt as a reason for bank vulnerability and losses in the context of the global financial crisis because highly-indebted companies and households were less able to absorb economic downturns and financing cost increases. However, there was little deleveraging in the aftermath of the crisis.

Household debt stayed broadly constant across advanced countries between 2007 and 2016, with some variance across countries and some cases of very high debt. Developments of corporate debt, by contrast, show a significant further increase in leverage in advanced countries on average. This and strong increases in emerging economies' debt contributed to the record global indebtedness of the private sector in the late 2010s. Table 6 illustrates that non-financial corporate sector debt had increased from an average of 82.6 to 93.7% of GDP between 2000 and 2007. A further increase to 107% of GDP occurred during 2007-2016.

The European Union monitors private sector debt against a scoreboard of indicators where the threshold for "safe" corporate indebtedness is 80% of GDP. A number of countries exceeded the safe threshold by over 40% of GDP, including Belgium, France, Ireland, the Netherlands, and Sweden. Only Spain, the United Kingdom and New Zealand experienced a significant debt deleveraging in the 2010s.

However, while the literature found a correlation between corporate debt overhang and fiscal costs (see above), there is no in-depth assessment, for example, of elasticities. Such research, for example, could permit the analysis of different policy paths and their implications for debt, growth and public finances in a backward and forward-looking manner (and hence also a better understanding of the merits of risk prevention and reduction).

Moreover, such research could analyze more deeply, when private debt becomes a systemic risk for the economy (with contagion across companies) and the financial sector (with contagion across banks)

so that government involvement is difficult to fend off. This could give rise to more state-contingent sustainable private debt thresholds than the rule-of-thumb figures that the European Commission currently applies.

**Table 6 Nonfinancial Corporate Debt, Loans and Debt Securities (Percent of GDP)**

	2000	2007	2016	Change pp 2007-16	Overhang pp >80
	(1)	(2)	(3)	(4)	(5)
<b>Euro Area</b>					
Austria	82.6	88.8	90.9	2.0	10.9
Belgium	104.7	122.6	166.2	43.6	86.2
Finland	90.3	94.1	114.1	20.0	34.1
France	97.8	104.0	131.5	27.5	51.5
Germany	57.8	56.0	52.8	-3.2	
Greece	39.1	50.5	63.9	13.4	
Ireland		127.7	246.8	119.1	166.8
Italy	56.0	74.5	73.8	-0.7	
Netherlands	128.9	111.3	123.0	11.8	43.0
Portugal	82.5	109.9	112.3	2.5	32.3
Spain	73.0	124.4	101.7	-22.7	21.7
<b>Other EU</b>					
Denmark	69.7	106.5	104.1	-2.5	24.1
Sweden	105.6	97.0	122.2	25.2	42.2
United Kingdom	79.8	94.7	82.9	-11.9	2.9
<b>Other Advanced Economies</b>					
Australia	68.1	80.4	80.2	-0.2	0.2
Canada	86.9	85.9	111.4	25.5	31.4
Japan	119.7	103.0	101.2	-1.8	21.2
Korea, Republic of	91.3	88.6	100.4	11.8	20.4
New Zealand	82.0	94.7	81.7	-13.0	1.7
Switzerland	86.1	90.2	111.4	21.3	31.4
Singapore	80.5	77.9	107.0	29.1	27.0
United States	63.9	69.7	72.2	2.5	
<b>Averages</b>					
Unweighted average (excl. Sgp. + Kor.)	82.6	93.7	107.0	13.3	

Source: IMF

Debt overhang only for countries with positive figure.

## 2. Government Debt with Banks

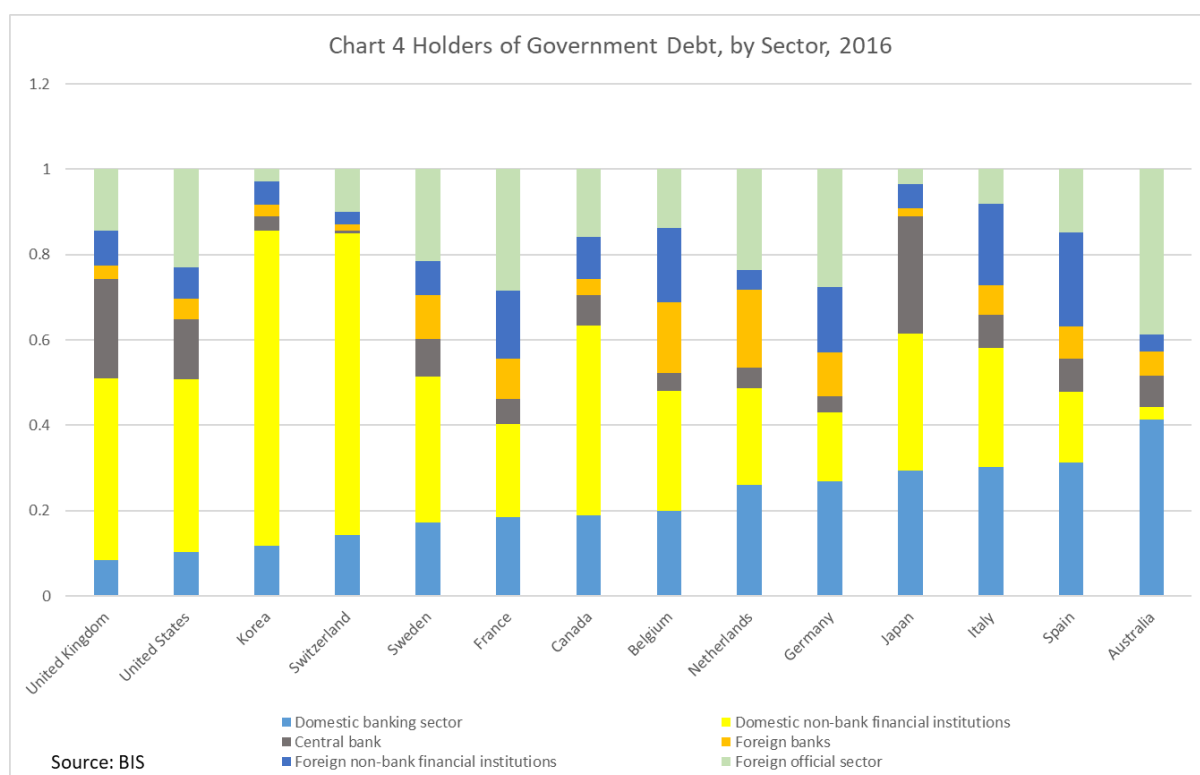
A further important vulnerability on bank balance sheets is government debt. Banks can incur losses from government debt revaluation and restructuring. They use government debt for collateral and liquidity reasons. These functions can suffer when government debt becomes less liquid and credible. Moreover, there is a correlation between the rating and financing conditions of banks and their sovereign. This link suggests that the value of implicit government guarantees differs significantly across countries (CGFS, 2011).

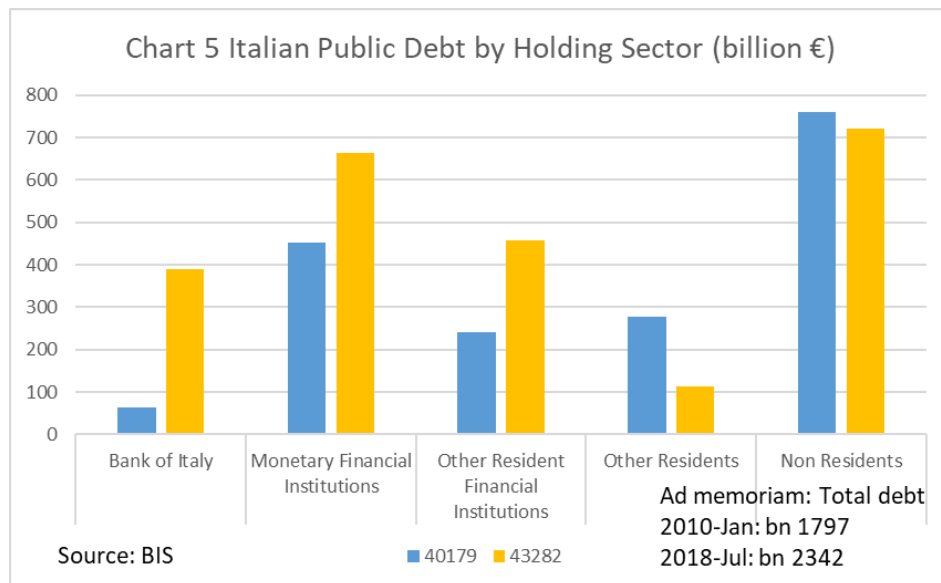
Banks are less vulnerable when governments have fiscal buffers. Vulnerability also goes down when government debt holdings on bank balance sheets are limited, especially when that debt is risky. A



hypothetical example for illustrative purposes only: if a bank holds 500% of its capital in government debt and that debt faces a 20% haircut, the loss would (mechanically) wipe out the banks whole capital. Similar calculations can be made for aggregate capital versus total government debt holdings by the banking sector.

In many countries, banks hold 20% or even 40% of government debt on their balance sheets (Chart 4). This is not very risky when public debt is safe, that is when total government debt is reasonably low. However, there are two country groups with medium and high vulnerability respectively. France, Canada and Belgium report government debt not far from 100% of GDP and banks hold about 20% of this debt. Losses on these holdings would have important effects on bank buffers and operations but quantitative analysis is not readily available.





In sum, banks have increased their buffers significantly since the global financial crisis. However, high corporate debt, non-performing loans and exposure to government debt in a number of countries point to remaining vulnerabilities in the banking system. However, there is limited understanding of how important these remaining risks are.

Stress tests at the micro (bank) level point to sufficient resilience across advanced countries at the time of writing. But government financing difficulties did not seem to feature prominently in such tests. There also does not seem to be much analysis about the sustainable exposure to public debt even though this may not be prohibitive to assess given expected losses implied in ratings and potential losses in stress scenarios. Unease remains in light of the described vulnerabilities.

## V. Financial Sector Risks—Non Banks

The financial crisis of the past decades in advanced countries emanated from the banking system. However, already in the global financial crisis, risks from non-bank, market based finance (or shadow banking) played a role. Banks had thought that they had off-loaded significant risk into special purpose vehicles. Moreover, holdings of government bonds on bank balance sheets resulted in some spillbacks to banks and the real economy. The bailout of the life insurer AIG illustrated the potential magnitude of risks from derivatives. Moreover, almost 20 years ago the failing hedge fund LTCM in the context of the Asian crisis suggested that contagion risk across asset managers was so important that it warranted a coordinated (private sector-led) bailout.

The size of the non-bank financial sector has grown enormously and disproportionately in recent decades. Of the total global debt of US\$ 200 trillion in 2017, about ½ or 100 trillion were part of the broader shadow-banking sector. The BIS saw half of that, US\$ 50 trillion or 70% of global GDP, to be

potentially volatile and subject to run risks. This included collective investment vehicles (71%), non-bank financial entities engaging in loan provisions (7%) and market intermediaries depending on short-term funding (8% of the total).

In the context of the financial crisis, the G20 countries decided to strengthen regulation of the non-bank financial sector to increase buffers and make the industry more resilient. However, progress was mostly slower than in the banking area, except for life insurances. The G20 “only” approved standards for attaining better supervision and greater buffers in the asset management industry in the autumn of 2017. Since, then IOSCO, the international securities regulator, has agreed on how to operationalize the standards and a first assessment took place by the FSB in early 2019.

The assessment showed less progress with the implementation of the regulatory agenda (FSB, 2019) and, consequently, more uncertainty as to the increase of buffers in this industry. Implementation of IOSCO recommendations was well advanced in half of the (24) FSB countries, including the USA and China. Most countries introduced the fair-value approach for money-market fund portfolios. However, there was less progress in liquidity management, securitization, risk-based capital requirements for equity in funds, and large exposures. Work on securities financing transactions (SFTs), including hair-cuts on non-centrally cleared SFTs, was still at an early stage.

## **1. Risks and potential transmission to public finances**

Risks in the non-bank financial sector emanate mainly from rising interest rates and spreads, so-called snapback risks, in a high asset price, risk-taking and leverage environment. Low interest rates contributed to this environment and “low for long” would provide a further boost (ESRB, 2016). Snapback risks appear to be limited at the short end, given forward guidance and ample liquidity from central banks. However, long-term rates and spreads for credit risk could change suddenly and strongly, thus stoking vulnerabilities.

First, automated trading and fickle investor behavior can lead to sudden reversals of the risk sentiment and sharp changes in rates and asset prices. This, in turn, could stoke solvency and liquidity problems in the asset management industry. When certain assets turn bad, there is a significant risk of contagion. The bundling of assets in ETFs can result in the sell-off of all the assets in the Fund rather than only the affected ones. This could lead to firesales of assets spreading from companies to sectors, to countries and even to country groups. Asset managers may not have enough liquidity especially if markets dry up.

A number of liquidity management instruments have been designed to mitigate such risks. These include redemption fees, suspension of redemptions and redemptions in kind, gates or liquidity buffers

to mention only a few. European countries all applied such instruments in 2018, but to very varying degrees (ESRB, 2018).

Regulation and ratings can reduce but also exacerbate snapback-related risks. Given cliff effects between investment and non-investment grade assets, the volatility of prices and liquidity may be particularly strong in the BBB and BB segment of the market. If there is a wave of downgrades in the context of a recession, the BBB market may shrink and become less liquid. The high-yield market may not be able to absorb the increased supply of existing and newly downgraded debt and even freeze.

Some numbers underpin this concern. Between 2008 and 2018, the global corporate bond market doubled from 6.5 to 13 trillion US\$ (Chart 6; see Celik, Demirtas and Isaakson, 2019). This is about 10 times the market for high-yield non-investment grade debt. Almost half of the market is in the US but growth has been strongest in China. Over half of the market was rated in the BBB range in 2018 (up from a historic 25-40%) while the share of AA or better had fallen from about 25% in 2000 to less than 10% in 2018 (Chart 7). Moreover, a growing share of this debt was the so-called covenant light debt where creditor rights were more limited. This reduces the risk of early asset seizure, foreclosure and downgrades. However, it may induce moral hazard by debtors and increase the risk of runs if creditors realize their weak position.

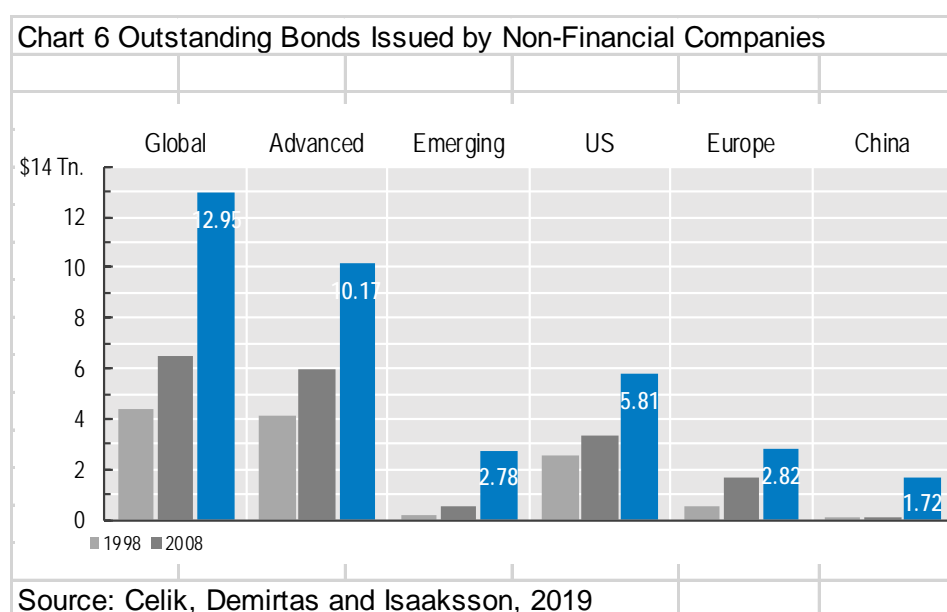
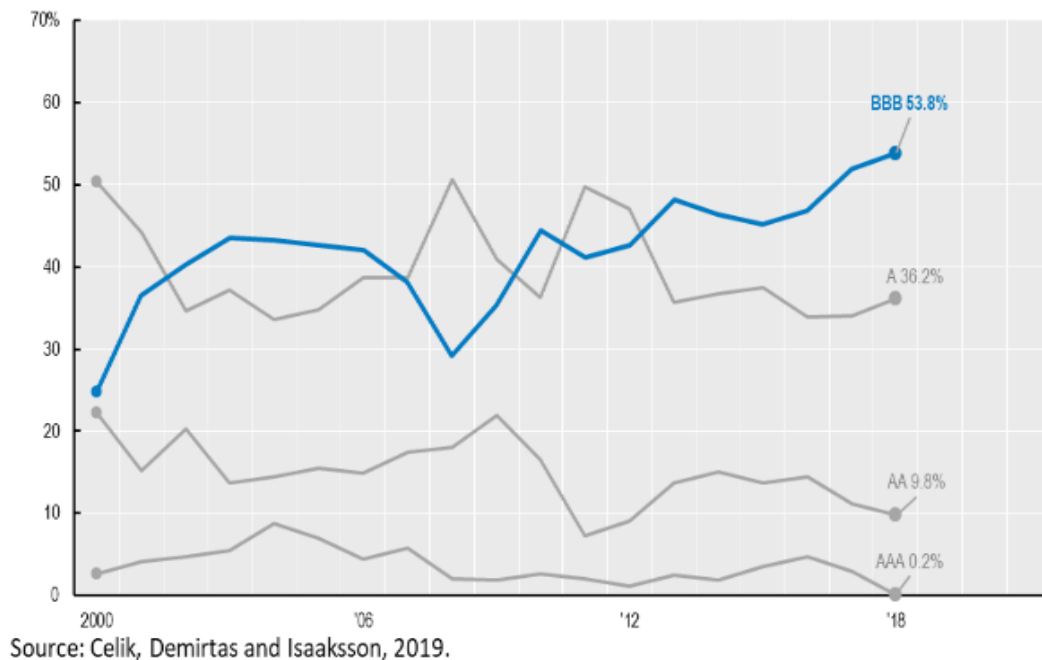


Chart 7 Rating Composition of Investment Grade Corporate Bonds



Why is this important for government finances? Run risks on vulnerable enterprises and the prospect of corporate (mass) bankruptcy are likely to provoke calls for government bailouts and guarantees. Failing asset managers and panic in the industry are also likely to lead to calls for government support, especially if the players are big and the private sector cannot organize their own rescue or takeover.

How large are these risks? One can only speculate but a 4% cost for the government (the lower bound of country experiences during the financial crisis in Table 5) on an industry of 50 trillion would imply a burden of 2 trillion US\$. Costs would very much depend on buffers and policy choices. The absence of analysis is somewhat puzzling, given past experiences.

Finally, asset managers also hold significant amounts of government debt. If such debt is of vulnerable governments with marginal ratings, the industry could stoke runs, volatility and sudden stops while having to deal with losses. Chart 5 showed that resident non-bank financial institutions held Euro 450 billion of Italian debt in late 2018. Non-residents held a total of 700 billion (though this included banks and other holders). The French non-banking sector appears to have held about 150 billion of Italian government bonds in the summer of 2018 (BIS, 2018).

Second, the non-bank financial sector includes a significant share of life insurers and pension funds. While life insurers were in a better space according to FSB scrutiny, there was a serious issue of underfunding of pension funds. Rauh (2018) estimated the funding gap for US, UK, Dutch and German pension funds at over 5 trillion US\$ in 2015/16 (Table 7). The US gap of 4 trillion constituted about 20%

of US GDP. In an adverse scenario, the gap in the Netherlands and the UK would potentially exceed 50% of GDP. The OECD (2019b) reports very large potential funding gaps as well.

**Table 7 Situation of Pension Funds**

	Total liabilities			Adverse scenario
	Actuarial (billion)	Market	Gap	Additional gap
US Public (2015)	4967	7435	2468	
US Corporate (2016)	1878	3075	1197	
US Union (2015)	614	1212	598	
UK (2016)	1825	2566	741	1411
Netherlands (2016)	1257	1339	82	348
Germany (2016)	171	210	39	61
Total (sum/average)	10712	15837	5125	1820

Source: Rauh (2018)

Is this a risk for government finances? Most probably yes, and especially in a major recession or crisis. It is hard to conceive that significant pension funds go bankrupt, leaving millions of pensioners stranded. One could argue that the risk is lower with defined contribution systems where the pensioners bear the risk of lower returns. However, if the cuts in pensions and the number of pensioners are large, political (and economic) pressure for bailouts will also be very strong.

Third, derivatives trading is largely taking place via regulated intermediaries, so-called central counterparties or CCPs. This has made derivatives trading and exposures much more transparent which is a big plus. On the other hand, counterparty risk has become more concentrated. CCPs adopted mechanisms to deal with losses via margins and loss sharing mechanisms, and resolution regimes were put in place. However, the industry may still be prone to runs and panic given how big derivative exposures are. This, in turn, suggests that governments might have to step in, especially when problems are or threaten to be systemic.

In summary, failing asset managers, corporates, pension funds and CCPs are likely to constitute significant implicit fiscal liabilities especially when a recession or crisis risks to become (or to be perceived as) systemic. However, there are no studies on past or future risks, partly due to the lack of historical experience. This is even more reason for prudence via high buffers in the non-bank financial industry and good, well-implemented regulation.

## **VI. Central Banks**

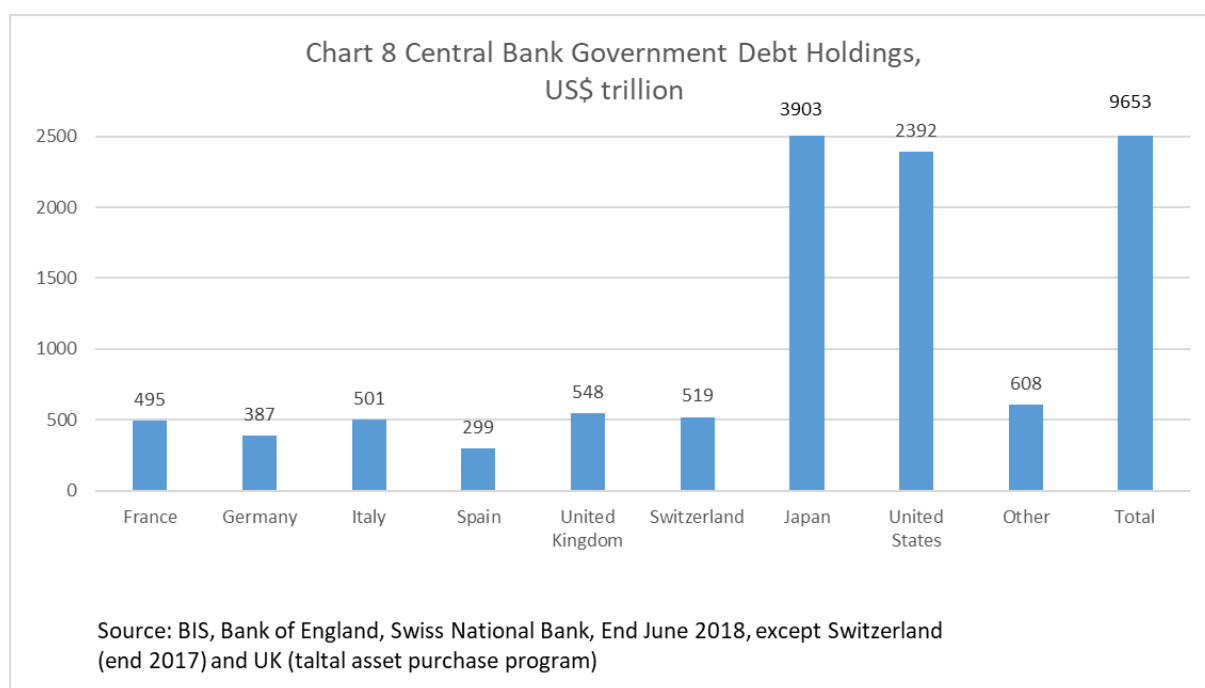
Central bank losses are a further risk of governments. How relevant such risks are dependent on a number of factors and this section only provides a very cursory glance. First, central banks, like any bank, have capital buffers. Moreover, some central banks have significant reserves, e.g. in undervalued

gold holdings. There have also been instances where central banks operated with negative equity (or unrealized losses) with the expectation that profits would recapitalize the bank over time.

In principle, and at least theoretically, central banks can “print their own money” and, thereby, shield themselves and governments. For example, the government can issue debt to capitalize the central bank, which the bank, in turn, can acquire and put on its balance sheet. Central banks also sometimes assumed financial sector losses on their balance sheets in the past (e.g., losses “parked” in special accounts). Whether this is neutral for the reputation, operation and independence of central banks depends but typically, central banks are very concerned about losses for these reasons.

In the context and aftermath of the financial crisis, advanced country central banks have taken on board risk through two channels: securities accepted in liquidity operations and asset purchases. Liquidity operations typically involved haircuts on collateral, thereby, limiting risks. For asset purchases, by contrast, the risk is with central banks, and the most important asset category is government debt.

Central banks held about one fifth of advanced country government debt in mid-2018 or almost US\$ 10 trillion (Chart 8). The most important holdings were with the Bank of Japan (3.9 trillion) and the US Federal Reserve (2.4 trillion). The central bank holdings of France, Italy, the UK, Switzerland and Germany were in the 400-600 billion range. The Bank of England and the Bank of Japan held the largest share of total government debt—20-30% (see earlier Chart 4). The central banks of these two countries, plus Italy and Switzerland also reported the largest exposure as a share of GDP. Swiss central bank debt holdings were mostly from foreign governments.



Whether such risks materialize and potentially burden government finances depends on the riskiness of government debt holdings. As long as no visible losses or write-downs occur, there is no visible balance sheet effect. Still, the vulnerabilities may be important.

There are a number of studies on central banks' role in fiscal and financial crises but there is little to no quantitative analysis of fiscal-financial risks in advanced countries via this channel. An exception is perhaps the study by Durre and Pill (2011) that examines how much government debt on the Eurosystem balance sheet could be "retired" from Eurosystem profits (seignorage). Current Eurosystem holdings fall into their range of about 1.5-2.5 trillion euros with the range being highly dependent on assumptions. In any case, central banks can only finance debt that way once.

"Normally", the central bank acquisition of government debt constitutes risk shifting within the country. It should be broadly neutral for sustainability when looking at the central bank consolidated with the rest of the public sector. If the central bank buys long term debt via short term central bank deposits, this reduces short term financing costs of government if the long rate is above the short rate. However, it may raise long term risks, as it changes the financing profile of the (consolidated) government to the short end.

The temporary effect of quantitative easing (QE) on interest rates and debt service costs is, therefore, not necessarily a sign of a permanent softening of the government budget constraint. QE is only non-neutral for national sustainability if it is mutualized at the supra-national level. In Europe, that holds for a limited fraction of the central bank asset purchases.

## **VII. International linkages**

Fiscal financial vulnerabilities are increasingly international for two reasons. First, banks and non-banks hold more and more international assets, whereby financing problems can transmit across borders, undermine financial stability and cause fiscal risks at home. Second, international financial support programs have become much larger over time so that the classic IMF-based, pre-funded support system is not sufficient any longer.

### **1. International credit**

Cross border financing that the BIS characterizes as international credit includes cross border and foreign currency bank lending and international debt securities held by banks and non-banks. It is this channel, and the related financial losses and risks and real economy effects that make buffers in the bank and non-bank system a truly international concern. And this is not just theory. In the global



financial crisis, significant losses accrued across borders, bankrupting, for example, important German banks.

The magnitude of international exposures in the financial system is huge. In 2018, international credit exceeded US\$ 30 trillion, almost 40% of global GDP (Table 8). International lending included 13.3 trillion, which was almost 40% of total credit. 17.5 trillion or almost 60% of total credit concerned international debt securities holdings. The figures include over 5 trillion in foreign currency lending and a similar amount of international bond holdings by banks.

Risks are, hence sectoral and cross-sectoral, with significant potential for spillover risks from the non-bank to the banking sector. The extent of fiscal risks from these holdings depends on the health of the domestic and foreign debtors and creditors and, again, no systematic studies are available.

**Table 8 International Credit**

	Trillion \$	% of Global GDP
Total	30.7	37.6
Bank loans	13.3	16.3
Cross border	8.0	9.8
Local in foreign cur	5.3	6.4
International debt se	17.5	21.3
Held by banks	4.7	5.7
Held by non banks	12.8	15.6

Source: BIS Quarterly Review, September 2018

## 2. Safety Nets

As regards international financial safety nets, the founders of the IMF-based financial system after World War II should feel thoroughly vindicated. The system allowed increasing international financial interdependence and liberalization of international capital flows without devastating crisis, de-globalization and pushback (unlike in the great depression). However, the growing interdependence and openness have gone hand in hand with a number of national and regional crises.

Crises will happen again just as commercial and policy errors will reoccur. It is perhaps also “normal” that the size of financial support packages has increased significantly over time given globalization, financial integration and growing international exposure (Table 9). Programs since the start of the global financial crisis have exceeded 10% of GDP, not including much higher regional support in the European countries. This compares to programs worth 2-9% in the 1995-2001 period.

**Table 9 The Size of IMF Programs**

		Amount Approved (Billion SDRs)	Amount Approved (% of GDP) 1/
Argentina	2018	40.7	11.2%
Greece	2012	23.8	14.9%
Portugal	2011	23.7	15.0%
Ireland	2010	19.5	13.7%
Greece	2010	26.4	13.8%
Argentina	2001	16.9	8.7%
Korea	1997	15.5	3.8%
Thailand	1997	2.9	2.6%
Mexico	1995	12.1	4.9%

Source: IMF Members' Financial Data, GDP from World Bank.

A/ GDP of respective country in indicated year.

In Europe, the absence of national monetary policy and exchange rate adjustment increased fiscal financial vulnerabilities considerably. As a result, countries decided to introduce the European Stability Mechanism, funded with paid in capital and backed by national guarantees (of about Euro 700 billion). This and higher IMF funding plus contingent mechanisms such as central bank swap lines increased the size of international buffers. However, with the ESM, the euro area introduced a real risk of (cross border) fiscal liabilities as recapitalization may at some point be needed and guarantees may be called.

## **VIII. Compound Risks**

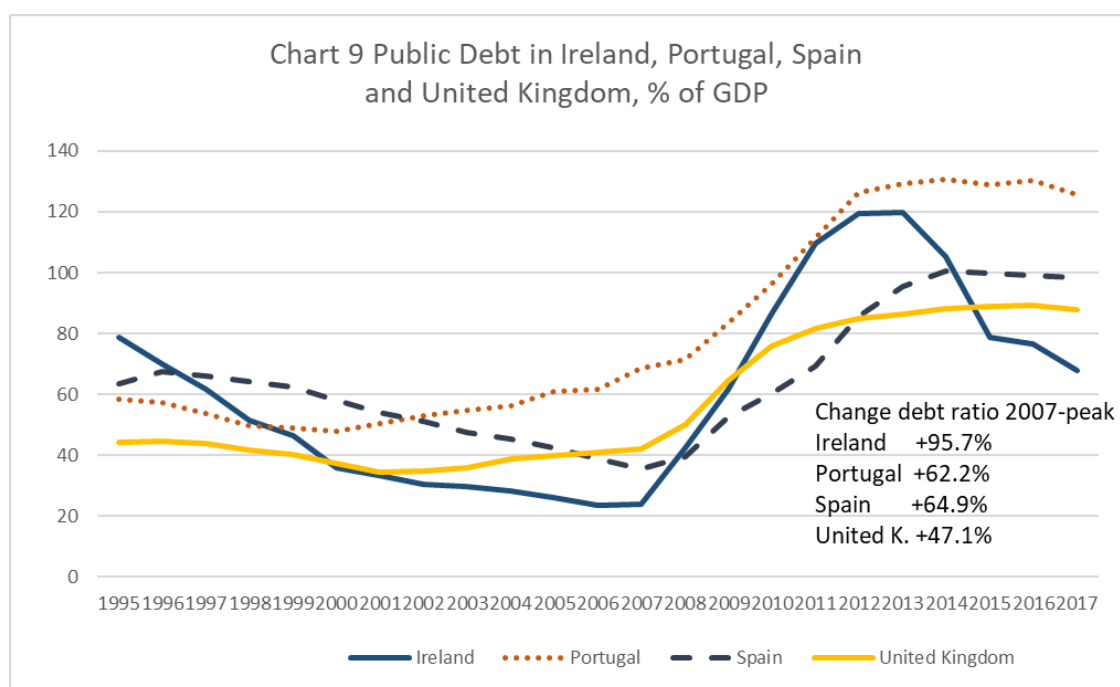
The global financial crisis revealed that risk analysis too often focused on fragments of the system and not the comprehensive picture. Consequently, the economic, financial and fiscal costs were much larger than anybody had expected or modelled. This was partly due to the lack of buffers in several places of the system but also due to the number of channels and the compound effects on fiscal balances.

As argued above, there is little to no in-depth analysis of the costs and effects of the different transmission channels and the compound effects, especially from a forward-looking perspective. However, one short cut is to measure the aggregate output loss and debt increase relative to a counterfactual.

Such an assessment is very difficult for output as the alternative growth path is truly unknown. It is somewhat easier for the total effect of fiscal financial vulnerabilities. The total debt ratio at the start of the episode can be compared with the debt ratio at the end (even though in principle one should exclude the debt increase that would have happened anyway without crisis). The change in the debt ratio, therefore, is a proxy for the compound effect of the global financial crisis.

The change in public debt during and after the financial crisis was rather staggering, especially in some of the European crisis countries (Chart 9). The Irish public debt ratio increased from about 25 to 120% of GDP, an increase of 95.7%. For Portugal and Spain, the increase exceeded 60% of GDP, for the United Kingdom it came close to 50% of GDP. This occurred despite massive interest rate cuts, which lowered public debt service costs.

Note also, that only Ireland managed to shrink public debt significantly after the crisis. Portuguese debt starting to decline significantly as of 2017. Spain and the UK (just as France and Italy) continued to report debt ratios near their post-crisis peak into 2019. This shows how difficult it is to bring down debt once it is up.



The findings on debt increases around the global financial crisis are consistent with Borio, Contreras and Zampolli (2019) who looked at crisis costs and buffers over the past decades. They argue that fiscal buffers to cover financial crisis-related losses with a 99% probability have to be between 20% and 60% of GDP. Much of course depends on the judgement whether financial risks are greater today than in the past and whether future crisis is likely to be more costly. In any case, these figures suggest that debt ratios of 100% of GDP may not provide sufficient buffers looking forward.

The argument that high debt is risky is less relevant from an interest service perspective—markets see rates as staying low for a long time. Therefore, the interest bill actually declined in advanced economies in the past decade and is not likely to rise rapidly. However, interest rates on public debt still exceed economic growth in some high debt countries (Fuest and Gros, 2019). Moreover, high debt countries

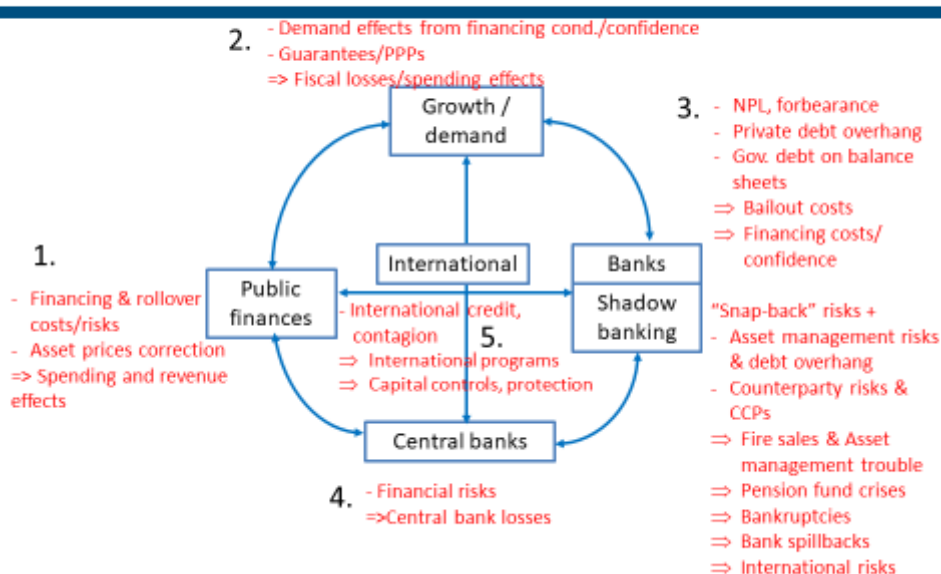
are more likely affected by large swings in risk premia and market access if deficits and debt rise rapidly (as often happens in financial crises) and risk sentiment shifts (see above).

Safety nets are available for dealing with such situations, but it is questionable whether they are sufficient if there was a wish to bail out large countries in the future with restructuring. Equally importantly, large countries would need to get the necessary political support at home and abroad for the accompanying adjustment program.

## IX. Conclusions and Implications

The paper discussed fiscal financial vulnerabilities through a number of transmission channels: asset price and financing cost effects on budgets, real economy effects, and vulnerabilities in the bank and the non-bank financial system, central banks and international linkages. The figure below shows the fiscal financial risk map including the main elements of transmission and risks.

**Fiscal-Financial Risk Map**



While fiscal buffers declined significantly over the past decade, buffers in the financial sector and in the international economy increased due to international policy coordination. At the same time, fiscal risks through all channels remain significant. Especially the non-bank financial sector and international risks are likely to be much higher today than a decade ago. There is little knowledge of the transmission and elasticities especially due to the potential non-linearity of the individual and compound effects. There is not much experience with market-based finance crisis in advanced countries. Therefore, in reality, we know little about the riskiness of the situation.

It is doubtful, whether the efforts to build buffers and reduce vulnerabilities in the fiscal and financial sphere have been enough given the analysis above (see also Borio, Contreras and Zampoli, 2019; Wolf, 2019). The IMF is pointing to growing medium term financial instability risks (IMF, GFSR, 2018/19). Moreover, population ageing and the political dominance of social expenditure increase rather than reduce future budget pressures (Schuknecht and Zemanek, 2019). Competitiveness and asset price disequilibria are probably lower in the late 2010s than a decade earlier but geopolitical challenges loom larger. Growth prospects may be lower than expected and the long-term effect of ultra-loose monetary policies remains unclear.

What needs to be done to better understand fiscal-financial vulnerabilities and prevent future fiscal shipwrecks? There are four types of action. First, public and private debt should come down to rebuild fiscal buffers and reduce financial vulnerabilities. Fiscal measures should include reducing debt biases in the fiscal and tax system (BIS 2016). Corporate taxation that favors debt and mortgage interest rate deductibility tend to be correlated with higher private debt. A number of fiscal measures can help prevent instability from real estate markets (Wolswijk, 2009).

There is a broad literature on fiscal rules towards sustainable deficits and debt. Credible medium term strategies support fiscal credibility, especially when fiscal adjustment is being delayed (Gaspar, Obstfeld and Sahay, 2016). Even if there is the firm intention not to use taxpayer money again for supporting the financial system, there may be good reasons for rapid (but not costless) clean-up operations. The presence of buffers should reduce the risk of an adverse fiscal-financial spiral with a fiscal crisis at its end.

Second, financial buffers in the bank and non-bank financial system need to augment in line with the continued implementation of the G20 and regional/national financial regulation and supervision agendas (BIS, 2019). The regulatory privileges of government debt create important distortions (BIS, 2017) that warrant change.

Third, and given the magnitude of risks and our lack of knowledge and understanding, there is a good reason to rethink the role of “circuit breakers”. There are two types of circuit breakers. First, there is national and international insurance. The crisis saw a number of new mechanisms, including the ESM and central bank swap lines, as mentioned above. There was also destabilizing insurance such as national blanket guarantees of deposits. Fiscal stimulus helped to stabilize the economy in some countries but not in those that effectively could not afford it. Forbearance (e.g. delaying the recognition of losses or the closing of a financial institution) can be a circuit breaker in the very short run but it has typically been associated with protracted problems and higher economic and fiscal costs.

There is a second type of circuit breaker, which may gain more prominence in the future. Following the examples of Greece and Cyprus, there may be more cases of capital controls to prevent the escape of private creditors and protect public bailout funds. The OECD code on the liberalization of capital flows and international discussions on debt negotiation/restructuring mechanisms serve as means of breaking destabilizing dynamics and maintaining order in markets in times of stress. Trading stops in securities (including ETF) markets like in stock markets may be advisable in an environment of automated trading and volatile markets and prices. A number of instruments are already in use or available in this regard (ESRB, 2018).

Standstills and prolongations of government debt are circuit breakers for investors to reflect and debtors to act while “the clock is on hold”. These measures could be part of a broader public debt restructuring regime that includes single-limb collective action clauses, provisions against hold-outs and a debt sustainability analysis. The aim is to reduce moral hazard and improve market monitoring by insuring private sector bail-in when government debt could be unsustainable (Weder di Mauro and Zettelmeyer, 2017 and Zettelmeyer, 2018; Destais, Eidam and Heinemann, 2019). This, in turn, would reduce international financial risks from the migration of public debt via the private sector to the public balance sheet of other countries.

Fourth, there is too little understanding of fiscal financial vulnerabilities despite progress notably via IMF and BIS studies. Given the scarcity of events in advanced countries and the difficulty of applying common academic analytical standards, it still seems worthwhile to conduct further work on the ground mapped out here.

Further analysis should also link these findings with the debate on “optimal” (or maximum) public debt. Just like the IMF Fiscal Monitor, this paper argues that one should see fiscal balances and fiscal financial vulnerabilities from a risk-management perspective. There is a literature that argued that public debt above 90% of GDP was detrimental to growth. Is there a comparable number from a fiscal-financial perspective? Debt increases of potentially 50-100% of GDP in a financial crisis would suggest that 90% is too high to prevent a future fiscal crisis. The Maastricht threshold of 60% may be more appropriate, except perhaps in safe-haven countries. But this claim also warrants further scrutiny.

## References

- Admati, A.R., P. M. DeMarzo, M. Hellwig, and P. Pfleiderer (2013) *Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity is Not Expensive*. Stanford Business School Working Paper No. 2065.
- Amaglobeli, D., N. End, M. Jarmuzek and G. Palomba (2015) *From Systemic Banking Crises to Fiscal Costs: Risk Factors*. International Monetary Fund Working Paper No. 15/166.
- BIS (Bank of International Settlement) (2016, 2019) *Annual Report*, Basle.
- BIS (Bank of International Settlement) (2017) *The Regulatory Treatment of Sovereign Exposures*, Basle: Discussion Paper.
- BIS (Bank of International Settlement) (2018 and other years) See Table of Data Sources.
- Blanchard, O. (2019) *Public Debt and Low Interest Rates*, PIIE Working Paper No. 19-4.
- Borio, C., P. Disyatat and M. Juselius (2013) *Rethinking Potential Output: Embedding Information About the Financial Cycle*, Basle: BIS Working Papers No. 404.
- Borio, C. E. Kharroubi, C. Upper and F. Zampolli (2015) *Labour Reallocation and Productivity Dynamics: Financial Causes, Real Consequences*. BIS Working Papers No. 534.
- Borio, C., M. Lombardi and F. Zampoli (2016) *Fiscal Sustainability and the Financial Cycle*, Basle: BIS Working Paper No. 552.
- Borio, C., J. Contreras and F. Zampoli (2019) *Banking Crises: Implications for Fiscal Sustainability*, Basle: BIS Mimeo.
- Buck, F. and L. Schuknecht (2017) Fiscal Soundness and the Triangle of Stability, *Credit and Capital Markets* 2/2017, pp. 171-187.
- Çelik, S., G. Demirtaş and M. Isaksson (2019) *Corporate Bond Markets in a Time of Unconventional Monetary Policy*, OECD Capital Market Series, Paris.
- CGFS (Committee on the Global Financial System) (2011) *The Impact of Sovereign Credit Risk on Bank Funding Conditions*, Basle: CGFS Papers No 43.
- De Mooji, R, M. Keen and M. Orihara (2014) Taxation, Bank Leverage and Financial Crises, in: R. de Mooji and G. Nicodeme (eds.) *Taxation and Regulation in the Financial Sector*, MIT Press.
- Destais, C., F. Eidam and F. Heinemann (2019) *The design of a sovereign debt restructuring mechanism for the euro area: Choices and trade-offs*, EconPol Europe Policy Report No. 11/2019.
- Durre, A. and H. Pill (2011) *Non-Standard Monetary Policy Measures, Monetary Financing and the Price Level*, Frankfurt: Mimeo.
- Eschenbach, F. and L. Schuknecht (2004) Budgetary Risks from Real Estate and Stock Markets. *Economic Policy*, 19(39), pp. 313-346.
- ESRB (European Systemic Risk Board) (2016) *Macroprudential Policy Issues Arising From Low Interest Rates and Structural Changes in the EU Financial System*, Frankfurt, November 2016.
- ESRB (European Systemic Risk Board) (2018) *Recommendation of the European Systemic Risk Board of 7 December 2017 on Liquidity and Leverage Risks in Investment Funds*, Frankfurt, February 2018.

- FSB (Financial Stability Board) (2018) *Global Shadow Banking Monitoring Report 2017*, Basle.
- FSB (Financial Stability Board) (2019) *Implementation and Effects of the G20 Financial Regulatory Reform*, 4th Annual Report, Basle.
- Fuest, C. and D. Gros (2019) *Government debt in times of low interest rates: the case of Europe*, EconPol Europe Policy Brief No. 16/2019.
- Honohan, P. and D. Klingebiel (2003) The Fiscal Cost of Implications of an Accommodating Approach to Banking Crisis, *Journal of Banking & Finance*, 27(2003), pp. 1539-1560.
- International Monetary Fund (2015, 2018) *Fiscal Monitor*, Washington DC.
- International Monetary Fund (2018, 2019) *Global Financial Stability Report/GFSR*, Washington DC.
- Jaeger, A. and L. Schuknecht (2007) Boom-Bust Phases in Asset Prices and Fiscal Policy Behaviour, *Emerging Markets Finance and Trade*, 43(6), pp. 45-66.
- Laeven, L. and F. Valencia (2013) *Systemic Banking Crises Database*, IMF Economic Review 61(2), pp. 225-270.
- Langedijk, S., G. Nicodeme, A. Pagano and A. Rossi (2015) *Debt bias in Corporate Income Taxation and the Costs of Banking Crises*, CEPR Discussion Papers No. 10616.
- Morris, R. and L. Schuknecht (2007) *Structural Balances and Revenue Windfalls. The Role of Asset Prices Revisited*, European Central Bank Working Paper No. 737.
- OECD (2019b) *Budgeting Outlook*, Paris.
- Rauh, J. (2018) *Fiscal Implications of Pension Underfunding*, Stanford University and Hoover Manuscript.
- Schuknecht, L. (2018) The Supply of Safe Assets and Fiscal Policy, *Intereconomics* 53(2), pp. 94-100.
- Schuknecht, L. and H. Zemanek (2018) *Social Dominance*, CESifo Working Paper No. 6997.
- Schuknecht, L., J. v. Hagen, and G. Wolswijk (2010) *Government Bond Risk Premiums in the EU Revisited*, European Central Bank Working Paper No. 1152.
- Weder di Mauro, B. and J. Zettelmeyer (2017) *The New Global Financial Safety Net. Struggling for Coherent Governance in a Multipolar World*, Essays on International Finance, Volume 4: January 2017.
- Wolswijk, G. (2009) Fiscal Aspects of Housing in Europe, in P. Arestis, P. Mooslechner, and K. Wagner: *Housing Market Challenges in Europe and the United States*. New York: Palgrave Macmillan, pp. 158-177.
- Zettelmeyer, J. (2018) Managing Deep Debt Crises in the Euro Area: Towards a Feasible Regime, *Global Policy* 9(1), pp. 70-79.