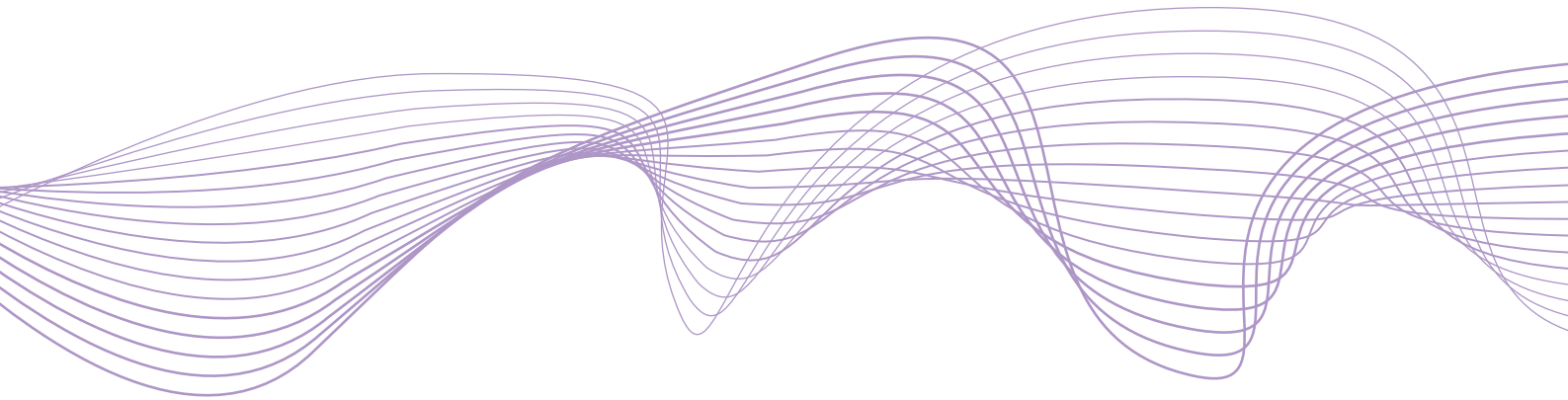
Working Paper Series

No 34 / February 2017

Resolution of international banks: can smaller countries cope?

by
Dirk Schoenmaker



ESRB
European Systemic Risk Board
European System of Financial Supervision

Abstract

The stability of a banking system ultimately depends on the strength and credibility of the fiscal backstop. While large countries can still afford to resolve large global banks on their own, small and medium-sized countries face a policy choice. This paper investigates the impact of resolution on banking structure. The financial trilemma model indicates that smaller countries can either conduct joint supervision and resolution of their global banks (based on single point of entry resolution) or reduce the size of their global banks and move to separate resolution of these banks' national subsidiaries (based on multiple point of entry resolution). Euro-area countries are heading for joint resolution based on burden sharing, while the UK and Switzerland have implemented policies to downsize their banks.

JEL Classification: F30, G21, G28
Keywords: Global Financial Architecture, International Banks, Burden Sharing, Resolution Planning, Single Point of Entry, Multiple Point of Entry

1. Introduction

The Great Financial Crisis of 2007-2009 highlighted that 'financial institutions may be global in life, but they are national in death' (Huertas, 2009, p.6). National authorities were thus on their own to resolve the respective national parts of those global banks that were failing or under severe pressure. While there have been reforms to strengthen the governance of the international banking system, they have not succeeded in addressing this coordination failure in the resolution of international banks between national authorities.

A key element of the reform is a new resolution framework setting out the responsibilities of authorities to resolve failing financial institutions in an orderly manner, by protecting critical functions and without exposing the taxpayer to the risk of loss. For this purpose, the Financial Stability Board (FSB, 2014) has introduced key principles for the resolution of international banks. Although these principles encourage cooperation between national resolution authorities, they are non–binding (Riles, 2014; Davies, 2015). As we witnessed during the Great Financial Crisis, as well as in earlier crises, authorities put non-binding agreements (like Memoranda of Understanding) aside in the heat of the moment when large sums are at stake.

There is a new literature emerging on resolution models for international banks, which applies game theory to analyse the cooperation between national authorities (Schoenmaker, 2013; Bolton and Oehmke, 2016; Faia and Weder di Mauro, 2016). A key insight is that a banking crisis can be considered as a rare event (one-shot game) with high financial stakes. The repeated game solution is thus not applicable to the non-cooperative equilibrium.

Bolton and Oehmke (2016) and Faia and Weder di Mauro (2016) analyse the two main resolution models for global banks. Under single point of entry (SPE) resolution, a global bank is recapitalised at the level of a single bank holding company that owns banking subsidiaries in multiple jurisdictions. The resolution losses are first allocated to the equity (and bond) holders of the parent holding and the authorities have statutory power to execute resolution at the parent holding. The underlying idea is that any remaining losses are shared across countries. Goodhart and Schoenmaker (2009) claim that only *ex-ante* binding burden sharing agreements between governments can solve the coordination failure. Faia and Weder di Mauro (2016) label this solution as cooperative SPE, which generally minimises losses since authorities internalise cross-country spillovers and is thus more cost-efficient.

By contrast, under multiple point of entry (MPE) resolution, separate resolutions are performed in each country (if necessary) with funds from national subsidiaries. The resolution losses are first allocated to the equity (and bond) holders of national subsidiaries. The host country has statutory power of resolution of national subsidiaries. Bolton and Oehmke (2016) show that MPE resolution is more applicable to decentralised global banks. The main contribution of Bolton and Oehmke (2016) and Faia and Weder di Mauro (2016) is to analyse the impact of the chosen resolution regime on the organisational form of banks. SPE is more inducive to centralised banks, while MPE leads to decentralised banks.

The contribution of this paper is to analyse the impact of the choice of resolution model on the structure of the banking system in a country. In our setting, authorities first choose to cooperate in resolution by providing a joint fiscal backstop under a binding burden sharing agreement, or not. Burden sharing (or loss allocation) facilitates joint supervision and cooperative SPE resolution. Without burden sharing, the home country has to carry the full burden of a possible bank recapitalisation under SPE. But the fiscal capacity of the home country can be limited, which subsequently puts the SPE model into question for banks head-quartered in these countries.

The paper develops a method to assess the potential fiscal costs for a country required to support its banking system. We apply this method to countries that are home to global systemic banks[1] and find that small and medium-sized countries cannot provide a credible fiscal backstop to large global banks. Our hypothesis is that these countries can only maintain global banks if they organise a joint fiscal backstop through burden sharing. The empirical evidence shows that medium-sized countries without burden sharing have started a policy-driven process of downsizing their banks, while countries with burden sharing have been able to preserve their banks. Our methodology is thus able to explain the impact of resolution (cooperation or the lack of it) on banking structure.

The paper is organised as follows. Section 2 discusses the need for a fiscal backstop and provides some estimates for the required size of the backstop. Section 3 analyses the (in)stability of international banking and derives three equilibrium outcomes for international coordination and banking structure. We argue that the burden sharing equilibrium is the most stable, albeit politically most difficult, outcome. Next, section 4 provides empirical evidence on these different equilibria. Finally, Section 5 discusses policy implications and concludes.

[1] Gandhi, Lustig and Plazzi (2016) provide evidence that stock investors price the implicit government guarantee for large banks, but not for small ones.

2. Need for fiscal backstop

A major reform after the Great Financial Crisis is the requirement to bail-in debt before a possible bailout of a failing bank can take place. The aim of the new bail-in regime is to reduce the costs of bank bailouts for taxpayers. While bail-in is appropriate for individual idiosyncratic failures, it may not be possible in cases of the failures of a systemically important bank or large parts of the banking system. Several academics (Avgouleas and Goodhart, 2015; Chan and Van Wijnbergen, 2015) and policymakers (Dewatripont, 2014) warn that bail-in of large banks might be adding to -instead of dampening- financial panic.[2]

In the case of a full-blown systemic crisis, there is thus still a need for a fiscal backstop by the government, either directly to recapitalise ailing banks, or indirectly as backstop for the central bank and the resolution and deposit insurance fund. The standing of a banking system depends on the strength and credibility of the fiscal backstop (Goodhart, 1998).

A framework for fiscal capacity

Fiscal capacity refers to the ability of the state to extract revenues to provide public goods. Applying this concept to banking, Pauly (2014) defines fiscal capacity as a country's budget capacity to provide a credible fiscal backstop to its banking system. As bail-in or liquidation is feasible for small and mid-sized banks, the backstop is primarily needed for the large banks. Systemic bank failures tend to be clustered due to common factors, such as a severe economic downturn, a housing bust and/or a currency crisis (Laeven and Valencia, 2013). The authorities may then need to backstop two or three of the largest banks, as, for example, happened in France, the Netherlands, Switzerland and the UK during the Great Financial Crisis (see Table 1 below). Using a conservative scenario, we assume that up to three of a country's largest banks might need to be recapitalised in a severe systemic crisis. Recapitalisation aims to restore the equity $E_{i,j}$ of bank i in country j, in the case that financial stability benefits exceed recapitalisation costs. Dermine and Schoenmaker (2010) argue that a bank's equity E_i is good proxy for recapitalisation costs. It is more precise than the often-used indicator of total assets, as not all value in assets is lost during a banking crisis. Next, a country's fiscal backstop is *ex ante* credible if the potential fiscal costs of bailing out the three largest of the population of n banks is below the hurdle rate for budget capacity B_j:

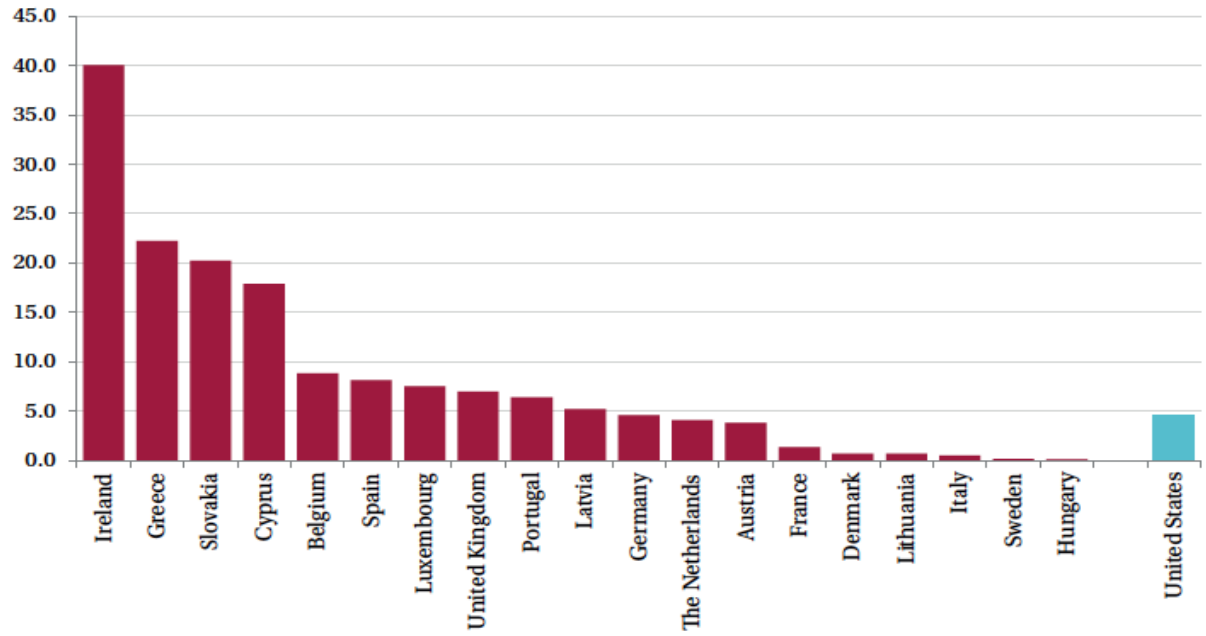
[2] The European bail-in regime allows for a financial stability exception for government support under certain conditions (see Articles 32, 44 and 56, Bank Recovery and Resolution Directive, 2014/59/EU).

$$\sum_i \max_{(n;\,1,2,3)} E_{i,j} \;\leq\; B_j \qquad (1)$$

Laeven and Valancia (2013) calculate that the direct fiscal costs of banking crises during the 1970-2011 period are on average 4 percent of GDP for advanced countries. Hüttl and Wolff (2016) provide a more granular overview with exact recapitalisation amounts of European banks during the global financial crisis and subsequent euro-debt crisis. Figure 1 shows that the direct fiscal costs range from 40 percent of GDP in Ireland to 0.1 percent in Hungary, related mainly to the depth of the crisis and the size of the banking system in countries (Hüttl and Schoenmaker, 2016).

The first four countries with very high recapitalisations costs needed external assistance from the IMF and the EU. Belgium and Spain with recapitalisations costs of about 8 percent are borderline cases with respect to external assistance. While Belgium could support the recapitalisation of its banking system without outside help, Spain needed external assistance. This was also due to far worse macro-economic conditions in Spain at the time. The recent crisis experience suggests that the hurdle rate for the credibility of the fiscal backstop hovers around 8 percent of GDP: $B_j = 8\%$.

Figure 1. Recapitalisation costs of EU and US banking systems 2008-2014 (as a % of GDP)



Source: Hüttl and (2016).

As this paper examines international banks, we are interested in the recapitalisation costs of large (inter)national banks, with assets over € 150 billion (or $ 165 billion). Table 1 illustrates

that the fiscal costs of recapitalisation and asset relief of Europe's 22 large banks were on average 2.7 percent of these banks' total assets and of the 13 large US banks on average 2.5 percent of total bank assets. Applying a 99 percent confidence interval, we find a range from 0.8 to 4.3 percent of total bank assets.

Fiscal capacity for future bank bailouts

Which countries do have a credible fiscal backstop for future banking crises? Following equation 1, we first need to determine the potential recapitalisation costs for one bank E_i. Taking the upper limit for the recapitalisation of EU and US banks in Table 1 as a conservative estimate, we standardise recapitalisation costs at 4.5 percent of total assets. Next, equation 1 requires calculating the recapitalisation costs of the largest three banks to establish a country's total potential fiscal costs.[3]

Table 2 shows that potential bailout costs for the top three banks range from 1.6 to 3.7 percent of GDP for large economies, such as China, the US and the euro area. Japan follows closely with 6.6 percent of GDP. These figures are sufficiently low to make a fiscal backstop for the large banks in these countries credible. Table 2 also shows that the potential fiscal costs for Germany, Italy and Austria are within the 4 to 5 percent range, but these countries are not home to global banks with €2 to €3 trillion in total assets, with the exception of Deutsche Bank.

The other euro area countries (with large banks) as well as the UK and Switzerland face potential fiscal costs for bailing out the largest banks ranging from 8.4 to 13.5 percent. The credibility of the fiscal backstop for these countries can be questioned, both the budgetary capacity (exceeding the indicative hurdle rate of 8 percent of GDP) and the political willingness to spend such large amounts. We should note that these calculations do not take into account (partial) bail-in, which would lower the potential costs for the government, or the fiscal space of individual countries (see Demirgüç-Kunt and Huizinga (2013) on the latter).

[3] France and Germany with 5 large banks in Table 1 still fit within the three largest banks scenario. France recapitalised all its largest banks during the crisis to avoid a bad signalling effect, but the aggregate amount of state aid is small. Germany did not have to recapitalise its largest bank Deutsche Bank with assets of € 2,814 bn (see Table 3). The combined assets of the last three large German banks in Table 1 (Bayerse, Hypo Real Estate and HSH Nordbank) is smaller at € 900 bn.

Table 1. Direct recapitalisation of large EU and US banks

Panel A: Direct recapitalisation of EU banks (2008-2013)

#	Bank name	Total assets (EUR bn)	State aid (EUR bn)	State aid in % of total assets
1	BNP Paribas (FR)	2,070.0	5.1	0.2%
2	Royal Bank of Scotland (UK)	2,050.0	81.1	4.0%
3	Crédit Agricole (FR)	1,740.0	6.0	0.3%
4	Société Générale (FR)	1,075.0	3.4	0.3%
5	Groupe BPCE (FR)	1,030.0	0.5	0.05%
6	ING (NL)	960.0	15.0	1.6%
7	Commerzbank (DE)	735.0	18.2	2.5%
8	Lloyds Banking Group (UK)	715.0	28.3	4.0%
9	Crédit Mutuel (FR)	580.0	2.4	0.4%
10	BNP Paribas Fortis (BE)	530.0	10.8	2.0%
11	Dexia (BE)	520.0	17.4	3.4%
12	Nordea Bank (SE)	510.0	0.5	0.1%
13	Landesbank Baden-Württemberg (DE)	410.0	14.0	3.4%
14	ABN AMRO (NL)	380.0	16.9	4.4%
15	Bayerische Landesbank (DE)	380.0	10.0	2.6%
16	Hypo Real Estate Holding (DE)	345.0	10.7	3.1%
17	KBC Group (BE)	340.0	10.8	3.2%
18	NORD/LB (DE)	225.0	3.1	1.4%
19	Banca Monte dei Paschi di Siena (IT)	215.0	5.8	2.7%
20	HSH Nordbank (DE)	175.0	3.0	1.7%
21	Bank of Ireland (IE)	170.0	7.1	4.2%
22	Allied Irish Banks (IE)	150.0	21.4	14.1%
	Average EU banks			**2.7%**
	Lower and upper bound*			**1.1 – 4.3%**

Panel B: Direct recapitalisation of US banks (2008-2012)

#	Bank name	Total assets (USD bn)	State aid (USD bn)	State aid in % of total assets
1	JPMorgan Chase	2,175.0	25.0	1.1%
2	Citigroup	1,940.0	45.0	2.3%
3	Bank of America	1,820.0	45.0	2.5%
4	Wells Fargo	1,310.0	25.0	1.9%
5	Goldman Sachs	850.0	10.0	1.2%
6	Morgan Stanley	770.0	10.0	1.3%
7	PNC Financial Services Group	290.0	7.6	2.6%
8	U.S. Bancorp	270.0	6.6	2.5%
9	Bank of New York Mellon	240.0	3.0	1.3%
10	SunTrust Banks	190.0	4.9	2.6%
11	State Street	175.0	2.0	1.1%
12	Ally Financial	170.0	17.5	10.2%
13	Capital One Financial	165.0	3.6	2.1%
	Average US banks			**2.5%**
	Lower and upper bound*			**0.8 – 4.2%**

*Notes: Direct recapitalisation costs for the government are based on state aid figures for direct recapitalisation and asset relief. Large banks are defined as banks with assets above EUR 150 bn / USD 165 bn. * the lower and upper bound are based on a 99% confidence interval.*
Source: Hüttl and Schoenmaker (2016).

Table 2: Potential fiscal costs for major countries, 2015 (as a % of GDP)

Countries	Assets in $ billion	Recapitalisation in $ billion	Fiscal costs % of GDP
Top 3 banks China	8,991	405	3.7%
Top 3 banks US	6,287	283	1.6%
Top 3 banks Japan	6,023	271	6.6%
Top 3 banks Euro Area	5,785	260	2.3%
Top 3 banks France*	5,465	246	10.2%
Top 3 banks Germany*	2,794	126	3.7%
Top 3 banks Spain*	2,646	119	9.9%
Top 3 banks Netherlands*	2,064	93	12.3%
Top 3 banks Italy*	1,854	83	4.6%
Top 3 banks UK	5,288	238	8.4%
Top 3 banks Switzerland	1.989	90	13.5%

*Notes: The largest three home country banks (ie headquartered in the home country) are chosen for each jurisdiction. Recapitalisation is standardised at 4.5 percent of total assets. The fiscal costs represent the potential fiscal costs of recapitalising the largest three banks as percentage of GDP. The countries indicated with an astrix * are member of the European Banking Union.*
Source: Assets from Top 1000 World Banks, The Banker (July 2016), and GDP from Worldbank.

3. Stability of international banking

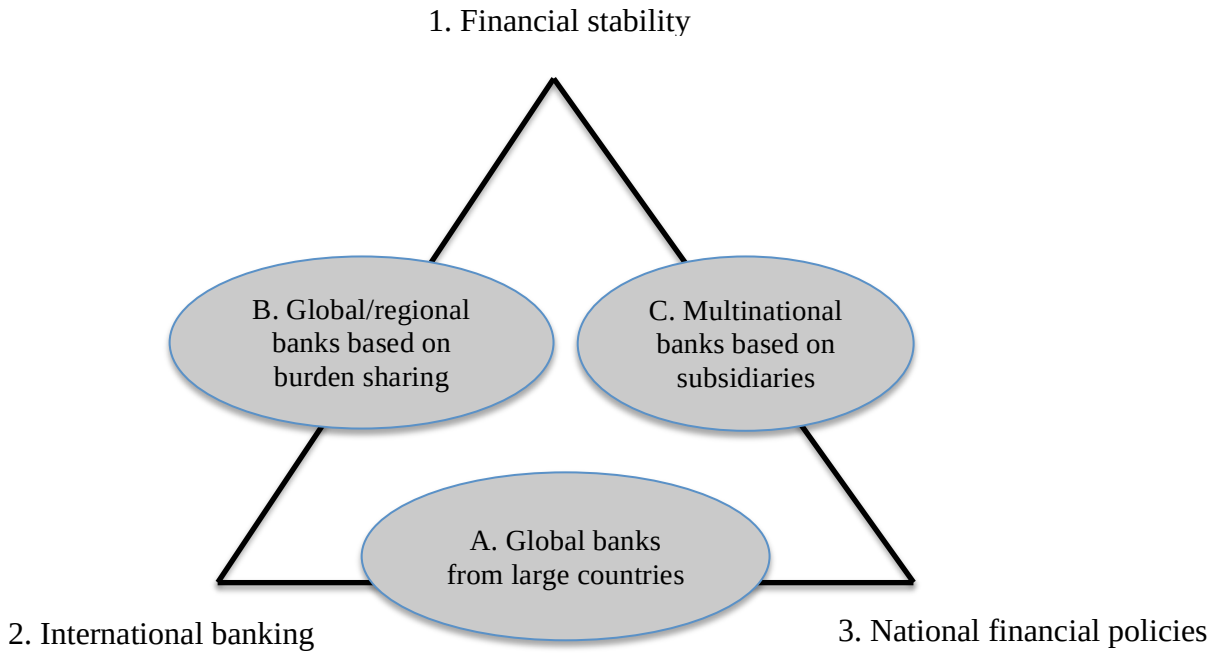
The provision of a credible fiscal backstop to international banks is challenging. The involved countries do not take into account any foreign externalities of a potential bank failure, and are only prepared (and politically authorised) to backstop their respective domestic part. More formally, the financial trilemma states that the objectives of (1) financial stability, (2) international banking, and (3) national financial policies for supervision and resolution[4] are incompatible (Schoenmaker, 2011). Any two of the three policy objectives can be combined but not all three; one has to give. The choice of policymakers produces three equilibrium outcomes for the structure of the international banking system, which differ in viability and stability. Figure 2 illustrates the equilibria of the financial trilemma. In a

[4] A broad definition of the governance framework for financial supervision and resolution is used: rulemaking, supervision, lender of last resort (i.e. emergency liquidity assistance), deposit insurance, resolution and the fiscal backstop (Schoenmaker, 2013).

similar vein, Eatwell, Gossé and Alexander (2014) develop similar, though slightly different, scenarios.

The purpose of this section is to analyse the ultimate consequences of countries' policy choice within the financial trilemma framework for the structure of the international banking system. In our analysis, the presence of large international banks is taken as given. The paper does not analyse the (dis)advantages of large banks or financial globalisation (see Kose *et al*, 2009, on the latter).

Figure 2: Equilibria of the financial trilemma



Source: Adapted from Schoenmaker (2011)

Equilibrium A. - Global banks, headquartered in large countries

The first two equilibrium outcomes concern centralised global banks.[5] We first deal with global banks headquartered in large countries. As analysed in Section 2, small and medium-sized countries have less fiscal capacity to support large global banks. The equilibrium outcome A. aims to achieve the policy objectives of international banking and national

[5] See Chapter 3 of Schoenmaker (2013) for a full description of bank business models. The global bank is a centralised international bank. By contrast, the multinational bank is a decentralised international bank.

financial policies. While having the headquarters in a large country solves the fiscal capacity problem, it does not address the issue of incorporating foreign externalities (see also Herring (2007) and Riles (2014) on incentive problems in international banking). Large countries are pre-occupied with the domestic externalities of a possible failure and do not take into account cross-border externalities.

This raises questions about the credibility of foreign retail branches and the application of deposit insurance (from the home or host country?). In times of crisis, the home authorities may save the entire institution (e.g. the case of AIG with many foreign counterparties) or not. The basis for resolution, SPE or MPE, is not clear. Even if the global bank states in its resolution plan that it will apply SPE, this is subject to time inconsistency. There are severe scenarios possible, whereby the home resolution authority and global bank jointly decide to rescue the home country part and to let the other parts go. The Fed, for example, provided bridge financing for only the US part of Lehman Brothers. The Lehman case is thus instructive about the time inconsistency of SPE. Faia and Weder di Mauro (2016) label this model outcome as the uncooperative SPE approach.

Given the inherent uncertainty about home country support, host countries might want to ring-fence the host country operations (e.g. by demanding a separately licenced and capitalised subsidiary) and provide host country deposit insurance. We are then in equilibrium C. with multinational banks (see below). Equilibrium A. with global banks from large countries is thus not very stable for host countries. Eatwell, Gossé and Alexander (2014) call equilibrium A. US-China hegemony. The US and China are the largest economies, which can still afford to have large banks and also have the geopolitical power to impose their preferred model. Nevertheless, host countries may in the long run not accept the unilateral approach of these large countries.

Equilibrium B. - Global or regional banks, based on burden sharing

The second equilibrium outcome is global or regional banks, based on burden sharing between the countries in which the banks operate. This outcome aims to preserve financial stability and international banking. It gives up on national financial policies, as governments work together in supervision and resolution based on hard law. As countries cooperate and review these banks on a consolidated basis, the resolution strategy is structured on SPE and all externalities, both domestic and cross-border, are taken into account. The cooperation has to be hard-wired in a legally binding agreement for burden sharing. Goodhart and

Schoenmaker (2009) sketch the various schemes for burden sharing, ranging from general burden sharing based on the relative size of participating countries (e.g. GDP or population) to specific burden sharing based on the relative presence of the failing bank (e.g. geographic segmentation of its assets). Faia and Weder di Mauro (2016) designate this model outcome as the cooperative SPE approach.

The technical solution of burden sharing addresses the problems of fiscal capacity and foreign externalities and is thus a stable equilibrium. The challenge is political (Rodrik, 2011). Are countries prepared to join forces in financial policies, and thus give up part of their sovereignty in this field? Unless or until fiscal authority moves to the level implied by globalising markets, effective policy capacity and durable political legitimation will remain in tension. Experimentalism and institutional innovations like the Basel process for banking supervision standards may help us live with such tensions (Pauly, 2014). Ad hoc arrangements during and after crises do give rise to reasonable expectations of future regulatory, monetary, and fiscal coordination.

Eatwell, Gossé and Alexander (2014) distinguish between regional and global banks based on cooperation. Regional cooperation is possible at the level of the European Union, NAFTA extended to Central American and the Caribbean countries, and a Far-east group centred on China and including Japan, Korea and ASEAN countries. In the case of global banks, multipolar collaboration is conceivable at the level of the G-20 with the necessary supranational institutions to enforce the commonly agreed rules.

Equilibrium C. - multinational banks, based on national subsidiaries

The third equilibrium outcome is that of multinational banks, based on a string of national stand-alone subsidiaries. This outcome results from combing the policy objectives of financial stability and national financial policies. The principle idea is that the national financial authorities require that the subsidiaries are separately capitalised and managed.[6] If one of the subsidiaries or the parent bank fails, the other parts of the multinational bank can continue. The national authorities can deal with each part separately and financial stability is contained at the national level without further (international) contagion. The resolution

[6] The host country applies both capital and bail-in requirements to national subsidiaries (but not branches). The FSB proposes that each material sub-group maintains an internal TLAC (Total Loss-Absorbing Capacity) of 75 to 90 percent of the external TLAC requirement that would apply to the material sub-group if it were a resolution group (Principle 18 of TLAC Termsheet, FSB, 2015).

strategy is based on MPE and deposit insurance, if any, is arranged by the respective home and host countries.

But is this equilibrium outcome viable and realistic? Banks still want to exploit synergies, for example, from centralised risk management and one brand name. Next, foreign subsidiaries often use a parent guarantee to enhance their creditworthiness, which reduces funding costs and makes the subsidiary a stronger counterparty in derivative transactions. Freshfields Bruckhaus Deringer (2003), an international law firm, examines to what extent legal firewalls (separate legal personality and limited liability of subsidiaries) can help to reduce or prevent contagion risk within a financial group. They find that legal firewalls can help to protect from direct contagion (credit exposures arising from intragroup transactions or operational risk from sharing of services), but are less effective in limiting indirect contagion (reputation risk and funding risk). This is because indirect contagion arises from perceptions and behaviour of (potential) counterparties and other market participants. The strategy of most major banks of developing and maintaining a global brand reinforces contagion risk.

A good example of indirect contagion is the Drexel Burnham Lambert collapse in 1990. While the Drexel Burnham Lambert Group experienced difficulties in the United States, the London subsidiary was solvent. Nevertheless, the Bank of England had to intervene as facilitator because the counterparties did not want to deal directly with the solvent London subsidiary.

In an empirical study, Anginer, Cerutti and Soledad Martinez Peria (2016) examine the association between default risk of foreign bank subsidiaries and their parents. After controlling for common factors, they find a positive correlation of default of 0.2 to 0.3. Although the correlation is lower for subsidiaries operating in countries that impose higher capital and disclosure requirements and tougher restrictions on bank activities, host country policies cannot break the link between the default risk of the foreign bank subsidiary and that of its parent bank located in the home country.

From these legal and empirical studies, we conclude that externalities between national subsidiaries of a multinational bank and its parent bank cannot be eliminated completely. Supervisors and resolution authorities from the home and host countries will need to cooperate when these banks experience problems, if they want to prevent disorderly outcomes and maintain financial stability. But where are the incentives and/or binding arrangements for cooperation in this MPE approach? The financial trilemma model suggests

that financial stability can only be managed at the national level in the case of truly stand-alone national banks, without further connections. So, the long run equilibrium C. is a multinational banking system, whereby the national authorities impose increasingly high ring-fencing requirements on national subsidiaries to limit contagion.

Summing up, each equilibrium outcome has its own challenges. Equilibrium A. is the least stable, as host countries will recognise that the home country authorities of global banks will not deal with the cross-border fall-out of a bank failure. They will thus take pre-cautions by requiring separately capitalised subsidiaries and ring-fencing the assets in these subsidiaries. This brings us in equilibrium C. with multinational banks, where national authorities try to contain the respective fall-out in their jurisdiction, but without any authority taking care of international contagion. Equilibrium B. with burden sharing between countries solves the coordination problem in international banking, but is politically difficult to achieve.

4. International banking in practice

The next step is to test the existence of the three equilibrium outcomes in the international banking landscape. The hypothesis is that global integrated banks (based on SPE) can only be supported by large countries (A.) or by a group of smaller countries based on binding burden sharing (B.). The alternative is organising international banks as multinational banks based on MPE resolution (C.) and/or downsizing the international banks.

Global banks

The vast majority of international banks adopt the 'global bank' model. Global banks operate on a centralised business model and adopt an SPE resolution strategy (at least on paper). For analytical purposes, we distinguish three broad groups of global banks:

- Global banks from large countries, like the US, China and possibly Japan;
- Global banks from the euro area, which has adopted Banking Union with some -albeit limited- forms of burden sharing;
- Global banks from mid-sized countries, like the UK and Switzerland, which are operating independently.

Our hypothesis is that only large countries or smaller countries working together can still maintain global banks. By inclination, independently operating smaller countries have to downsize international banks headquartered in their jurisdiction. To test this hypothesis, we examine the development of the size of the global banks in the aftermath of the Great Financial Crisis (GFC). The relevant period is from the eve of the GFC at end-2007 until now at end-2015 (latest available data). We take the top 20 banks for both periods, as published by The Banker (July 2008; July 2016). While ups and downs of a country's banking system are largely cyclical, the aim is to examine the structural trend (corrected for GDP growth) in the aftermath of the GFC. The structural trend is measured by the net annualised change, which is calculated as annualised asset growth minus annualised GDP growth.

Table 3 reports the results. Our empirical results show that the largest Chinese and US banks have still been growing largely in line with GDP at an annualised net rate of +1 and -1 percent, respectively, over the 2007-2015 period. Surprisingly, the large Japanese banks have grown faster than the economy at an annualised net rate of +5 percent over the same period. The large countries seem thus to be able to 'maintain' their large banks. Next, the largest euro-area banks have, like the US, grown at an annualised net rate of -1 percent. The Banking Union appears thus to be instrumental in maintaining the large euro-area banks.

By contrast, the large UK and Swiss banks have contracted at -5 and -11 percent respectively. These mid-sized countries have enacted major reforms (both structural reforms and higher capital charges) with the official aim to increase the resilience of their banking system, and the intended side effect of downsizing their large banks and reducing their foreign activities at the same time. The new requirements have been disproportionally stringent on the largest banks compared to the rest of the banking system. A case in point is the Vickers separation of retail and wholesale banking, which affects the large UK banks. The main purpose of this separation is to limit the contingent liability of the UK taxpayer to support the British banking system (Goodhart, 2012). Moreover, the UK and Switzerland have imposed higher capital surcharges on their large banks than other countries. In the aftermath of the Iceland experience with the failure of its banks in 2008, whereby Iceland was not able to support its banks' outsized foreign activities, the UK and Switzerland also want to reduce their 'foreign exposures'. Contrarily, the major euro area countries have implemented some lighter 'Liikanen' reforms (Liikanen, 2012) than the UK and Switzerland. An open issue is whether policymakers will shift the fiscal backstop for the euro-area banking system from the country to the euro-area level (see below).

Table 3: Development of global banks for the major countries, 2007-2015

Banking groups	2007		2015		2007-15		
	Assets in $ billion	Asset rank	Assets in $ billion	Asset rank	Change		
					Assets	GDP	Net
Top 5 Chinese banks	3,928		12,684		16%	15%	1%
ICBC	1,189	20	3,422	1	14%		
China Construction Bank	903	23	2,827	2	15%		
Agricultural Bank of China	726	27	2,741	3	18%		
Bank of China	820	25	2,591	5	15%		
Bank of Communications	289		1,103	23	18%		
Top 5 US banks	7,943		8,879		1%	3%	-1%
JPMorgan Chase	1,562	12	2,352	7	5%		
Bank of America	1,716	10	2,147	9	3%		
Wells Fargo[1)]	1,358	29/41	1,788	11	3%		
Citigroup	2,187	7	1,731	13	-3%		
Goldman Sachs	1,120	21	861	28	-3%		
Top 8 Euro Area banks	14,578		11,807		-3%	-1%	-1%
BNP Paribas	2,477	3	2,168	8	-2%		
Crédit Agricole	2,253	6	1,847	10	-2%		
Deutsche Bank	2,814	2	1,771	12	-6%		
Banco Santander	1,335	17	1,457	17	1%		
Société Générale	1,567	11	1,450	18	-1%		
Groupe BPCE[2)]	1,184	24/44	1,268	19	1%		
UniCredit	1,494	15	935	25	-6%		
ING Bank	1,453	16	911	26	-6%		
Top 4 UK banks	10,600		6,492		-6%	-1%	-5%
HSBC Holdings	2,354	5	2,410	6	0%		
Barclays	2,443	4	1,672	15	-5%		
RBS	3,771	1	1,207	20	-13%		
Lloyds Banking Group[3)]	2,031	18/33	1,204	21	-6%		
Top 3 Japanese banks	4,344		6,023		4%	-1%	5%
Mitsibushi UFJ	1,939	9	2,649	4	4%		
Mizuho	1,551	13	1,718	14	1%		
Sumitomo Mitsui	854	24	1,657	16	9%		
Top 2 Swiss banks	3,211		1,781		-7%	4%	-11%
UBS	2,009	8	952	24	-9%		
Credit Suisse	1,202	19	829	31	-5%		
Total 27 banking groups	44,604		47,667		1%	3%	-2%

Notes: Total assets and assets rank are provided for the major banks in the top 20 both for 2007 and 2015. Mergers: 1) Wells Fargo reports the combined assets of Wachovia and Wells Fargo in 2007; 2) Groupe BPCE reports the combined assets of Groupe Caisse d'Epargne and Groupe Banques Populaires in 2007; 3) Lloyds Banking Group reports the combined assets of HBOS and Lloyds TSB Group in 2007. The change is calculated as an average annualised rate over the 2007-2015 period; the net change is annualised asset growth minus annualised GDP growth.
Sources: Assets from Top 1000 World Banks, The Banker (July 2008; July 2016), and GDP from Worldbank.

An alternative hypothesis for the relative decline of large UK and Swiss banks is the market discipline channel. These banks face higher external debt finance costs due to lower credibility of their fiscal backstop. The hypotheses (policy respectively market induced decline) are complementary and both point to downsizing of the large banks.

We discuss the implications of our results for the international banking landscape in more detail below.

Equililbrium A. – Global banks from large countries

The first group of global banks are from the large countries. This is an equilibrium insofar as these large countries can provide a credible fiscal backstop to their banking system. Table 3 confirms the trend that the leading global banks are based in the large countries. Looking at the top 20 banks in 2015, China, the US, the Euro area and Japan are home to these banks, with still one major bank from the UK, namely HSBC, on the 5th position (the position of the other UK banks is swiftly declining with Barclays tumbling from 4 in 2007 to 15 in 2015 and RBS from 1 to 20). The Swiss banks dropped out altogether from the top 20. The same trend is visible in investment banking (Goodhart and Schoenmaker, 2016). The US investment banks are about to surpass European investment banks in the European market. The Chinese investment banks are growing fast and have already overtaken the US and European investment banks in the Asian-Pacific market.

Equililbrium B. – Global / regional banks and burden sharing

The second group of global banks are based in the European Banking Union, with banks like BNP Paribas, Deutsche Bank, ING and UniCredit. Table 2 shows that the potential fiscal costs can be large at the country level, from 10 to 12 percent of GDP for France, the Netherlands and Spain. The credibility of the fiscal backstop to their banking system can be questioned for these countries. If the fiscal backstop were moved to the euro area level, the costs would drop to 2 percent of GDP. The fiscal backstop will then be as credible as that of the US and China.

The Banking Union countries thus face a political choice, which is not only important from a financial stability perspective, but also from a geopolitical perspective. If they want to stay at par with the other two world powers, these countries must organise the fiscal backstop at the euro area level.

The European Stability Mechanism (ESM) is enshrined in an intergovernmental treaty (hard law) and based on a general form of burden sharing, with the burden sharing key based on an arithmetic average of countries' shares in population and GDP (Goodhart and Schoenmaker, 2009). The ESM was created as fiscal backstop to member countries. Under the current arrangements, it provides a very partial backstop to the Banking Union banking system. A member country can receive an ESM loan to recapitalise its banks (the indirect recapitalisation of Article 15 ESM Treaty). Only when a member's fiscal sustainability is in danger (ESM, 2014), the ESM can directly recapitalise banks from that member country under certain conditions (e.g. an own contribution of the member country and a bail-in of 8 percent of a bank's total liabilities) and with unanimity of votes, which might lead to protracted negotiations with an uncertain outcome. The current ESM Direct Recapitalisation Instrument falls thus short of an *ex ante* credible fiscal backstop at the euro area level.

A first step to complete the ESM as fiscal backstop to the banking system would be to enable direct bank recapitalisation from the ESM, without first waiting for the country to go bankrupt and subsequently meeting prohibitive conditions and voting procedures (e.g. Goyal *et al*, 2013). A second step is to establish a Single Resolution and Deposit Insurance Fund, with a credit line from the ESM, similar to the FDIC, which has a US Treasury credit line (Gros and Schoenmaker, 2014).

In risk sharing terms, the ESM would then be behind the bank risk sharing, both directly by providing direct bank recapitalisation and indirectly by providing a credit line to the Resolution and Deposit Insurance Fund. The European arrangements would then match the US arrangements for bank risk sharing (Gros and Belke, 2015).[7]

Equililbrium C. – Global banks without a credible fiscal backstop (multinational banks)

Our analysis suggests that the third group of banks from mid-sized countries can no longer operate as integrated global banks, based on an SPE resolution strategy. As the fiscal backstop to these banks is less credible, equilibrium A. of global banks is not sustainable for them. These banks end up by inclination in equilibrium C. of multinational banks with MPE resolution.

[7] More broadly, burden sharing for international banks, as part of wider package of supervision and resolution of these banks by a world authority, could be organised at the global level (e.g. Schoenmaker, 2013; Eatwell, Gossé and Alexander, 2014), but that is currently not on the horizon of policymakers.

HSBC, Santander and BBVA are examples of large multinational banks, which have a decentralised structure with national subsidiaries and openly adopt the MPE approach. HSBC is a truly international bank, spanning the three main continents: the Americas, Europa and Asia. At the global level, HSBC adopts an MPE approach with three main resolution hubs in the UK, the US and Hong Kong (see the US Resolution Plan 2015 of HSBC filed at the Federal Reserve Board). The Spanish banks, Santander and BBVA, have major foreign operations outside the Banking Union in the UK (only Santander), the US and Latin America. By getting local funding for their subsidiaries and adopting an MPE approach, they aim to compartment the risks. The Chief Economist for Financial Regulation at BBVA proposes that an SPE approach might be suitable for the euro area, as that should be regarded as a single jurisdiction, combined with an MPE approach for third countries (Fernández de Lis, 2015).

Credit Suisse, one of the two large Swiss banks, has an SPE approach at the global level with bail-in debt at the group holding company. But below that Credit Suisse is in the process of implementing separate country subsidiaries for its major operations and two subsidiaries (one at the global level and one in the US) for shared services functions. The main country subsidiaries are planned in Switzerland for its Swiss business, in the US for all US activities, and in the UK as hub for its European investment banking business (Credit Suisse, 2013).[8] This approach illustrates that while SPE is the preferred strategy, the planned legal structure allows for MPE resolution at country level if needed. This new legal structure thus reflects the limited credibility of the Swiss fiscal backstop.

It should be noted that the MPE approach with a segmented banking system is more expensive than the cooperative SPE approach with an integrated banking system (see also Bolton and Oehmke, 2016, and Faia and Weder di Mauro, 2016). On the funding front, capital and liquidity are trapped at the national level and cannot be freely used within the group, which leads to higher overall holdings of capital and liquidity (Cerutti *et al,* 2010). TLAC also needs to be pre-positioned for 75 to 90 percent at the national subsidiaries (see Section 3). On the resolution front, SPE allows for the less costly cooperation approach in resolution, whereby potential bailout costs for capital shortfalls are shared among the countries according to the burden sharing key. By contrast, MPE forces separate resolutions. On the operational front, a bank with an MPE resolution strategy needs to establish a separate subsidiary for shared services to guarantee continued services to the surviving subsidiaries.

[8] Credit Suisse has opened a Dublin branch in 2015 (Credit Suisse Annual Report 2015). It is not clear yet what the impact of Brexit is on the UK passport and where Credit Suisse will move its European passport business.

5. Policy implications and conclusions

Much has been done to strengthen the stability of the banking system. Nevertheless, international financial stability remains elusive. National authorities have a natural tendency to focus on their national self-interest, which makes it difficult to supervise and resolve international banks in a joint spirit. Cooperation based on soft law may break down at times of crisis, as witnessed during the Great Financial Crisis. Nevertheless, this is still the prevailing governance approach (e.g. Crisis Management Groups based on Memoranda of Understanding) adopted by the Financial Stability Board (Riles, 2014; Davies, 2015).

Hard law, underpinned by a binding burden sharing agreement, is needed to ensure cooperation for SPE resolution between national authorities and can thus provide a stable basis for international banking (Goodhart and Schoenmaker, 2009). The euro area is in the process of building a fiscal backstop for the Banking Union. The European Stability Mechanism, which is based on burden sharing, would then become available for direct recapitalisation of banks and function as a backstop to a Single Resolution and Deposit Insurance Fund.

If the euro area were to establish such a fiscal backstop, it would be able to absorb banking shocks at the euro-area level and thus enhance financial stability. The euro area would also come at par with the United States, China and Japan, which are the only countries left with the fiscal capacity to support large global banks (operating on an SPE resolution model). The cooperative SPE model with an integrated banking system is more cost-efficient than the MPE model with a segmented banking system. The remaining mid-sized countries, such as the UK and Switzerland, would then play a secondary role in international banking with multinational banks operating on an MPE model.

References

Anginer, A., E. Cerutti, and M. Soledad Martinez Peria (2016), 'Foreign Bank Subsidiaries Default Risk during the Global Crisis: What Factors Help Insulate Affiliates from their Parents?', *Journal of Financial Intermediation*, forthcoming.

Avgouleas, E. and C. Goodhart (2015), 'Critical Reflections on Bank Bail-ins', *Journal of Financial Regulation* 1, 3-29.

Bolton, P. and Oehmke, M. (2016), Bank Resolution and the Structure of Global Banks, Working Paper, Princeton University.

Cerutti, E., A. Ilyina, Y. Makarova, and C. Schmieder (2010), 'Bankers without Borders? Implications of Ring-Fencing for European Cross-Border Banks', in: P. Backé, E. Gnan and P. Hartmann (eds), *Contagion and Spillovers: New Insights from the Crisis*, SUERF Study 2010/5, Vienna.

Chan, S. and S. van Wijnbergen (2015), 'Cocos, Contagion and Systemic Risk', CEPR Discussion Paper No. 10960.

Credit Suisse (2013), 'Credit Suisse Group announces plan to evolve its legal entity structure', Press Release, 23 November, Zurich.

Davies, P. (2015), 'Resolution of Cross-Border Groups', in: M. Haentjes and B. Wessels (eds), *Research Handbook on Crisis Management in the Banking Sector*, Edward Elgar, Cheltenham, 261-282.

Demirgüç-Kunt, A. and H. Huizinga (2013), 'Are banks too big to fail or too big to save? International evidence from equity prices and CDS spreads', *Journal of Banking & Finance* 37, 875-894.

Dermine, J. and D. Schoenmaker (2010), 'In Banking, Is Small Beautiful?', *Financial Markets, Institutions & Instruments* 19, 1-19.

Dewatripont, M. (2014) 'European banking: Bailout, bail-in and state aid control', *International Journal of Industrial Organization* 34, 37-43.

Eatwell, J, J.B. Gossé and K. Alexander (2014), 'Financial Markets and International Regulation', in: J. Eatwell, T. McKinley and P. Petit (eds), *Challenges for Europe in the World, 2030*, Routledge, Abingdon, 105-137.

ESM (2014) 'FAQ on the ESM direct recapitalisation instrument', European Stability Mechanism, Luxembourg, December.

Faia, E. and Weder di Mauro, B. (2016), 'Cross-Border Resolution of Global Banks: Bail in under Single Point of Entry versus Multiple Points of Entry', CEPR Discussion Paper No 11171.

Fernández de Lis, S. (2015), 'The Multiple-Point-of-Entry Resolution Strategy for Global Banks', blog, International Banker, 25 February.

Financial Stability Board (2014), Key Attributes of Effective Resolution Regimes for Financial Institutions, Basel.

Financial Stability Board (2015), Principles on Loss-absorbing and Recapitalisation Capacity of G-SIBs in Resolution: Total Loss-absorbing Capacity (TLAC) Term Sheet, Basel.

Freshfields Bruckhaus Deringer (2003), *Study on Financial Conglomerates and Legal Firewalls*, London: Freshfields Bruckhaus Deringer.

Gandhi, P., H. Lustig and A. Plazzi (2016) 'Equity is Cheap for Large Financial Institutions: The International Evidence', NBER Working Paper No. 22355.

Goodhart, C. (1998), 'The Two Concepts of Money: Implications for the Analysis of Optimal Currency Areas', *European Journal of Political Economy* 14, 407-432.

Goodhart, C. (2012), 'The Vickers Report: an assessment', Law and Financial Markets Review 6 , 32-38.

Goodhart, C. and D. Schoenmaker (2009), 'Fiscal Burden Sharing in Cross-Border Banking Crises', *International Journal of Central Banking* 5, 141-165.

Goodhart, C. and D. Schoenmaker (2016), 'The Global Investment Banks are now all Becoming American: Does that Matter for Europeans?', *Journal of Financial Regulation* 2, 163-181.

Goyal, R., P. Koeva-Brooks, M. Pradhan, T. Tressel, G. Dell'Ariccia, R. Leckow, C. Pazarbasioglu and an IMF Staff Team (2013), 'A Banking Union for the Euro Area', IMF Staff Discussion Note 13/01, Washington D.C.

Gros, D. and A. Belke (2015), *Banking Union as a Shock Absorber: Lessons for the Eurozone from the US*, Centre for European Policy Studies (CEPS), Brussels.

Gros, D. and D. Schoenmaker (2014), 'European Deposit Insurance and Resolution in the Banking Union', *Journal of Common Market Studies* 52, 529-546.

Herring, R. (2007), 'Conflicts between Home and Host Country Prudential Supervisors', in: D. Evanoff, J. Raymond LaBrosse and G. Kaufman (eds), *International Financial Instability: Global Banking and National Regulation*, World Scientific, Singapore, 201–220.

Huertas, T. (2009), 'The Rationale for and Limits of Bank Supervision', Paper presented at the Financial Markets Group conference "Regulatory Response to the Financial Crisis" at the London School of Economics on 19 January 2009, London.

Hüttl, P. and D. Schoenmaker (2016), 'Fiscal Capacity to Support Large Banks', *Policy Contribution* 2016/17, Bruegel.

Hüttl, P. and G. Wolff (2016), Bruegel Dateset on State Aid to Banks, Working paper, Bruegel, *forthcoming.*

Kose, A, E. Prasad, K. Rogoff and S.J. Wei (2009), Financial Globalization: A Reappraisal, *IMF Staff Papers* 56, 8–62.

Laeven, L. and F. Valencia (2013), 'Systemic Banking Crises Database', *IMF Economic Review* 61, 225–270.

Liikanen Report (2012), High-level Expert Group on Reforming the Structure of the EU Banking Sector, Final Report, Brussels.

Pauly, L. (2014), 'Governing Global Risks: The Evolution of Policy Capacity in the Financial Sector', WZB Discussion Paper, Berlin: Wissenschaftszentrum Berlin.

Riles, A. (2014), 'Is New Governance the Ideal Architecture for Global Financial Regulation?', in: C. Goodhart, D. Gabor, J. Vestergaard and I. Ertürk (eds), *Central Banking at a Crossroads: Europe and Beyond*, Anthem Press, London, 245-263.

Rodrik, D. (2011), *The Globalization Paradox: Democracy and the Future of the World Economy*, Norton, New York.

Schoenmaker, D. (2011), The Financial Trilemma, *Economics Letters* 111, 57-59.

Schoenmaker, D. (2013), *Governance of International Banking: The Financial Trilemma*, Oxford University Press, New York.

Imprint and acknowlegements

The author would like to thank Thomas Huertas, Roger Laeven, Sam Langfield, Carlos Mavarall-Rodriguez, Andrew Sheng, Peter Wierts and seminar participants at the Single Resolution Board, the University of Amsterdam, and the LSE Conference in Honour of Charles Goodhart “The Life of a Central Banker” for useful comments on an earlier version titled ‘Is Burden Sharing Needed for International Financial Stability?’. The views are these of the author.

Dirk Schoenmaker
Rotterdam School of Management, Erasmus University, Bruegel and CEPR; email: **schoenmaker@rsm.nl**

Postal address	60640 Frankfurt am Main, Germany
Telephone	+49 69 1344 0
Website	**www.esrb.europa.eu**

ISSN	2467-0677 (online)
ISBN	978-92-95081-93-2 (online)
DOI	10.2489/955092 (online)
EU catalogue No	DT-AD-17-001-EN-N (online)