

Financial Dominance*

Paolo Baffi Lecture

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1 Introduction

Prior to the Great Recession the majority of macroeconomic research treated the financial sector as a veil. Financial frictions were considered as less important than price and wage rigidities. The global financial crisis triggered by the Lehman collapse clearly revealed the centrality of the financial sector for a well-functioning economy. The subsequent European debt crisis and slump led to an increased focus on financial frictions – and the financial sector’s role in mitigating them. In light of this shift, the overall financial architecture as well as the transmission mechanism of both fiscal and monetary interventions have to be rethought.

Some of these interventions are tailored at recapitalizing balance sheet impaired sectors – sometimes explicitly, often implicitly. The fear of a collapse of e.g. the financial sector, largely inseminated by the major disruptions on markets following the bankruptcy of Lehman’s brothers, motivated these ex-post interventions. At the same time, they generated concerns among policymakers and academics alike about the risk that such interventions could create bad incentives for the large and systemic financial institutions.

This lecture focuses on *financial dominance* defined as the ex-ante behavior of the financial sector, which out of fear that losses will be pushed onto it, purposely stays (or even becomes) undercapitalized. This behavior increases volatility and might force fiscal or monetary authority to absorb losses. I will explore the implications of financial dominance and its relation to the existing concepts of fiscal and monetary dominance. Under a monetary dominance regime the central bank is in the driver seat and fiscal authorities have to adjust the fiscal budget to cover funding shortfalls. In contrast, under fiscal dominance fiscal authority has the upper hand and monetary authority gives in potentially resulting in inflation. Which authority’s will prevails is often the outcome of a “game of chicken” between the fiscal and the monetary authority. Under financial dominance few losses can be pushed onto the financial sector and even worse, it might be needed to be bailed out. A second

game of chicken between the fiscal or monetary authority might arise of who has to bail out the financial sector. instead of providing insurance for the government sector, the financial sector can be a drag for the economy and with it for government's tax revenue. If the fiscal side is not sound, a diabolic loop between sovereign risk and the financial sector can emerge. A weak financial sector weakens the government sector and vice versa.

In this lecture I will show that while financial dominance can seemingly help to overcome time inconsistency and liquidity problems related to government debt, it destroys the insurance role of the financial sector and ultimately results into a risky doubling up strategy. If a government can promise to repay its debt without defaulting on it or inflating it away, it can issue debt at a lower interest rate. One way to commit to repay the debt in full is to offer the financial sector as a hostage. If a large fraction of the government debt is held by highly levered domestic banks then any default will ruin the financial sector. This, in turn, will destroy the real economy and with it government's tax base. In addition, the government might be forced to bail out the financial sector. Given such prospects governments typically refrain from defaulting on their debt in the first place. In short, an insufficiently capitalized financial sector which holds a lot of government debt can be guarantor that the government will not default on its debt. Proponents of the "hostage view" implicitly argue that (under financial dominance) the financial sector is a useful commitment device for the government not to default. In contrast, proponents of the "insurance view" assign a different role for the financial sector. Under this view, financial sector should not be dominant and be sufficiently well capitalized such that some losses can be absorbed by the financial sector and hence the financial sector stabilizes the economy. The adverse impact on the real economy due to the diabolic loop can be avoided. I will also argue that the "hostage strategy" is ultimately a simple doubling-up strategy. The hostage strategy may work well after a medium sized shock, since the government can continue to borrow at a low interest rate. However, after a further adverse shock the government might have to default nevertheless. Then the govern-

ment will not only be out of funds but at the same time the country's financial sector will also be in shambles. In other words, the hostage strategy is like a doubling up strategy. That is, the government gambles for resurrection: if the initial crisis is followed by a good shock the low interest rate helps to grow out of the problems (provided that the diabolic effects are not too large), but if it is followed by another adverse shock, things will look really dire.

This lecture will also devote special attention to the role of government debt as a safe asset. The financial sector needs a safe store of value. Treating government debt as contingent debt, while improving the insurance aspect, worsens the safe asset feature. Moreover, a safe and default free (long-term) government bond is useful for the purpose of conducting monetary policy. It allows some stabilizing stealth redistribution as outlined in Brunnermeier and Sannikov (2015)'s "I Theory of Money."

The final part is devoted to the creation of a government security that does both: (i) it serves as safe asset and (ii) allows governments to take advantage of the insurance component of contingent debt. For Europe, this asset is the European Safe Bond (ESBies). They are created by bundling many government bonds and issuing against it a senior bond (ESBies) and a junior bond (the European Junior Bond). The European Junior Bond protects the senior bond and hence, despite of possible default by some governments the senior bond remains default free. That is, ESBies do not lose their safety status even when one of the member countries has to default on its debt. Moreover, ESBies have an additional advantage: they redirect flight to safety capital flows. Without ESBies, flight to safety leads to capital flows across borders say from the European periphery to the core. With the union-wide safe asset, ESBies, flight to safety would occur out of the European junior bond to the ESBies. Since both bonds are European, adverse shocks do not lead to cross-border capital flows and the funding for countries in the European periphery is stabilized.

2 Ex-post Redistribution and Ex-ante Insurance

2.1 Ex-post Perspective: Redistribution of Losses and Recapitalizations

When a crisis hits, it is necessary that some economic entity within a society absorbs the shock. Due to its economic and regulatory power, it is believed that a government is able, at least partially, to decide which entity will take on the losses. For example, it may inflate its debt away or default upon it to pursue fiscal stimulus, and bail-out specific sectors or economic entities. The financial sector is naturally one such entity: for example, the government may toughen foreclosure laws or soften private bankruptcy ones in order to push losses from the households onto the financial sector – which could be fair, given that parts of its revenues are earned due to its role as an insurer.

Ex-ante, the government cannot commit not to redistribute across the different economic entities of the economy (financial sector, household, nominal savers, etc.). How it redistributes depends on how it affects the aggregate state in the economy, and the sectors with the least side-effects/amplification will usually be taking the hit, while the others may see themselves bailed out. Losses especially to an undercapitalized financial sector can be dramatically amplified and spill over to the real economy. Hence, as we have seen in the recent financial crisis, it usually is one of the sectors to whom losses are not pushed onto; rather, it is the sector that is directly or indirectly bailed out.

The financial sector positions itself in anticipation of this mechanism, and this is the essence of *financial dominance*. Because it can detect crashes and reallocate its resources faster than many other entities, the financial sector will make sure it is weak – e.g. become very levered, refuse to issue sufficient amount of equity, and hence decrease its loss-absorption capacity – in order to avoid bearing losses on its own. For that matter, it can put itself in a position close to where amplification mechanisms and hence downward spirals are likely

should it lose more, forcing authorities to avoid financial repression and even bail-out some of the weakest banks assumed to be suffering from severe liquidity, or even solvency problems. Just before and during the peak of the financial crisis, the financial sector hence took unreasonably risky positions, while continuing to pay large amounts of dividends instead of raising its equity cushion in prevision of potential losses. Hence highly levered and sensible to shocks, the financial sector almost completely collapsed when the crisis actually hit (Shin (2014)). In a sense, the financial sector follows the motto “being weak is your strength.”

Balance-sheet impairments need not be limited to the banking sector. In the U.S. sub-prime crisis, homeowners suffered as well, depressing overall demand in the economy. The U.S. Federal Reserve’s purchases of mortgage-backed securities also lowered mortgage rates, and hence indirectly boosted house prices. This, in turn, helped many home owners who were previously under water, and so provided an extra stimulus to aggregate consumption. Yet, it can be argued that the financial sector, through competition forces, easily makes strategic moves to ensure that losses cannot be pushed onto it.

This behavior forces, ex-post the shock, the relevant authorities not only to refrain from pushing losses onto the financial sector, but even to bail it out, for not doing so would make matters worse due to the amplification channel. Both fiscal and monetary authorities are typically involved in the subsequent bail-outs. Fiscal policy (i) extends government guarantees and (ii) undertakes direct recapitalization through equity injections. Indeed, we saw after the crisis national entities often coming to the rescue (or playing an important role in it) of their national banks, with Ireland being a primary example.

Monetary policy actions are similarly important in recapitalizing banks. Conventional interest rate cuts lower banks’ funding costs and affect asset prices. Subsequent sizable asset purchase programs lifted these assets of the banks’ balance sheets at favorable prices. This implicit or “stealth” recapitalization of the financial sector (see Brunnermeier and Sannikov (2015)) is one of the transmission mechanisms of monetary policy and can lead

to an overall improved economic outcome. In other words, the redistribution is not a zero-sum game and can in certain circumstances make all agents in the economy better off. Note that this redistribution mechanism of monetary policy transmission is conceptually quite distinct from the standard consumption demand management transmission emphasized in the Keynesian literature. In standard representative-agent New Keynesian economies, monetary policy works through the substitution effects induced by interest rate changes. Tobin (1982) considered the case of heterogeneous consumers and argued that redistributing wealth from households with low marginal propensity to consume to households with high propensity to consume boosts aggregate demand. Auclert (2016) develops a model in which the covariance between the marginal propensity to consume and wealth is a sufficient statistic for aggregate demand management. The mechanism emphasized here goes beyond demand management and stresses the redistribution across sectors especially towards balance sheet impaired (productive) sectors. The redistribution occurs because different individuals and sectors have different interest rate and /or inflation exposure.

In sum, (1) the financial sector is able to reposition itself, i.e. by weakening itself when it fears losses to be pushed onto it or funds can be transferred from tax payers to cover their losses and (2) fiscal and monetary policymakers can essentially be cornered to bail-out the financial sector when the latter is weak, as it is ex-post efficient. I detail the latter assertion in the next section.

2.2 Role of the Financial Sector: Amplification and Paradox of Prudence

As has been noted, to understand financial dominance, it is important to understand why the financial sector matters at all. Let me point out the most important roles that the financial sector takes in economic activity. In full generality, its role might be defined as mitigating the financial frictions that affect a society, and hence favour the optimal allocation of productive

resources. In particular, the financial sector plays an important role in (i) diversifying idiosyncratic risks, using economies of scale implied by the law of large numbers; (ii) insure society by taking a larger relative share of aggregate risk, against a premium, and participate in the creation of safe assets; (iii) participate in the maturity transformation; (iv) reduce asymmetric information through monitoring; and (v) lubricate the economy through the provision of an efficient payment system.

Therefore, the health of the financial sector has a direct impact on the real economy through the services it provides. More importantly, the impact of its health on real activity can be highly non-linear, particularly on the downside. A large literature exists on these amplification effects (see Brunnermeier et al. (2012) for a survey). For concreteness, let me however focus on the I Theory of Money (Brunnermeier and Sannikov (2015)), where the model is able to parsimoniously explain why small adverse shocks amplify and spillover to the whole intermediation sector.

This can most easily be seen by dissecting the impact of a bad aggregate shock affecting the economy in four steps. The first step is simply the immediate impact of the adverse shock on the end-borrowers' ability to repay their loans. As a direct result of the shock, the value of the banks' assets falls. This drop will be larger the bigger the share of marked-to-market assets on the banks' balance sheet is. But since usually a banks' assets far outstrip its equity, the decline in the value of the assets will, in percentage terms, be dwarfed by the percentage decline in the equity buffer. As a result, the bank's leverage ratio will shoot up.

This leads us to the second step: the banks' response. For their IOUs (demand deposits) to still be considered safe, the banks need to bring their leverage ratio down to acceptable levels. How far they want to push down leverage, though, is very much a function of how bad the liquidity mismatch between assets and liabilities is. In practice, bringing down leverage almost always means shrinking the balance sheet rather than raising new equity – as we have seen. Banks will hence extend less new credit, and try to sell existing loans. In short,

we have a veritable credit supply crunch. During the Euro crisis the credit growth rate was indeed very weak.

The third step is the so-called *liquidity spiral*. This liquidity spiral actually comes in two variants, with the first known as the loss spiral. As banks fire-sell some of their old loans, their assets fall in value and so equity declines further, setting in motion yet more fire sales. Of course, the severity of this spiral is again very much a function of the share of assets marked-to-market. Indeed, if the adverse feedback loop is strong enough, then these fire sales can lead to a decline in equity faster than the decline in assets, so the leverage ratio may not come down after all - a self-defeating deleveraging paradox can emerge. In modern banking systems there is a second distinct dimension to the liquidity spiral, known as the margin (or haircut) spiral. The first thing to note is that, during a crisis, funding liquidity worsens. Borrowers are afraid that they will not be able to roll over existing short-term unsecured debt or if so, only with worse terms. For collateralized funding, haircuts rise, so a collateral asset worth, say, 100 can now be used to raise only 80 instead of 95 as before. As a result, financial institutions have to de-lever even more. Again, the only way to do so is to sell off assets. But again, as all are selling, this leads to a further fall in prices and an increase in volatility and uncertainty, which serves to justify the high haircut requirements.

Finally, the fourth step is a *disinflationary spiral*: as banks shrink their balance sheets by selling loans and extending less new credit, they also shrink the liability side, i.e. the amount of (inside) money they are creating. Since outside money is by assumption fixed (absent any central bank intervention, of course), this fall in the supply of inside money means that total money supply declines. Disinflationary pressure thus builds up, and so inflation will drop, possibly even into negative territory. And as the value of money rises, so does the real (inflation-corrected) value of the banks' liabilities. After all, the banks owe the savers money. This increase in the real value of money hurts the banks' equity even further, necessitating yet more fire sales. In short, the liquidity and disinflationary spirals

feed into each other, creating a vicious circle. A clear echo of these spirals are the differences in inflation rates between the core and the periphery of the Euro area, where the adverse spirals were much more pronounced.

Both the liquidity spiral and the disinflationary spiral are the result of financial sectors' response to the initial adverse shock. Each institution tries to be micro-prudent and lower its risk exposure, but as a group they are macro-imprudent. As the financial sector tries to lower their (idiosyncratic) risk exposure, the price of capital falls. So aggregate investment and growth are depressed, leading to lower returns on all assets, including on money holdings. The Paradox of Prudence is analogous to Keynes Paradox of Thrift, but the former is about changes in portfolio choice and risk, while the latter refers to the consumption-savings decision.¹

To summarize, an adverse shock hits banks on both sides of their balance sheet, and sets in motion two dangerous spirals. This amplification effect is important to understand how the financial sector will be able to use it as a “threat” to influence ex-post redistribution towards itself in bad times.

2.3 Ex-ante Perspective: Risk transfers and Insurance

Redistribution can lead to a speedier recovery after an adverse shock. It can therefore be ex-post efficient. Yet even from an ex-ante perspective, redistribution can be efficient. A rule that redistributes wealth from winners to losers can be seen as an insurance scheme that steps in for missing markets².

For example, an interest rate rule that cuts the rate after a negative shock and raises it after a positive shock de-facto insures the banking sector against these shocks. Another

¹Keynes Paradox of Thrift states that an increase in the savings propensity can paradoxically lower aggregate savings. An increase in savings propensity lowers consumption demand. If the increased savings are parked in (bubbly) money instead of additional real investments, aggregate demand becomes depressed.

²In the Arrow-Debreu sense.

monetary policy rule is to use a procyclical collateral policy.³ This can stabilize the financial sector. Through appropriate policy risk can be transferred to sectors which can most easily bear it. Overall risk can be lowered notably through better diversification and systemic risk that is self-generated by the system is smaller. In addition, risk premia might decline and become less time-varying. In sum, an ex-ante well specified rule that leads to a well-dosed redistribution of wealth from (relative) winners to losers might be even ex-ante desirable.

However, as with any insurance, this insurance provided by the official sector to fill in for missing markets comes with moral hazard problems. Knowing that an adverse shock will be softened by an ex-post redistribution by the official sector leads to more aggressive risk taking ex-ante. Some of this additional risk taking might be desirable and even be the point of the insurance, but excessive risk-taking can also be counter-productive.

In our context, macro-prudential rules can restrict the financial sector’s risk taking in anticipation of insurance – we’ll discuss it in more details at the end of next section. Interestingly, optimal monetary policy is more aggressive in an environment in which stricter macro-prudential regulations are enforced. In other words, macro-prudential regulation nicely complements ex-post redistributive monetary policy (and potentially even anticipated fiscal policy) – indicating that some rules may even spill over to each other.

2.4 The Commitment Problem: Fiscal and Monetary Dominance

Ex-post redistributions are not bad *per se* – they reflect economic and social arrangements that may well be efficient ex-ante. However, to work effectively, such arrangements must follow clear rules, well-specified ex-ante. The possibility of “meddling” ex-post with these

³In general, if a financial institution wants to borrow funds directly from the central bank, then it has to deposit certain assets as collateral. Central banks have two degrees of freedom here: First, they can decide which kind of assets they accept as collateral. And second, they can set the haircuts they apply to the different assets that they do accept. Banks of course benefited from relaxation of collateral rules, as they could borrow money more cheaply and at the same time saw the value of any asset eligible as collateral boosted. Yet, de facto no transfers *stricto sensu* were made from any parties, and the collateral policies are arguably easy to tighten once good times arise again.

rules, say through moral hazard behavior or lobbying activity, will break their efficiency (instead of “inefficiency”?).

The problem, hence, becomes one of commitment: ideally, the government (or whoever is in charge, or has the power of executing these redistributions) wants to commit to certain actions in the future. This is an old problem in the economic literature, going back at least to Kydland and Prescott (1977), and parsimoniously in the context of monetary policy in Barro and Gordon (1983).

Ideally a government would like the public and market participants to believe that they will to a large extent refrain from accommodating various interest groups (such as the financial sector) in times of crisis. However, when a crisis occurs, without binding rules they surely change their mind. Forward looking market participants anticipate that words are cheap and earlier promises will not be followed through without binding rules – the time-inconsistency problem. As the above example showed, however, a *commitment device* can be used to overcome the time-inconsistency problem, which often takes the form of a particular institutional design.

Furthermore, the future action should be state-dependent. Instead of committing to a single action in the future, authorities should ideally commit to a state-dependent rule. The advantage of rules is that they are predictable and allow for some form of ex-post risk sharing.

Since not all future contingencies are foreseeable and hence not be part of a rule, an alternative way to overcome the time-consistency problem is to outsource the decision to an independent authority, i.e. by clever institutional design. The most discussed example of institutional design responses to time commitment problems is the separation of a government into a fiscal authority and a monetary authority. Indeed, left alone under a single roof, the government might get tempted to always inflate its debt away in the short-run, creating an over-inflation regime in the long-run which may turn out to be costly, as in the

fiscal dominance regime of the Fiscal Theory of the Price Level (FTPL). The creation of a monetary authority helps to preserve price stability, and is one of the primary reason of the existence of modern central banks.

Under *monetary dominance* the central bank is in the driver's seat and refuses to give in to fiscal authorities. The monetary authority refuses to accommodate losses or unbalanced budgets through monetary financing. It essentially forces the fiscal authority to cut government expenditures or raise tax revenue. In contrast, under *fiscal dominance* the fiscal authority is in the driver's seat, refuses to assume losses, balances the long-run budget and pushes the central bank into monetary financing. While the FTPL literature assumes that we are in one of the two regimes, reality is less binary. In reality both authorities play a "game of chicken" with each other. Which authority gets its way depends on the exact circumstances (and also on the people in charge). The ultimate outcome depends on the state of the world we are in, and hence still potentially allows debt to be partially inflated away when deemed necessary. Delegating monetary decisions to an independent authority also has the advantage that it can react consistently to unforeseen contingencies. Rules are by nature incomplete as they cannot include unforeseen scenarios.

In the presence of *financial dominance*, the unwillingness of the financial sector to raise new equity in order to absorb losses, an interesting interplay between the three dominance concepts can arise. Financial dominance requires some intervention to recapitalize the financial sector by the official sector. Financial dominance, where the bailing-out of the financial sector is forced by its own weakness, leaves the two other institutions – monetary and fiscal – to fight a "second game of chicken" over who should bail-out the financial sector. Either the monetary authority gives in and tries to recapitalize the banking sector through ex-post redistributive monetary policy, or the fiscal authorities intervene directly through explicit bail-out schemes.

From a political economy perspective fiscal interventions are typically more difficult to

implement, since they are very transparent explicitly while a monetary intervention can be designed in the form of less transparent “stealth recapitalizations .” Nevertheless there will be a quarrel between the fiscal and monetary authority who should “swallow the toad .”

This dynamic game of chicken, or war of attrition, between both authorities leads to a strategic delay. Each authority waits strategically for the other authority to give in first. The “can is kicked down the road” and in the meantime the economic situation deteriorates further. Brunnermeier and Reis (2015) model this war of attrition more formally.

3 Government Debt and Financial dominance

In this section, we zoom in to the special role government debt plays in achieving the re-distributions that are necessary in crisis states, and how this role interacts with the issue of financial dominance. We’ll note that debt not only has a role in fiscal policy: it also is an important instrument for monetary policy. Safe long-term government debt without default risk allows banks to have exposure to interest rate risk. Appropriate monetary policy can then use this exposure to interest rate risk to stabilize the financial system. Keeping this in mind throughout this section will be important.

3.1 The Dual Role of Debt

Abstracting from pure public investments, sovereign debt has played two roles in the macroeconomics of business cycles and fiscal policy in general. The first one is the ability of transferring resources over time: a State that can commit itself to repay its debt can raise funds even in difficult times at reasonable costs. This debt can then be used to conduct Keynesian stimulus measures and mitigate relevant liquidity shocks and, once the economy is back on track, can be paid back with interest payments.

However, there is another important role that sovereign debt plays: that of an insurance

mechanism. A country may face severe adverse shocks. There exist states of the world in which it is better to default upon or inflate part of the debt away. In these states of the world austerity measures will be counterproductive. The recent troubles in Greece or Iceland are prime examples of that phenomenon: sometimes, a devaluation becomes necessary in the verge of a shock that **affects** the solvency of the government itself. It is important to note that such **a** phenomenon is not bad *per se* and may well arise in “equilibrium” contracts under pre-specified clauses; the downside, of course, is the appearance of an insurance premium – which is not necessarily bad itself, if it is worth the insurance.

To make matters very concrete, let us assume that the states of the world can be ranked on a continuous space and split into three ranges as depicted in Figure 1. For simplicity one can think of the x-axis as random tax revenue in the next period, while the small vertical black line is the projected budget. Any realization below this point represents a budget short-fall, while above this point is a surplus.



Figure 1: The three regions of the state space.

The top range is simply the normal state of affairs, where the economy is close to or above its steady state. The middle range corresponds to the “liquidity need state:” if funding at a reasonable interest rate can be ensured, countermeasures can be taken and the economy will return to normal. Of course, outside (risk-neutral) investors only provide funding at a low interest rate if anticipated default probability is sufficiently low. If the projected default probability is high, the interest rate is high and consequently default also occurs with a higher probability. In other words, over the middle range there are multiple equilibria. Finally, there

is the “bottom range,” the catastrophic states of the world. Imposing austerity in these states of the world in order to repay existing debt is counterproductive as it depresses the economy even further. Current debt levels become unmanageable, akin to what happened in Greece.

Hence, ideally, the government would find a contract that would make it commit to repay its debt in the middle and high range, without removing the possibility of default (or inflation, in case of nominal claims) in the bottom catastrophe range. In other words, the repayment of its debt should be state-contingent: a “straitjacket arrangement” that would prevent it from any source of debt devaluation, be it default or inflation, would not necessarily be optimal.

3.2 Time-inconsistency and Liquidity Problem for Government Debt

A government might promise to fully repay its debt in all but the catastrophic range. This would ensure that the interest rate at which it can borrow is lower, which, in turn, would allow the government to grow out of the middle range. In addition, default will ensure that the economy will not go into a tailspin if it enters the catastrophic range.

The problem is however that investors fear that ex-post the government will claim one of the catastrophic states as realized even though it didn’t. This would allow the government not to repay its debt (fully) and divert resources for other (politically more popular) programs.

This concern makes investor wary of whether they will get their money back and hence will charge a higher interest rate to be compensated for this risk. In other words, in the liquidity range, the government might have the ex-post incentive to claim to be in the bottom range and default upon its debt – something suboptimal ex-ante, but to which it cannot resist ex-post.

Of course, the government can build up a reputation not to do this and follow the rule

to only default if the economy drifts into the bottom range.

But even more credible would be a commitment device. The perfect commitment device is state contingent. In the top range, repaying the debt is not so costly and the commitment needed is rather small. In the middle range the government is most tempted to default for strategic reasons and hence the punishment for deviating from promises must be most severe. Importantly, the ideal commitment device would limit the punishment in the bottom range and would let the government (at least partially) off the hook should a catastrophic event occur.

Evidently the actual split of the state space in the three ranges depends on the quality of the commitment device. A perfect state-contingent commitment device mimics ex-post the split between catastrophic states and liquidity states. Hence, governments can raise funds at reasonable costs ex-ante – costs which include a premium only for defaulting on the catastrophic states, not the liquidity ones. If the commitment device is not powerful enough, liquidity problems become more severe. On the other hand, a “straitjacket” commitment may solve liquidity problems but may prevent default in very adverse states, creating an over-commitment problem. That is, in the very worst states when default can not be avoided default might be extremely costly.

Finding a commitment device or more generally an arrangement that overcomes the time-inconsistency problem is challenging. How can a sovereign nation state credibly commit to anything, when the definition of the sovereign is that it makes (and can change) the rules? The founding of certain central banks can be traced back to this problem. The earliest answer to it was given by the English in the aftermath of the Glorious Revolution – the overthrow of King James II by English parliamentarians and Dutch stadtholder William III in the late 17th century. Prior to the Revolution, the increasing fiscal needs of the Crown led to expropriation of wealth through the redefinition of property rights in favour of the sovereign and periodic defaults (such as the “exchequer stop ”). All of this was possible

because the sovereign could alter “the rules of the game .”⁴

The institutional changes brought along by the Revolution were designed to address this. In particular, after 1688 the (new) Crown now had to obtain parliamentary assent in all its changes to existing arrangements. Since the Parliament represented wealth holders, this substantially limited the ability of the Crown to renege on its debt. In this set-up, the newly created Bank of England (as the main holder of government debt) played a key role. It held sovereign debt, and its equity was by and large provided by the class represented in parliament, who could control the budget; thus sovereign default except in severe crisis states became unacceptable.

In today’s economies, government debt is often widely held by domestic citizens and voters. This makes a possible default very costly for a government, making it a credible commitment device, as in the case of Japan.

3.3 Using Banks as a Hostage

The first section of this lecture suggests that when the financial sector is weak, there exists both an ex-post incentive and potential tools for the authorities to refrain from transfer losses or even shift resources towards the financial sector, in order to avoid amplification mechanisms that create costs going beyond the costs of the bail-outs themselves. Ex-ante, however, this in turn creates an incentive for the financial sector to stay weak. When the banking sector is undercapitalized it acts as shock amplifier instead of a shock absorber.

3.3.1 The Overcommitment Problem

One beneficial aspect of the above mechanism, however, is that financial dominance can help to alleviate the *time-consistency* problem that the sovereign might be suffering. Indeed, in the search for a possible commitment device, it is tempting to take a weak, undercapitalized

⁴For a classical reference see North and Weingast (1989).

banking sector as “hostage” that makes defaulting hard.⁵

Suppose that the government mainly sells its debt to national banks (I will relax this assumption completely later). Because of financial dominance, these banks stay weak during bad times, including “liquidity bad states” in which it is not worth for the government to default ex-ante.

Indeed, in such states, it may not be worth anymore for the government to default, because that would mean bringing down the financial system as well, which through the amplification effects described in the first section would make matters even worse. Hence, the government is able to commit to repay its debt.

Such a mechanism makes the likelihood of default for the government smaller: it solves the time-consistency issue, and allows the government to borrow at reasonable rates when facing liquidity problems. A government will think twice whether to default on systemic (undercapitalized) banks, since at the end of the day it simply has to bail out these banks and so has not achieved anything from the restructuring of its debt.

Yet, a side-effect of it is that it renders the insurance role of debt harder to maintain, as the solvency costs may not be enough to justify the fall of the financial system. In other words, in the state of the world where default is desirable ex-ante (even at a premium on the interest rate paid by the sovereign), it may not be so ex-post, as the fragility of the financial sector (due to financial dominance) makes the cost of defaulting too high – a “straitjacket” commitment. If the shock is so bad that despite the now high commitment costs, the government has to default then the population will suffer greatly. The economy risks moving towards a complete tail spin after a default. This is the *over-commitment* problem.

In a dynamic setting with many periods, a government might have the intention to buy “downside risk insurance.” However, as a crisis looms and interest rates rise, it then has an incentive to tighten its commitment not to default in order to lower the interest rate burden

⁵See e.g. Gennaioli et al. (2014).

and hope to recover. Tightening the commitment as one enters into a crisis phase is like a doubling-down or gambling-for-resurrection strategy. If things continue on smoothly, the lower interest rate burden help the economy to recover. On the other hand, if an additional adverse shock occurs, the stricter commitment makes things even worse.

3.3.2 The Secondary Markets Dilemma

We have seen that the overcommitment problem prevents domestic banks from providing insurance to the sovereign. But why does the sovereign not simply buy this insurance from other, non-domestic (financial) entities? The problem lies in secondary market trading. Intuitively, as a result of secondary markets trading, the overcommitment problem also "leaks" to any other financial entity, including foreigners, and so makes it impossible for the sovereign to buy tail risk insurance from anyone. The basic logic goes as follows: Suppose that the government were to issue contingent bonds at a higher yield to foreigners or other wealthy investors in the hope of buying some insurance against extreme downside risk. When a crisis looms, however, foreigners will sell the government bonds to (weak) domestic banks. Domestic banks' willingness to pay for the government bonds is higher since they can ensure that the government is less likely to default, see e.g. Broner et al. (2010). It is therefore not surprising that at the height of the Euro crisis government debt travelled back to national domestic banking systems, especially to undercapitalized domestic banks, as documented in Brutti and Sauré (2016).

The same argument also applies not only to foreign investors, but also to domestic investors. Banks through their weakness and threat to amplify shocks can better ensure that the government does not default on its debt. Hence, even domestic well capitalized investors will sell a large enough fraction of their government bond holdings to weak domestic banks.

Of course, in equilibrium all market participants anticipate that they will be able to sell the bonds to weak domestic banks at a relatively high price - given that the latter will

ultimately rule out a government default with high probability. Hence, in normal times even foreign investors are willing to lend governments at a relatively cheap rates.

3.3.3 Detrimental Side Effects: Diabolic Loop between Sovereign and Banking Risk

Part of the commitment power that the banking sector brings is due to the amplification caused by the so-called *diabolic loop* between sovereign and banking default risk.⁶ The financial sector can prevent sovereign default by the mere fact of holding domestic government debt in large amounts – and as we have seen in the section above, it usually has an interest in doing so. Empirically, Altavilla et al. (2016) document that banks’ sovereign debt portfolios show a strong home bias, thus tying bank solvency to the perceived market value of government debt. Now, if government debt is suddenly viewed as unsafe, the financial sector faces distress as well.

Sovereign default and the demise of the domestic banking system are clearly linked. By allowing undercapitalized banks to hold large amounts of domestic sovereign debt, the outcome is bi-polar: Either they ensure that the government doesn’t default or if default is unavoidable both government and the banking sector and with it the real economy crashes. Under financial dominance banks refuse to raise equity and hence are unable to provide insurance to the government. In contrast, the government insures and potentially bails-out the banking sector, but it might be dragged down with the banking sector as well. Ultimately, it does not really matter whether the initial trigger that gets the diabolic loop started comes from the government sector, as was arguably the case in Portugal or from the financial sector, as was the case in Ireland or Spain.

Figure 2 depicts both components of the diabolic loop: First, an initial adverse shock leads to price declines on government bonds. Since banks hold a large fraction of the government debt on the asset side of their balance sheet, the banks suffer capital losses and their equity

⁶The literature also refers to the diabolic loop as “doom loop” or “sovereign-banking nexus”.

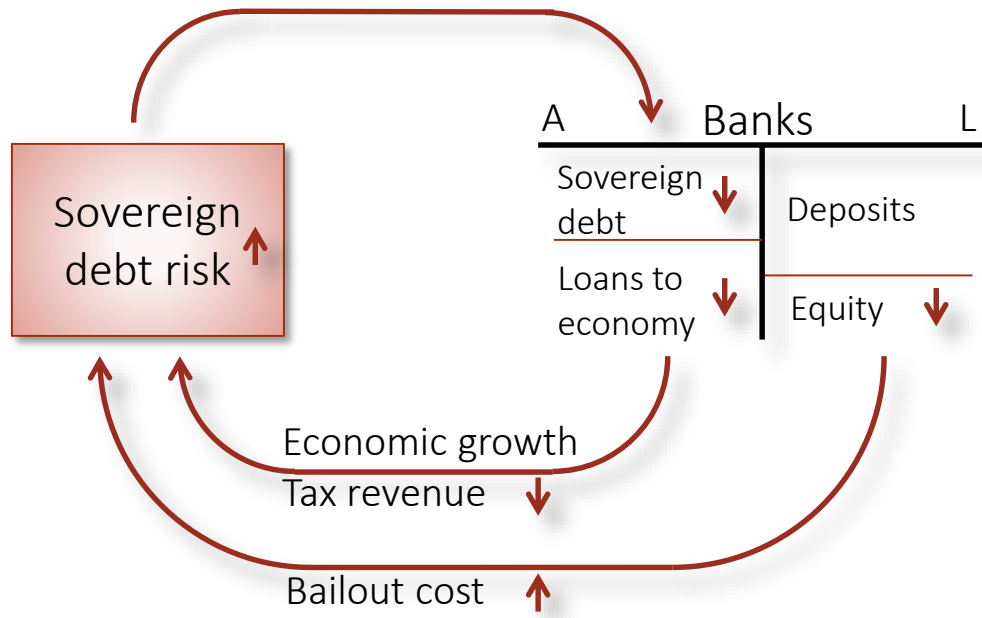


Figure 2: The Diabolic Loop between sovereign risk and banking risk.
Source: Brunnermeier et al. (2011).

declines. A decline in equity, in turn, increases the bail-out probability. This leads to yet more strain on public finances which lowers the sovereign debt value further and so on. This first component of the diabolic loop takes the growth rate as given. The second component (inner loop in Figure 2) refers to the fact that less well capitalized banks also reduce their credit supply to the real economy. Credit growth declines. This lowers the growth rate of the real economy, which in turn lowers governments tax revenue. In addition, automatic fiscal stabilizers lead to an increase in government expenditures. As (long-run) government deficits rise, the value of government bonds declines. This decline hurts banks' asset position and their equity suffers capital losses, which in turn lowers their credit supply, leads to lower economic growth, lower tax revenue and a reduction of the value of government bonds. In other words, as banks cut back on their loan supply even more, and with less credit going into the economy, growth slumps further, which harms public finance even more, etc.

Empirically, the close tie-up between sovereign and banking risk can also be seen in [?]

the correlation of CDS spreads. Figure 3 plots the change in the sovereign debt CDS - a measure of the default probability of government bond - on the x-axis and the change in the CDS premia of average bank in the corresponding country on the y-axis. The figure clearly shows that countries with low (high) CDS spread changes, the banks in this countries change in CDS spreads are also low (high). There is definitely a positive correlation between the country's and its banks CDS spread changes.

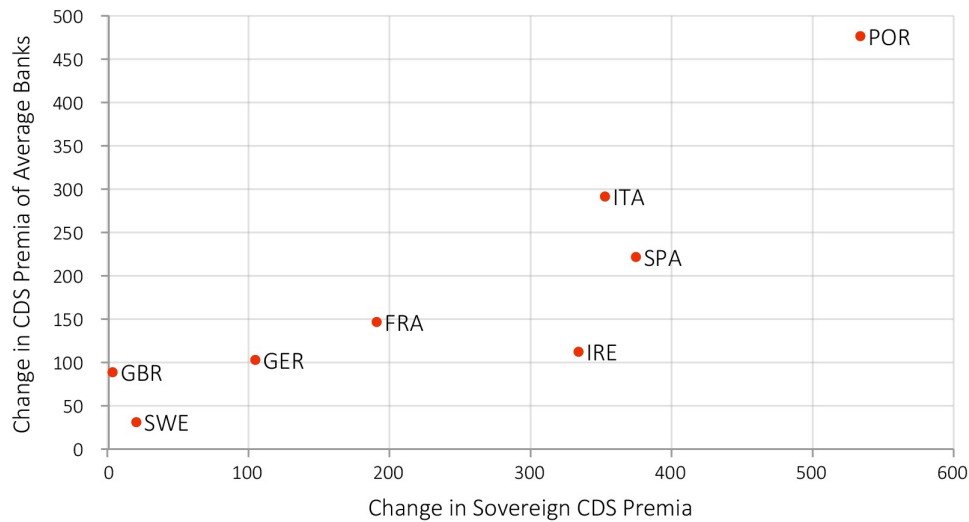


Figure 3: Correlation between domestic sovereign debt and banks' risk premia, as measured by CDS. Source: Brunnermeier et al. (2016a).

Do both channels of the diabolic loop increase government's commitment power and ultimately reduce states of the world in which the government defaults? The answer seems yes for the first diabolic loop that works through the bailout channel. Investors know that a government default would wreck the financial system and hence are willing to lend to the government at a relatively low interest rate. A lower interest rate in turn stabilizes government finances and lowers the default probability. Hence, focusing only on the first diabolic loop, one can justify taking banks as hostage as a "doubling-up" or "gambling for resurrection" strategy.

However, the second diabolic loop, the one that works via the credit lending channel,

destroys this argument. Undercapitalized banks that shift their lending activity away from the real economy towards government financing, hurt the real economy. Hence, GDP and tax revenues fall and the prospect of crisis again looms larger. Consequently, the government might have to default even in more states of the world – despite the high default costs. Even worse, a default now destroys the financial sector and sends the economy in a tailspin.

Finally, one should also note that the logic of the diabolic loop can also be reversed to a virtuous loop after a positive shock: Mario Draghi’s “whatever it takes” speech pushed down sovereign yields and essentially amounted to a stealth recapitalization of the domestic banking system, the economy improved, fiscal deficits shrank, the banking sector recovered further, and so on. Ultimately, the ECB’s quantitative easing gives banks the option to realize these capital gains by selling part of their sovereign debt holdings at a high price to the ECB. Apparently, banks do not take advantage of this option, as a large fraction of the QE purchases come from foreigners.

3.3.4 Why Purchase Government Bonds via Banks and Not Directly?

Using the financial sector as a hostage, which refuses to raise the necessary equity to absorb shocks, raises the question whether central bank intervention should be done through the banking sector by providing cheap funding (e.g. via LTRO). If the banking system is not absorbing losses, the central bank is not protected against losses and hence it could directly intervene (e.g. via QE).

If the shock is only a temporary liquidity shock, e.g. the private sector can’t coordinate to rollover existing government debt, the central bank can step in and act as a “market maker of last resort.” Such actions would ensure that domestic government debt is free from liquidity risk (of course, the central bank will not be able to do this for bonds denominated in foreign currency).

However, if it turns out that the underlying shock was not purely a liquidity shock then

someone has to absorb the losses. Under fiscal dominance, the fiscal authority can refuse to do so. The monetary authority – playing a game of chicken with the fiscal authority – might be pushed and would like to have some back-up insurance from the banking sector for such cases. However, under financial dominance such an insurance does not exist. Hence, going through the banking sector and pretending that banks provide insurance against e.g. government insolvency risk is an illusion. As banks might go under, the central bank will hold the bag (of losses) and the intervention will result in monetary financing.

In sum, in the real world the distinction between liquidity and solvency of government debt is not clear cut. Hence, there is a rationale for central banks to lend funds to private banks which then purchase government bonds. The private banks' equity provides a safety cushion in case government turns out to be unsustainable. However, banks that follow a financial dominance strategy do not provide this service. They simply default at the same time as the government. Funding undercapitalized banks to purchase government debt is a subsidy for banks. If this is not the intention, the central bank could purchase government bonds directly, since central bank would also get the upside in the good states and not only the downside.

3.4 The Financial Sector as Insurer

One solution to the missing insurance problem, obviously, is to limit financial dominance, by e.g. forcing the financial sector to issue new equity in downturns. Another one, however, is to restrict banks to *not* hold domestic sovereign debt, or only in a limited amount. That way, the domestic financial sector becomes resilient to defaults of its own government. Of course, the downside is that the “straitjacket” commitment device is then ruled out. The financial sector now acts as an insurer in case of default and wants to be compensated for this service. This section discusses this issue and tries to answer the question how one ensures that the banking sector is sufficiently capitalized?

3.4.1 “Command and Control” Macro-prudential Policy

Basel II agreements imposes rules on banks’ risk exposure. By preventing the financial sector to leverage itself, they hope to enhance resiliency of banking sector in bad times. Banks should turn into shock absorbers rather than shock amplifiers.

Risk weights versus Exposure Limits. There are at least two ways to limit banks’ sovereign debt risk taking: risk-weights and exposure limits. Risk weights require banks to hold some equity cushion against the risk of a sovereign bond default. These risk weights limit banks’ risk-weighted leverage and might force banks to issue new equity or shed some of the government bonds in downturns. If risk-weights and capital requirements are held constant in downturns banks might fire-sell assets instead of raising new equity. To limit the liquidity spiral and its associated amplification and force banks to issue new equity, capital requirements should ideally not be based on lagged asset holdings, but current equity values.

That is, capital requirements should be countercyclical in order to avoid the amplification effects through the liquidity spiral. In other words, the regulatory requirements should be more stringent and strictly binding in good times and more relaxed in crisis times. A countercyclical regulation constrains banks from funding imbalances and bubbles in good times which enables them to act as shock absorbers in bad times.

Note that risk-weights do not take diversification benefits into account. Holding one’s own country’s sovereign debt requires the same amount of equity cushion than holding a well-diversified portfolio of many sovereign bonds. Imposing exposure limits take these diversification effects into account. They ensure that no bank is overly exposed to a single sovereign. Exposure limits make it more difficult for a government to use its own banks as a hostage. On the other hand, assigning no risk weights and purely relying on exposure limits assumes that the sovereign debt carries no risk at all. Essentially, one implicitly assumes that diversification - or simply not being too exposed to one practical - sovereign eliminates

all the risk. Finally, it should also be mentioned that the zero risk-weight on sovereign debt in Europe for European banks is inconsistent with the no bail-out clause in the Maastricht Treaty.

Who should be the Macro-prudential Regulator? This raises the question of which institution should be in charge of implementing bank related macro-prudential measures. Should it be the central bank or a government agency closer to the fiscal authority?

Instead of thoughtful weighing all the arguments – a lot of ink was spent on this debate – I will refer to Smets (2014) and stress only two main points. First, like monetary policy, regulatory measures should be most strict in good times and relaxed in bad times. Indeed, enforcing a rule that restrict bank leverage in good times and relax their constraints in bad times likely suffers from a time-consistency problem (similar to the one discussed above). Second, a strict rule-based approach is challenging since of the increased complexity and constant evolution of financial assets, financial market structures, and shadow banks whose sole purpose is to circumvent regulation.

3.4.2 “Race Away from the Bottom” Macro-prudential Regulation

Instead of having command and control rules inform of risk weights or exposure limits, modern regulation could also exploit the competition among the banks. Formally speaking the regulators could set up a mechanism that induces banks and other market participants (which are typically better informed) to behave in a manner that leads to better economic outcome.

As e.g. in Brunnermeier and Sannikov (2015), one could punish the “least prudent” banks, henceforth creating incentives among all the banks not to be the worst performer. This can create a race away from the bottom. Such policy will of course create some costs – as the Lehman crash demonstrated – but, if clearly specified, might be beneficial ex-ante.⁷

⁷For more details see Brunnermeier et al. (2016a).

4 Implications for Europe: ESBies

As we’ve seen, the existence of financial dominance and the fact that domestic banks are overly exposed to domestic sovereign debt makes it difficult for individual countries to default on their debt when they need it the most. In fact, when getting close to the “insolvency state,” governments often accept a “straitjacket commitment” in order to lower their interest rates, hence binding their hands and gamble for resurrection. Also, the fact that sovereign debt is safe under such mechanism makes it a proper instrument for monetary policy.

Yet, this absence of this safety valve is particularly problematic in currency unions, like the Eurozone, where essentially no safety valve exists. Monetary policy is set by the ECB, and the exchange rates are fixed by nature, no adjustment mechanisms are available for countries in deep financial troubles to activate a safety net without creating major distortions. On the other hand, the international arrangement and European treaties also offers some commitment devices.

The ESBies proposal The Euro-nomics group has put forward the following proposal for a safe asset.⁸ The European Safe Bond (ESBies) does not involve any form of joint liability, contrary to other proposals such as blue-red bonds or redemption funds. The idea is that a private organization or debt agency buys a portfolio of European government debt and issues out of it a senior European and junior European bond.

In more detail, such entity buys on the secondary market say approximately 5.5 trillion euros of sovereign debt (60% of the Eurozone’s GDP). The weight of each country’s debt would be equal to its contribution to the Eurozone’s GDP. Hence, each marginal euro of sovereign debt beyond 60% of GDP would have to be traded on a single bond market, where prices would reflect true sovereign risk, sending the right signal to the country’s government. To finance its 5.5 trillion purchase, two securities are issued: The first security, the ESBies,

⁸See Brunnermeier et al. (2016b).

would be senior on interest and principal repayments of bonds held in the pool. The second security would receive the rest - it is therefore riskier and would take the hit if one or more sovereigns default. See Figure 4.

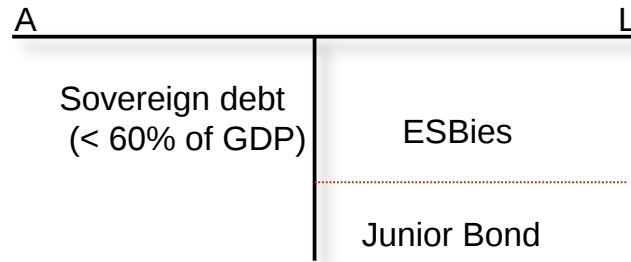


Figure 4: The European Safe Bond (ESBies) structure.

That way, when a euro area member defaults on its debt, the junior bond takes the full hit. That is, junior bond holders assume all the risk, while the senior bond holders are protected by the junior bond holders. This keeps the possibility of default, hence essentially creating a safety valve, while keeping a safe asset, the senior bond – as long as defaults are not too-well correlated.

European banking regulation and ECB policy would be adjusted so that banks face incentives to invest in safe ESBies instead of risky sovereign debt. Exposure limits on domestic debt would be imposed – it is a safe asset after all, only exposed to interest rate risk.

The senior bond thence created would serve as a safe asset that can be used to conduct monetary policy. An interest rate cut leads to an appreciation of the safe asset, which could recapitalize banks. ESBies should also be accepted (without haircut) by the ECB (since they are truly very safe).

In contrast, the banks' holdings of the junior bond should be limited through macro-prudential regulation. Ideally other (non-levered) investors (outside the highly levered banking sector) should provide some insurance against extreme tail risk. That way, financial

dominance could be partly avoided and a sovereign default would not be so detrimental. This will lower the exposure of banks to their own sovereign and break the vicious circle described above. ESBies will bring stability to the financial system.

Importantly, ESBies are politically feasible - because they are a pure repackaging of existing debt, they do not require additional funding by member states. They do not involve joint liability: as said, if one member-state defaults, the junior tranche will take the hit still. Finally, because purchases by the debt agency are capped at 60% of the Eurozone's GDP, countries will face their individual credit spreads on all euros borrowed above this limit. Individual market signals will hence discipline each government.

ESBies have many of the advantages of euro-bonds. They create a large pool of safe assets, about half the size of US Treasuries, and will therefore stabilize and diversify global capital flows. ESBies also have another positive side-effect. Flight to safety capital flows which currently occur across the borders - as a crisis becomes more severe investors sell bonds from the periphery and buy German bonds - will be redirected to flows from the European junior bond to the senior bond. Both bonds are European and hence the flight to safety premium would be equally shared across Europe. That is, Germany would give up the flight to safety premium, but this construction avoids a joint-liability structure and provides a liquid safe asset for Europe.⁹

5 Conclusion

Overall, there are two competing financial architectures. The first one assigns strict macroeconomic rules, and by limiting financial dominance tilts the balance either to fiscal or monetary dominance. It also enables the central bank to be more aggressive in offering liquidity support through the banks, as the default/solvency risk can be born by the banking sector. Overall, government debt can be contingent and hence provides some insurance against very

⁹Bolton and Jeanne (2011)

adverse shocks that push the economy into a tail spin.

As banks are prevented to be overly-exposed to the domestic sovereign, it becomes easier for the latter to default. Of course, the risk is that it does so too easily: the loss of commitment device (the financial sector as a “hostage”) makes default too easily for the sovereign.

In contrast, a financial architecture that does not rule out financial dominance has the advantage that the banking sector can offer itself as a hostage. This leads to a “straight-jacket” commitment. It might be easier to get out of a smaller crisis, but a very severe crisis will lead to a demise of the real economy. The sovereign and the banking risk is highly interlinked through the diabolic loop. In these circumstances ex-post redistributive monetary policy becomes less effective, as an interest rate cut can lower banks funding costs of holding sovereign debt but at the same time sovereign debt causes losses through increased default risk.

Moreover, the existence of a safe asset is important for monetary policy and redistribution to work effectively, as we have seen through the “stealth recapitalization” mechanism highlighted in the first section. Hence, restoring the possibility of “default” into sovereign debt does come at the risk of orphaning the domestic economy from a safe asset.

Entering a currency union casts the exchange rate in a straight-jacket. Since a major safety valve is switched off, it is important to have alternative shock absorbers. A well capitalized banking sector can take on part of this task. The financial dominance solution would add another complication since it makes it easier to overcome medium crises, however at the expense of dramatically worsen bad economic crises.

Finally, I advertised the ESBies (European Safe Bond) proposal, which hopefully encompasses both elements. It allows for a safe asset that facilitates monetary policy and for a risky junior bond which if held by well capitalized other investors can provide some shock absorbing insurance. In addition, it benefits peripheral countries by redirecting flight to

safety capital flows. Instead of flowing across borders from the periphery to the core, capital flows will occur from the junior bond to the senior bond. Since both bonds are European, the flight to safety premium is shared with all European countries.

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