A New Start for the Eurozone: Dealing with Debt

MONITORING THE EUROZONE 1

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Contents

About the Authors *v*
Acknowledgements *viii*
Foreword *xi*
Executive Summary *xiii*

Introduction **1**

1. With high debt, the Eurozone remains vulnerable **5**
Looming sovereign debt overhang and inadequate fiscal framework 7
The risk from an overburdened monetary policy 8
Risk-on/risk-off: Between safety and paranoia 9
The home bias has worsened though the crisis 11
The financial market continues to be fragmented 14

2. Dealing with the legacy sovereign debt **17**
Setting up a stability fund for debt buyback operations 18
Debt buyback without any transfers across countries 19
Advantages and disadvantages of different revenue sources 20
Calibration of the 'national buyback' scheme 23
Additional sources of debt reduction 27
Schemes involving redistribution across countries 27
Private sector participation through a debt-equity swap 31

3. Reforming the crisis lending framework **35**
The twin objectives 36
Special problems in a currency union 37
How not to do it: The experience with Greece 38
A better lending framework for the IMF 40
The present lending framework of the ESM 42
Adapting the lending framework of the ESM 44

4. Diversification of sovereign risk and a safe asset **47**
Proposal: Immunising banks and creating a liquid safe asset 47
Advantages of the proposal 48

Conclusion **51**

Discussion **53**

Introduction 53
1. Delinking banks and sovereigns 54
2. Fiscal governance 60
3. Dealing with the legacy debt 63
4. Political feasibility 69

References *73*
Appendix A: Calibration of national debt buyback from seigniorage *76*
Appendix B: Calculation of the haircut for GDP bonds *79*

Foreword

Recent Eurozone growth has been sporadic and hesitant, and confidence in the recovery is marred by concerns over returning financial instability and long periods of little or no growth. These problems are rooted further back in the Eurozone's history than the recent crisis, and the authors of this report, the first in the *Monitoring the Eurozone* series, call for a reconsideration of the Eurozone's architecture itself. They focus on three key points where improvements can be made without a Treaty change or the creation of a "fully-fledged fiscal federation": a one-time debt stock operation to quickly cut sovereign debt; a strengthened sovereign lending structure for the European Stability Mechanism; and the arrangement of changes in regulation that discourage and limit the exposure of banks to sovereign debt.

The newly created European Council of Economic Experts, a CEPR initiative, has taken on the ambitious task of producing a cohesive analysis of the Eurozone and its future in the *Monitoring the Eurozone* series. The Council is a group of academics, from diverse national backgrounds, who come together to forge common analysis of problems of the Eurozone and to propose workable solutions. This first report represents months of careful deliberation of the data, and draws together a previously fragmented discussion of the real challenges Europe faces in its recovery. Taking no institutional stance on policy, CEPR is delighted to support this initiative. The Centre thanks the founding committee and its advisers, as well as Anil Shamdasani and the CEPR staff for their efforts in bringing these efforts to fruition. We are also grateful to the European Commission for its support of CEPR, and acknowledge that support from it does not constitute an endorsement of the views expressed in this report.

Tessa Ogden
CEPR, London
March 2015

Executive Summary

The recent, still timid progress in the Eurozone towards recovery and institutional consolidation is tainted by concerns over the possible return of financial instability and/or a long period in which growth remains anaemic. Although a recovery seems finally to be on the way, it is quite weak and there is little room for complacency if one looks at unemployment rates.

The Eurozone architecture is unfinished business in many respects. This report focuses on three issues because they are important and they can be addressed without a fully-fledged fiscal federation or changes to the Treaty. The components of our proposal are:

1. A one-time debt stock operation to rapidly reduce sovereign debt, particularly in the highly indebted peripheral countries. We offer a menu of options, one of which is a debt buyback through the commitment of future revenues, which could include seigniorage, VAT or a wealth (transfer) tax. This does not involve any redistribution across members of the currency union, but it would not be sufficient to eliminate the overhang. Therefore, we discuss a number of other choices, including a European solidarity tax with some limited redistribution across countries and 'debt-equity' exchange with GDP-indexed bonds.
2. A strengthened sovereign lending framework for the ESM, which both creates strong market-based incentives to avoid excessive debt levels in the future and makes future debt restructuring – should it become necessary – less painful than is currently the case.
3. A set of regulatory changes that discourage and limit the exposure of banks to sovereign debt, particularly that of their own sovereign. This should be complemented by the creation of a European synthetic bond that does not require mutualisation, but would constitute a safe asset and could facilitate unconventional monetary policies by the ECB.

Certainly, our goal is ambitious: we propose to kill the three birds of enforcing long-run fiscal discipline, dealing with the legacy debt overhang and breaking the sovereign bank loop with one stone. This would require a concerted effort and significant investment of political capital, which may only become available if the fragility of the present situation becomes apparent. However, the solutions to these three problems are strongly complementary and would generate large welfare improvements for Eurozone citizens if implemented jointly.

Introduction

For a while, the storm seemed to have passed and the Eurozone entered a welcome tranquil period.[1] Now, Greece has once again triggered the alarm and, while the financial and economic resilience of many member countries has improved, their political resilience has not. Greece is special in many ways and will have to be dealt with in a different way from the other member countries. Nevertheless, the renewed turbulence it has caused once again has highlighted that the construction of the monetary union remains incomplete.

No doubt, important institutional steps have been taken. Sovereign risk premia have declined following the announcement of the ECB's Outright Monetary Transactions (OMT) programme, the Single Supervisory Mechanism (SSM) has taken over from national supervisors and a Single Resolution Mechanism is being phased in. In addition, the Eurozone banking system has survived a comprehensive assessment and a stress test with only minor scratches. Finally, the ECB is embarking on a sizeable and open-ended quantitative easing (QE) programme including sovereign bonds.

However, the weight of crisis-fighting has fallen heavily on the ECB, which increasingly faces the danger of becoming overburdened – while being criticised simultaneously by those who think it is doing too much and those who wish for more. While the ECB is not the only central bank in danger of being overburdened, the political and institutional structure of the Eurozone makes the problem more complex and potentially divisive. Meanwhile, reforms at the European level have come to a standstill and all debates on increasing fiscal and political integration have remained moot. Some countries have implemented significant fiscal consolidation and structural reforms, but others have lagged.

Fundamentally, the Eurozone remains vulnerable because growth is anaemic. A key reason behind this is a debt overhang, which discourages investment and consumption growth. Several countries are currently caught in a low-activity equilibrium involving weak demand, high unemployment and rising non-performing loans. With a high outstanding debt stock, a new shock – whether external or within the Eurozone – could easily set off a new crisis. If spreads on sovereign debt were to widen again to levels similar to those reached before Mario Draghi's "whatever it takes" speech of 2012, debt sustainability would be an issue

1 It is easy to forget just how different things are in 2015. In July 2012, a group of eminent economists wrote: "We believe that as of July 2012 Europe is sleepwalking toward a disaster of incalculable proportions. Over the last few weeks, the situation in the debtor countries has deteriorated dramatically. The sense of a never-ending crisis, with one domino falling after another, must be reversed. The last domino, Spain, is days away from a liquidity crisis, according to its own finance minister." (INET, 2012).

in a number of countries. The Eurosystem remains vulnerable to fiscal shocks since there is no room left for fiscal manoeuvre in a number of countries. In addition, the diabolic loop between banks and sovereigns is alive and well. While the Single Supervisory Mechanism and the Single Resolution Mechanism are critical to reversing financial fragmentation, they are not sufficient, particularly in the near and medium terms. High borrowing costs of banks and – by extension – corporates and households in peripheral countries are still related to continued sovereign risk.

In this setting, attempts to implement necessary reforms of the fiscal governance in the Eurozone are stillborn. The existing rules did not prevent countries from issuing too much debt, nor providing liberally excessive lending, as both private agents and the governments correctly anticipated that the Treaty was too weak to make the no-bailout clause credible. Under a credible no-bailout clause, correct pricing of risk should have deterred excessive debt accumulation *ex ante*. This did not happen. By now, all the potential beneficial effects of deterrence are long gone. In the present situation, with debt levels already very large and a still developing and untested institutional framework to protect countries from adverse spillovers, debt restructuring involving the private sector is not an attractive option. All that is left are the adverse *ex post* consequences of overly large stocks of private, but especially public, debt, including the vulnerability to runs. This is why, in the present circumstances, the difficult inheritance of the recent past is bound to frustrate and undermine fiscal governance reform capable of reining in moral hazard. Any hope of proceeding from here will necessarily require a change in the initial condition, to be brought about with a courageous and convincing Eurozone political initiative, to back a technically well-designed, sizeable reduction in existing debt levels.

While our proposal is not suitable for the special case of Greece, it may become more urgent if the situation in Greece escalates.[2] This would clearly be undesirable, but it might open a window of opportunity for the Eurozone to agree on a new start.

We advocate a one-off coordinated policy among reform-minded countries to decrease the *legacy debt* in exchange for a permanent improvement of the fiscal and financial governance of the Eurozone. The debt reduction plan constitutes a one-off restructuring of the legacy debt with no open-ended commitment. The new fiscal deal sets the parameters of a credible and enforceable framework that limits bailout by making future private sector participation in debt restructuring binding for future ESM lending in cases of excess debt. Thus, it restores *ex ante* incentives to avoid excessive debt and sets the conditions for an orderly default *ex post*. Delinking banks and sovereign balance sheets will make the systemic costs of default more limited, and hence restructuring a politically feasible

2 Greece will need to lay out an economic programme that its partners are willing to support. A new programme for Greece might be modelled on the HIPIC programme, which involved a prolonged qualification period during which countries had to prove a good track record before eventually reaching the conclusion point and receiving official debt relief. The qualification period is, however, key.

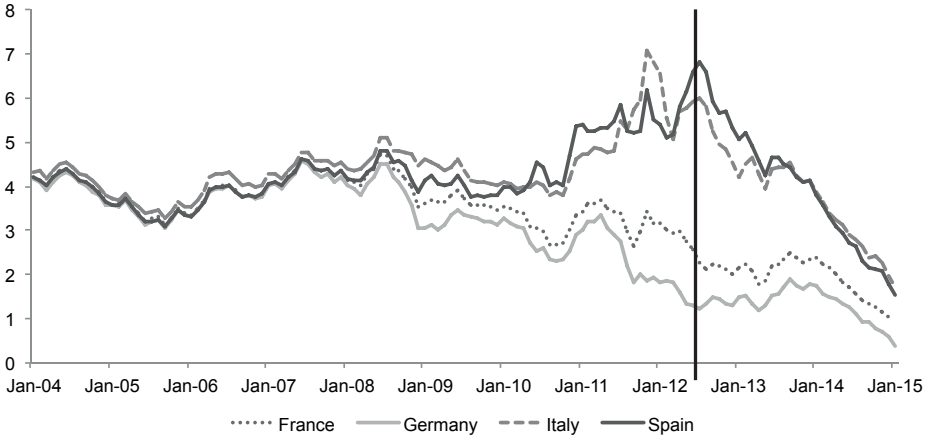
option to restore economic efficiency after large disturbances. This permanent improvement in the governance structure of the Eurozone cannot take place without decreasing legacy debt to much lower levels.

While the *aims* of the proposals are fairly narrow – for example, we do not include short-term stimulus although our measures may have positive effects on demand by reducing uncertainty about the future of the Eurozone, and they do not directly address private sector indebtedness – the proposed package to achieve these aims is broad. This package should not be unbundled nor should the implementation be partial. The basic logic of some elements of the proposal has been articulated in the past, including by members of this group of authors. However, these elements have been refined and, most novel, their combination in a joint package generates complementarities that enables this package to both address debt overhang and dissuade renewed accumulation of excess debt.

1. With high debt, the Eurozone remains vulnerable

Financial markets appear to believe that the sovereign debt crisis in the Eurozone is over. As Figure 1 shows, sovereign spreads have collapsed since the "whatever it takes" speech by Mario Draghi in July 2012, the introduction of the OMT programme and, more recently, as the consequence of declining inflationary expectations and expectations of further monetary action by the ECB.

Figure 1. Long-term government bond yields



Source: OECD.

Yet, public debt levels in the Eurozone remain at dangerous levels and are forecast to remain elevated for a long time. For the Eurozone as a whole, projected public debt for 2019 is 88.2% of GDP, over 20 percentage points above the 2007 level. The debt-to-GDP ratios of member countries are shown in Table 1. By way of example, the IMF projects that Italian public debt will stand at 125.6% of GDP in 2019, compared with 103.3% in 2007.

Table 1. Public debt/GDP in Eurozone countries

Country	1999	2007	2014	2019
Eurozone	71.9	66.5	96.4	88.2
Austria	66.4	64.8	86.8	71.8
Belgium	114.7	86.9	106.4	94.2
Cyprus	55.1	54.1	107.5	106.5
Estonia	6.0	3.6	10.2	8.2
Finland	44.1	34.0	58.9	58.3
France	60.0	64.2	95.3	95.9
Germany	59.9	63.5	74.2	60.5
Greece	94.0	103.1	176.3	135.3
Ireland	46.7	24.0	110.8	97.5
Italy	110.0	99.7	131.9	125.6
Latvia	12.2	8.4	40.4	30.8
Luxembourg	6.4	7.2	22.7	35.2
Malta	62.1	62.4	68.6	68.5
Netherlands	58.5	42.7	69.5	65.4
Portugal	51.0	68.4	128.9	119.3
Slovak Republic	47.1	29.8	53.6	49.3
Slovenia	23.7	22.7	82.2	80.2
Spain	60.9	35.5	98.3	99.6

Source: AMECO (2014). Debt ratios for 2019 are from the October 2014 *World Economic Outlook* (IMF, 2014a). Eurozone and Estonia data are from the WEO.

In this report, we stress that, notwithstanding the current market perception of low sovereign risk, the debt crisis is far from having been solved. As shown above, there is little sign of prospective public debt reduction, and this is compounded by high private-sector debt levels in many countries (Buttiglione *et al.*, 2014). Consistent with the decline in the long-term interest rate, the market is anticipating weak trend output growth and weak inflation (relative to pre-crisis expectations), which raises concerns about debt sustainability. The structural problems underlying the design of the Eurozone remain unresolved, and pose long-term risks for the Eurozone itself.

The Eurozone remains an incomplete monetary union: its institutional framework is still not consistent with the long-term viability of the union. In the inherently political process of institutional development, several perverse features of the Eurozone remain, as we shall argue, which undermine the long-term sustainability of the euro:

- The debt overhang poses both acute (crisis) risks and chronic (low growth) risks, while the fiscal framework remains inadequate.
- The lack of progress in fiscal and macroeconomic reforms, and deficiencies in the governance of the Eurozone, raise the risk of the ECB becoming overburdened.

- The current institutional arrangement aggravates the binary 'risk on, risk off' mechanism that characterises the functioning of the financial markets since the inception of the crisis.
- The 'diabolic loop' between states and banks, which was the main cause of the gravity of the Eurozone crisis, if anything has grown stronger over the years.
- The financial markets of the different member countries continue to be extremely fragmented.

We first discuss why these problems persist in spite of the (apparent) ending of the acute phase of crisis. We then make a concrete proposal to solve these problems, which involves both regulatory and ECB action.

Looming sovereign debt overhang and inadequate fiscal framework

The dangers of high debt are well known

On the one hand, a public debt overhang weakens long-term growth prospects, as the burden of debt service acts like a prohibitive tax on new private investment and labour income – investors anticipate the proceeds from any new project to be (in part) expropriated to serve legacy debt. The result is lower investment, lower growth and, for a given tax rate, lower tax revenues and lower ability to repay the debt. For a high enough level of debt, it is possible for a country to be on the right-hand ('wrong') side of the debt Laffer curve, where debt reduction/relief is in the collective interest of creditors as well as the debtor.

On the other hand, high public debt is likely to expose a country to self-fulfilling debt crises and liquidity problems. The two considerations are strictly interwoven. It is the low growth prospects that raise the risk of a country falling back into the zone of vulnerability to crisis dynamics. It is the exposure to these dynamics, activating vicious loops between rising risk premia, fiscal solvency, banking health and economic activity, that feeds pessimistic expectations of growth.

In the member countries most affected by the current crisis, uncertainty about the fiscal adjustment required for ensuring debt sustainability is arguably taking a heavy toll in terms of forgone economic activity. A resolution to this uncertainty is a key precondition for addressing the ongoing recession, and restoring conditions for growth.

It is worth stressing that there are many channels through which, in the current situation, the debt overhang problem is likely to compound financial and macroeconomic instability. For example, recent work by Rendahl (2014) emphasises the feedback effects on demand and growth of large unemployment crises: when a large recessionary shock raises unemployment substantially, it is increasingly difficult for workers who have no job to find a match with firms. Unemployment becomes more persistent, lowering the permanent income of households and thus lowering demand. Adverse market conditions also weigh on those workers still with a job. As they become increasingly concerned with the prospect of losing it, they may increase their saving in a precautionary manner, again lowering demand. With policy rates at the zero lower bound,

the contraction in demand lowers activity and creates more unemployment, inducing a vicious circle (unemployment, saving, demand, unemployment) that exacerbates the effects of the initial shock.

Through this channel, to the extent that a debt overhang discourages investment and growth, low income perspectives reduce demand and employment today, in turn creating a long period of low cyclical growth. Long-term and short-term considerations combine in a perfect storm, condemning a country to a state of a persistently large output gap and inefficient wasting of physical and human capital.

The fiscal framework is inadequate to address the problem of excess debt

The revision of the fiscal contract during the crisis has improved the set of fiscal rules by offering a degree of extra flexibility to countries that are suffering from severe recessions, undertaking structural reforms and/or engaged in significant investment programmes. Yet, for the highly indebted countries, the marginal increase in flexibility offered by the new rules does not provide a convincing solution to the stock problem of excessive accumulated debt.

A contract simply requiring countries to pursue a pre-established path of debt reduction is no more credible than the rules that failed to stop the imbalances building up and leading to the current Eurozone crisis. It is not difficult to predict that, as was the case in the early experience of the Maastricht Treaty, the stock reduction objective will be systematically downgraded in any risk-off period, only to return to the top of the policy agenda if and when markets switch to their risk-on mode.

The risk from an overburdened monetary policy

The success of the OMT announcement is undisputed. The OMT programme was the culmination of a careful political and institutional process (making OMTs conditional to the ESM, to strengthen conditionality and minimise moral hazard). Its introduction effectively ruled out open-ended hikes in sovereign risk premia.

Arguably, these spikes were mainly driven by self-fulfilling expectations that typically arise in a situation of fundamental stress, confounding the correct assessment of credit risk with non-fundamental considerations. The OMT programme is designed to prevent this type of runaway speculation from causing unwarranted and disorderly credit events that might eventually lead to the breakup of the Eurozone. It is not designed to eliminate fundamental credit risk, which would instead require the provision of a blanket guarantee.[3] Such a risk requires fiscal, not monetary, initiatives.

In response to the current stagnation, the ECB has further announced a series of non-conventional measures, culminating in the announcement on 22 January 2015 of a sizeable quantitative easing (QE) programme that includes the purchase of sovereign debt. Beyond its potential impact on current demand and

3 See Corsetti and Dedola (2014) for an analysis of monetary backstop to government debt.

inflation expectations, we believe that QE is another important step to address some of the perverse features of the macroeconomic adjustment to a debt crisis in a monetary union. But this step can only be completed if QE is complemented by strong policy initiatives at the national and Eurozone levels, and is combined with regulatory changes in relation to the treatment of government bonds for capital purposes. These changes are necessary for the full effectiveness of QE.

It would be a great mistake to place all the burden of demand and crisis management on the ECB (see Pill and Reichlin, 2014 on this point). The current weakness of the Eurozone requires convincing and sizeable measures, combining fiscal and monetary policy as well as reforms, and including, as we argue in this report, some kind of deal on outstanding debt. If, in the absence of these measures, the economy will not pick up convincingly, QE may actually end up being divisive, proving right *ex post* those who believed that QE would actually discourage reform efforts. It will also raise the possibility of a new phase of costly and disruptive financial turmoil.

The QE programme is being implemented without full risk-sharing of possible losses from the purchases of national assets. Limited risk-sharing (a feature of Emergency Liquidity Assistance) is a way to draw a line between fiscal and monetary policy, and to address the issue of incentives to reform. There are, however, important macroeconomic and financial implications that need to be fully understood. The point is that, with national responsibility for own losses, a government faces harsher consequences of slowing down reforms and failing to address budget sustainability.

Consider the possibility that, after QE, markets may come to doubt the balance sheet of a national central bank, and that expressing concerns that prospective or actual losses on the central bank's balance sheet may undermine the willingness and ability of the European monetary authorities to respond to a crisis.[4] These doubts alone may easily ignite a run on the domestic banking system – why should depositors take the risk of being trapped in a vulnerable national system? Even if we do not find it likely (after all, the OMT programme is still there), this scenario cannot be ruled out. Note that it illustrates another dimension of the 'diabolic loop', whereby bank fragility is induced by sovereign and national central bank weakness, instead of the other way around (see below).

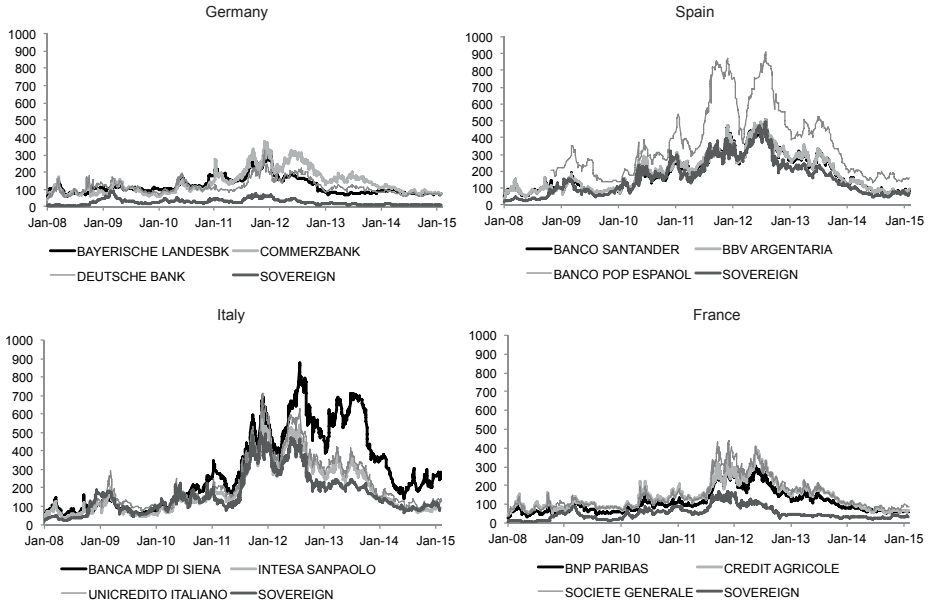
Many market participants seem convinced that QE has solved the financial stability problem in the Eurozone (except for in Greece). Easy financing conditions and open-ended QE is seen as an effective blanket guarantee on public debt. These positions disregard possible perverse dynamics stemming from limited risk-sharing if and when a government fails to deliver.

4 We note that there is no economic reason why this should be so, given that central banks can have negative net worth. The relevant measure for solvency of a central bank is the net present value of future seigniorage revenues estimated at the target inflation rate (see Section 3).

Risk-on/risk-off: Between safety and paranoia

A worrying feature of the current state of the financial markets is their tendency to oscillate between periods of 'risk on' and 'risk off', whereas correlations between a wide ranges of asset classes tend to be high and almost reach unity during crises. The uncertain governance of the Eurozone accentuates a binary dynamic. The market either believes in the strong commitment of the central bank to backstop individual sovereigns, in which case credit risk is low everywhere, or it doubts the commitment to monetary union, in which case there is a flight to safety generating risk premia so large that they are plausible only under (possibly self-fulfilling) expectations of currency redenomination with a breakup. In either case, but especially in the latter, market signals appear unable to provide a realistic assessment of the fundamentals of each country's fiscal position, and thus fail to discipline government policies adequately.

Figure 2. Bank spreads in Germany, Spain, Italy and France



Note: All spreads SNR 5Y – CDS PREM. MID.

The initiatives of the ECB – the OMT announcement (explicitly designed to eliminate the perceived redenomination risk) and the QE programme – may have been misperceived by some market participants as a kind of guarantee of sovereign debt. The remarkable compression of spreads after the announcement may reflect this misperception, pricing bailout well beyond the ECB's carefully considered target. The concern is that governments may perceive their actions as playing little or no role in either the 'risk-on' or the 'risk-off' regime, reducing the incentive to develop responsible long-term budgetary policies. However, we have already argued that market misperception can easily become reversed.

The home bias has worsened though the crisis

While some of the problems leading to the crisis have been fixed over the last few years, the 'diabolic loop' between banks and sovereigns has not disappeared as the crisis has evolved and mutated.[5]

During the first ten years of the euro, we have seen a progressive geographical integration (within the Eurozone) of the sovereign bond market. Since the crisis, the process has reversed. Monetary and financial institutions (MFIs) have increased their holding of government debt with a strong home bias in its composition (Brutti and Sauré, 2014; Broner *et al.*, 2014; Reichlin, 2014).

The standard explanation for the intensification of the home bias is the growth of the carry trade – using short-term funding to buy high-return sovereign debt. However, the carry trade explanation would lead us to expect all banks, including core country banks, to be investing in high-yield periphery debt rather than in their own sovereigns' low-yielding debt. Indeed, in what has been called "the greatest carry trade ever" (Acharya and Steffen, 2013), the convergence in yields between the different member states of the Eurozone in the run-up to the crisis has been explained as a consequence of the huge 'arbitrage' opportunity provided by the gap between peripheral and core country debt. These banks, particularly (and consistently with moral hazard) the larger and less well capitalised banks, had used their access to cheap short-term wholesale funding to invest in peripheral sovereign debt. Dexia, for example, which was bailed out in the autumn of 2011, had invested one third of its balance sheet in peripheral sovereign bonds and financed half of it with short-term funding. Clearly, given the European capital requirements (CRD), this behaviour is only to be expected.[6] Of course, the banks

5 See Brunnermeier *et al.* (2011) on the inter-linkages between banks and sovereigns.

6 In 1988, Basel I introduced a credit risk framework based on different levels of capital for different types of assets. The computation was based on the use of risk weights, which depended on the credit risk of the assets (safest assets would have a zero risk weight). The risk weights have been revised to include risks other than credit risks and to expand the scope of assets covered in Basel II (2004) and in Basel III (2010). The regulatory treatment in Basel II of sovereign bonds in Basel II depends on whether bonds are held on the trading book or on the banking book, with entirely different capital regimes (e.g. VAR based on one year for the banking book, based on ten days for the trading book, and fair value accounting on gains and losses) and determined exclusively by the declared intent of the bank (Pepe, 2013). Traditionally, under Basel II, the trading book regime was apparently more demanding in that a broader set of risks had to be considered. However, the banks were allowed to use their own VAR and had to use only ten days of data, making the trading regime much more appealing. After the crisis, the Basel II.5 package introduced tougher rules for the trading book, including the requirement that sovereign debt fall within the model scope. However, it did not exclude the possibility of a zero risk weight if that was determined by the models. Basel III expands and substantially homogenises the definition of capital (the numerator) but leaves the definition of the weights and of the assets essentially unchanged (Le Lesle and Avramova, 2012). Under Basel III, for any asset, both unrealised losses and gains will impact on CET1 capital, although a national central bank or the ECB/EBA could potentially exclude government central banks during the phase in period. Although the Basel regulation does not prescribe a zero risk weight for sovereigns, the implementation of Basel under CRD IV does. There are two potential sovereign bond biases in this regulation: the zero risk weight for sovereigns and

ended up losing on both sides of the trade, as core bond prices soared through flight to safety and peripherals plummeted.

This changed in 2011 (Reichlin, 2014; Reichlin and Garicano, 2014). Banks in all countries increased their holdings of their own sovereign's debt; banks in Germany increased their share of domestic government securities in total assets by a third, while Italy and Spain doubled their shares. This created a sharp change in the composition of Eurozone's banks' balance sheets, which shifted away from loans to domestic companies towards government securities.

These dynamics can be seen clearly in Table 2 and Figure 3. They characterise both core and periphery countries, including Germany, and therefore affect banks both in 'risky' and 'safe' sovereigns. The most recent available data, for December 2013, showed that the ratio of national sovereign bonds over core tier one capital was 68.1 % in France, 137.13% in Germany, 160.98% in Spain and 362.20% in Italy.

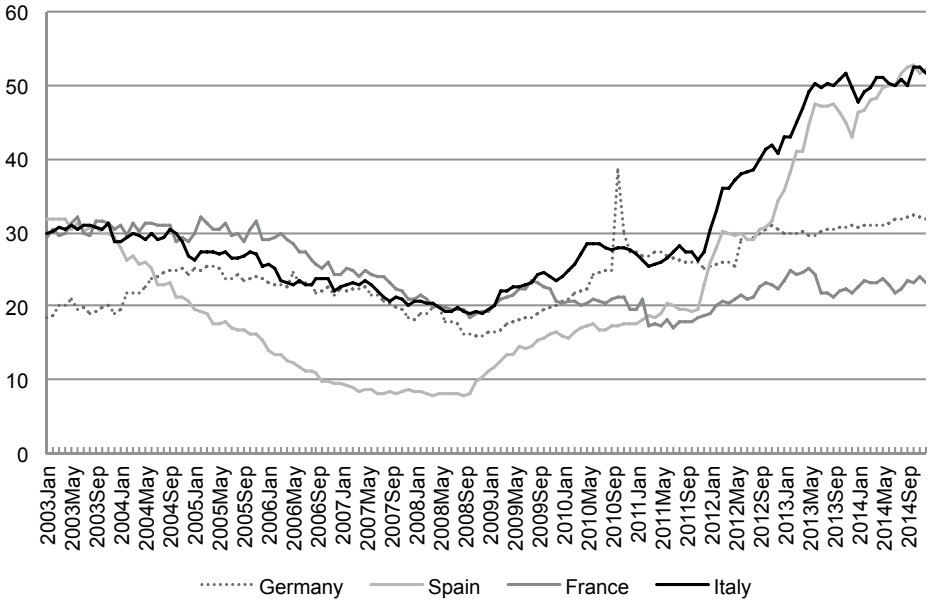
Table 2. Evolution of bank balance sheets

	Loans - retail					Gov. bonds - other EZ			
	Germany	Spain	France	Italy		Germany	Spain	France	Italy
2007	30.04	58.28	23.04	37.81	*2007*	1.38	0.60	2.55	0.53
2008	29.89	54.36	22.98	36.53	*2008*	1.26	0.51	2.51	0.33
2009	31.16	52.51	23.26	36.24	*2009*	1.41	0.75	2.69	0.31
2010	27.91	51.69	23.63	38.75	*2010*	1.30	0.34	2.25	0.21
2011	27.91	47.53	23.19	37.50	*2011*	1.12	0.34	0.74	0.17
2012	28.71	43.37	24.37	35.20	*2012*	1.14	0.38	1.02	0.12
2013	31.44	44.55	25.17	35.17	*2013*	1.29	0.42	1.07	0.16
2014	30.54	43.80	24.29	35.11	*2014*	1.45	0.99	1.10	0.35
	Gov. bonds - domestic					ESCB (MRO+LTRO)			
	Germany	Spain	France	Italy		Germany	Spain	France	Italy
2007	1.91	2.55	2.11	4.84	*2007*	2.72	1.74	-	0.82
2008	1.69	2.92	1.94	4.47	*2008*	3.34	2.72	-	1.35
2009	2.15	4.41	2.09	5.29	*2009*	2.75	2.36	-	0.72
2010	2.59	4.56	1.94	6.29	*2010*	1.12	2.01	0.35	1.25
2011	2.40	5.33	1.82	6.02	*2011*	0.25	3.66	1.41	5.17
2012	2.96	6.79	2.26	8.33	*2012*	0.88	9.98	2.22	6.44
2013	3.28	8.28	2.25	9.99	*2013*	0.12	6.56	0.91	5.83
2014	3.21	9.53	2.36	10.36	*2014*	0.30	4.77	0.42	4.84

Source: ECB, Bruegel database of Eurosystem lending operations

the liquid assets requirements in the new 'liquidity coverage ratio'. Liquid assets held may be level 1 (sovereign bonds) or level 2 (corporates and others). However, neither of these rules would lead the Eurozone banks to discriminate in favour of their own sovereigns, as it would make no difference in terms of the rules as to what sovereign risk is held.

Figure 3. MFIs (excl. ESCB) assets: Domestic government securities/loans to domestic NFCs



Source: ECB.

Colangelo *et al.* (2014) provide a quantitative assessment of the statistical significance of this fact. On the basis of a counterfactual exercise, they find that such bias is an "exceptional feature" of MFI balance sheet dynamics since the recession of 2011. In other words, it cannot be explained by the historical behaviour in previous cyclical downturns.

So if it is not (just) the carry trade, what can account for this widespread increase in home bias? Hedging the risk of a Eurozone breakup, which was a real concern at the height of the crisis, is a more likely explanation.

If the Eurozone were to break up, then banks would want to match the denomination of their assets and liabilities. This probably accounts for the sharp increase in home bias in all countries, core and periphery, that can be observed between January 2011 and December 2012.

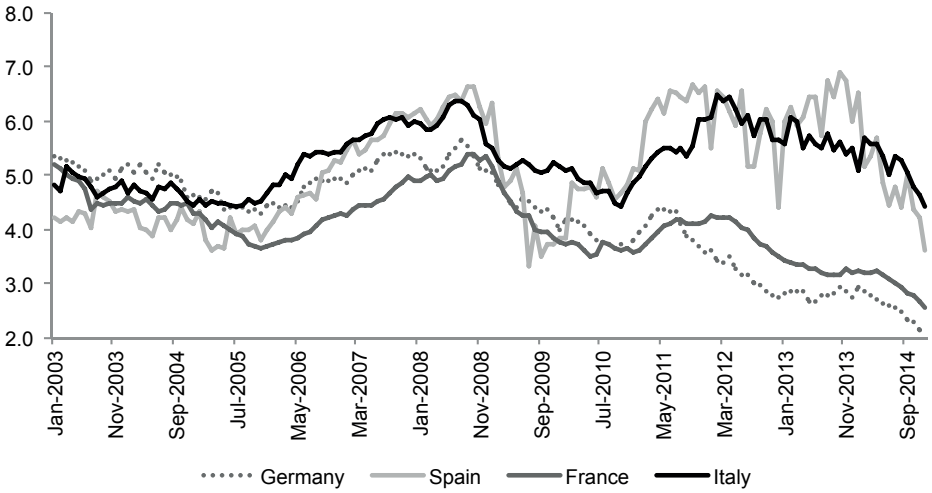
Furthermore, the fact that the home bias intensified at the height of the crisis in peripheral countries is probably explained by the fact that those countries' banks did not evaluate the default risk of the sovereign in the same way as foreign banks. If the sovereign defaults, the banks calculate that the banks themselves default, and whether they hold 10% or 15% of their assets in government paper is likely to be immaterial.

The carry trade would imply a convergence of all banks to a similar activity. The fact that the market instead fragmented so intensely must necessarily have been a consequence of the increasing systemic risk.[7]

The financial market continues to be fragmented

As the different sovereigns were increasingly perceived as having different solvency risks by the markets according to their different levels of public debt and the health of their financial systems, the financial conditions affecting corporations in the core and the periphery countries became sharply differentiated, as Figure 4 shows. And this mattered – it is increasingly clear from microeconomic evidence that the credit supply restriction did indeed have an important causal impact on the drop in economic activity (see, for example, Bentolila *et al.*, 2013; Garicano and Steinwender, 2014; Iyer *et al.*, 2014; Jimenez *et al.*, 2014).

Figure 4. Interest rates on loans to non-financial corporations, 5 years, up to 1 million, new business.



Source: ECB.

Borrowing costs of non-financial corporations display a sharp correlation with sovereign risk, even for large firms that would be expected to rely less on domestic banks and have more access to international financial markets (Corsetti *et al.*, 2014). This correlation complicates and strengthens the effects of the

7 See Battistini *et al.* (2013) for a persuasive argument in this direction. Specifically, they find that banks in periphery countries respond to increases in own-country risk premia by raising their domestic exposure, while in core countries they do not. They also find that the home bias of all banks increases as a result of increases in systemic risk. They conclude that for periphery countries, the carry trade does have explanatory power, but that something like hedging redenomination risk must be playing a role throughout the Eurozone.

diabolic loop described above. To the extent that recessionary shocks worsen the fiscal outlook of one country, it is priced into the spread. This also worsens the borrowing conditions of the corporate sector, causing an additional endogenous contraction in aggregate demand.

In summary, we see that (1) the debt overhang dampens the long-term prospects for growth; (2) monetary policy could become overburdened; (3) there are sudden switches between 'risk-on' and 'risk-off' movements that can be aggravated by the asymmetric geographic nature of the flight to safety flows – from South to North; (4) the diabolic loop, which was at the core of the second European recession, has not disappeared and in any crisis, banks have a strong incentive to bias their holdings towards their own sovereign, intensifying the diabolic loop, market fragmentation and systemic risk.

2. Dealing with the legacy sovereign debt

In this chapter, we articulate strategies to implement a one-time debt stock operation aimed at eliminating the public debt overhang in all participating countries at the same time and establishing the appropriate conditions for resetting a sustainable institutional framework for the Eurozone. The ultimate goal is to boost growth in the Eurozone by eliminating the overhang – thus increasing the incentives to invest and decreasing the uncertainty due to possible self-fulfilling runs in highly indebted countries – in a sustainable manner by improving the long-run institutional structure of the Eurozone. All countries will benefit.

We present a menu of possibilities for the debt reduction operation: (i) a debt buyback via a stability fund that uses capitalised revenues from either (a) taxes, or (b) seigniorage; and (ii) a swap operation through which sovereign bonds are exchanged against a combination of debt and equity (GDP-indexed debt). Since each option has costs associated to it and the scale of the debt reduction needed is large (we aim at bringing each country to below a 95% debt-to-GDP ratio), the best course of action would be to implement a combination of these options.

It is possible to perform the debt buyback using only national resources or, more efficiently, by allowing limited and temporary transfers across countries. The usual moral hazard issues associated with cross-country transfers are dealt with via the implementation of the new governance framework described in the next chapter. At the same time, switching to the new framework is made possible only because of the reduction in debt levels. In what follows, we present the different options and how they could be implemented, and we give some ideas about their calibration.

Besides producing a time-consistent way of dealing with the debt overhang in the Eurozone, there is another important benefit of our proposal, which has to do with the role of the ECB. Ruling out dangerous runs is an obvious qualifying aspect to our proposal, but, very importantly, our proposal goes a long way towards dealing with the elephant in the room: the well-known problem of disentangling illiquidity and insolvency. By cutting debt levels to below 95%, our proposal brings countries back into what is plausibly a zone of solvency (see Chapter 3), and by preventing countries from becoming too big to fail again, our proposal helps the ECB to fulfil its role as lender of last resort. It prevents the ECB from being dragged into grey areas of intervention where illiquidity may be partly insolvency.

Setting up a stability fund for debt buyback operations

The principle is to bring forward for a certain period the future income stream coming from some fiscal resources and to use this to buy back the national debt. Capitalising (even small) current and future income streams in a stability fund over a long horizon (say, 50 years) generates in net present value terms a large sum of money to buy back the debt.

The treasuries of the participating Eurozone countries would credibly commit to dedicating part of their respective fiscal revenues – from a wealth transfer tax (collected on asset or real estate transactions, for example), a VAT increase or seigniorage – for a period of time to retire debt. They would create a 'stability fund' that could be under the auspices of the ESM.[8] The fund would buy a large fraction of the debt of each participating country and would then swap those bonds into non-interest-bearing perpetuities, i.e. for all intents and purposes, it would retire this fraction of the debt of participating countries. The fund would finance its purchases and interest costs by using the current fiscal revenue stream and issuing stability fund bills, collateralised by the future fiscal income of the participating countries. These bills could be issued with whichever maturity structure the fund deemed preferable; for example, it could mimic the maturity structure of the retired debt.

The stability fund bills would be accepted by the ECB as top-quality collateral for refinancing purposes; they should be viewed by the market as perfect substitutes for reserves held at the ECB. They are safe because: i) they are collateralised by a stream of income paid into the stability fund; ii) the stability fund is insured against liquidity shocks by the ECB (just as the Bundesbank stood ready to buy bond issues in case of a failed auction by the German treasury – or any other central bank vis-à-vis its national treasury – the ECB would stand ready to buy stability fund bills if need be in the secondary market); iii) if the ECB buys stability fund bills in that context, it would then immediately sterilise its purchases so that there would be no effect whatsoever on its monetary policy mandate;[9] and iv) if the revenues of the stability fund fall short of the amount needed, the period during which the fiscal income is paid into the fund can be extended.

8 According to Art. 3 of the Treaty Establishing the ESM:

> "The purpose of the ESM shall be to mobilise funding and provide stability support under strict conditionality, appropriate to the financial assistance instrument chosen, to the benefit of ESM members which are experiencing, or are threatened by, severe financing problems, if indispensable to safeguard the financial stability of the Eurozone as a whole and of its member states. For this purpose, the ESM shall be entitled to raise funds by issuing financial instruments or by entering into financial or other agreements or arrangements with ESM members, financial institutions or other third parties."

9 The ECB could of course buy the stability fund bills in the context of its QE or other monetary policy operations, in which case they need not be sterilised. The bills provide just another instrument through which monetary policy can be implemented.

Advantages of the debt buyback operation via a stability fund
This debt buyback is an attractive way of performing debt restructuring as: i) it could be done in a relatively short time frame and it should therefore boost growth quickly; ii) it would not threaten the stability of the financial sector; and may even strengthen it by increasing asset prices;[10] and iii) since a large amount of debt is now held by public-sector institutions, it would sidestep difficult issues such as whether haircuts should apply to debt held by the ECB.

Problems with the debt buyback operation
The debt buyback operations raise a few issues: i) raising additional taxes will have negative effects on the economy, so the timing and intensity of the implementation of these additional taxes are key; ii) committing future national fiscal revenues to the buyback means that the treasuries or the ECB will not be able to use these resources for other purposes;[11] and iii) finding a mechanism that guarantees the credibility of the payment of future fiscal revenue streams into the stability fund is key – it seems easier to implement with Eurozone-level sources of revenue (such as seigniorage) than with other sources; iv) it could create windfall gains for private creditors, thus the stability fund should buy at maturity or at historic prices only; and v) fairness considerations have not been taken into account. One could think, for example, that creditors should suffer some haircut on their debt holdings and share the burden (see our discussion on taxes or debt equity swaps below for more elaboration on this).

Debt buyback without any transfers across countries

The debt buyback can be implemented either without any transfers across countries by using only current and future national fiscal revenues, or by allowing some transfers across countries. We start by laying out a menu of options without *any* transfers across countries and call this option the '*national debt buyback*'.

This national debt buyback is a purely fiscal operation. It is equivalent to the securitisation of the future income stream of a country and using the proceeds of this securitisation to retire existing debt. The ECB provides insurance against

10 An effect described in particular by Bulow and Rogoff (1998). In some of the cases they study, governments on the verge of default may see the value of their remaining debt increase by large amounts after a buyback, so much so that the debt buyback is a mere subsidy to the creditors and does not reduce the debt burden significantly. This would be unlikely to be the case in the Eurozone, as debt valuations are already high.

11 In the case where existing revenues such as seigniorage are used, it means, *ceteris paribus*, that the remaining part of the debt is 'juniorised', which could make it riskier in principle (a lower future revenue stream is available to service it). This argument however disregards the effect on growth due to the reduction of the debt overhang; there are also likely to be positive effects due to the decrease in refinancing needs (lower likelihood of self-fulfilling dry-ups, though this is probably model dependent). Finally, this argument does not apply if additional fiscal revenues are raised from taxes, nor in case of international transfers or if debt equity swaps are used to restructure the debt.

liquidity risk, while the treasuries of the Eurozone provide a joint implicit backstop via their existing fiscal backing of the ECB.

The national debt buyback is, however, not a neutral fiscal operation. For it to produce the desired outcome, it is essential that the buyback result in a swap of default-risky government debt with an asset that is subject to the risk of inflation, but not to the risk of default.[12] In our proposal, we envisage the liabilities issued by the stability fund as a zero coupon bond asset, emphasising their properties as safe and liquid assets. It may be possible for them to pay the same interest rates as reserve money without altering the essence of our proposal, although paying interest would make the proposal's cost marginally higher. Insofar as the swap strengthens the resilience of the Eurozone countries to belief-driven crises and helps to reduce the debt overhang, the overall cost of government borrowing should fall correspondingly.

It is also not neutral for domestic finances, in the sense that national governments commit part of their current and future revenues to financing the large buyback. Explicitly, in exchange for enhancing stability, they commit to adjusting their budgets to whatever levels are required to ensure a credible fiscal outlook. While our proposal produces overall gains for everybody to share, these gains only materialise if all participating countries act cooperatively on the content of the quid pro quo.

Advantages and disadvantages of different revenue sources

A large menu of taxes, either one-off or collected over an extended period of time, could be considered to provide the collateral for the stability fund. Here, we give examples of three possible revenue streams (a wealth transfer tax, VAT and seigniorage) and discuss their pros and cons. We note that these three revenue streams could be combined and/or supplemented with other revenue sources.

Of course, it is paramount to remember that as tax increases put a burden on the economy and reduce economic activity, such schemes must be designed carefully in order to avoid jeopardising economic recovery.

VAT

VAT is the tax that induces the least distortions (IFS, 2010). Any tax has the disadvantage of reducing economic activity in the member countries, but while personal and corporate income taxes reduce investment incentives as they are levied on income from labour, capital and land, as well as on pure profits, VAT is levied on consumption and thus burdens labour income and pure profits, but not capital income.

It is possible, however, to design a VAT scheme such that economic recovery is not stalled. One could backload the collection of VAT, starting without changing the current rate but progressively increasing it in order to generate the desired amount by capitalisation over a certain horizon. Such a scheme would have the

12 See the detailed discussions by Gertler and Karadi (2011), Hall and Reis (2013) and Corsetti and Dedola (2014).

additional benefits of bringing forward consumption in order to avoid the higher tax in the medium run. Moreover, as VAT tends to have an immediate effect on consumer prices, an increase in its rate over time could have a positive effect on inflationary expectations, which are currently too low in the Eurozone. Another positive aspect is that a small portion of existing VAT revenues at the European Union level are financing the EU budget, implying that the 'mechanics' of using VAT revenues with a European goal in mind already exist.

A wealth (transfer) tax

From a distributional perspective, wealth taxes have desirable properties as they should, in principle, fall disproportionally on the wealthy residing in countries with strongly skewed wealth distributions. A wealth tax is equivalent to a tax on capital income given a fixed rate of return on the assets held by an investor. This is easily illustrated by following expression, according to which wealth W is equivalent to a constant yearly income stream y from today to infinity discounted by $R = 1 + r$:

$$W = y/R + y/R^2 + \ldots = y/r,$$

so that, for example, a 1% wealth tax is approximately equal to a 20% income tax. A wealth tax is different from an income tax, however, because yearly income is not constant. This means that the equity of individuals and firms is taxed whenever the actual income is lower than the income implied by the wealth tax. In countries with low growth, it follows that the equity is eroded over time. Therefore, the wealth tax leads to heavier distortions than an income tax. In particular, it may discourage investment more and reduce economic growth.

Fewer distortions occur by increasing taxes on real estate or real estate transfers. Given the immobility of real estate, such taxes do not necessarily require coordination at the EU level. A real estate tax could discourage investment in housing and shift capital from housing to manufacturing investment, which could be seen as an advantage given the current situation in several Eurozone countries. A real estate tax has the disadvantage that it is levied on owners without taking their income situation into account; some owners, in particular those with owner-occupied houses, could be forced to sell their homes. This effect would certainly be undesirable and in order to avoid this, one could implement a tax on real estate transfers, levied on purchases of real estate, for example.[13] As with any transaction tax, it would discourage market activity. A long horizon of tax collection is therefore important to avoid strategic behaviour, i.e. people delaying sales and purchases until the transaction tax is phased out.[14]

13 Alternatively, for those suffering cash flow problems, an annual property tax could be cumulated and paid upon disposal of the property.

14 In Germany, for example, the real estate transaction tax generates only 1.3% of overall tax revenue despite tax rate increases from 3.5% to at least 5% in 13 out of 16 German states. As we propose to capitalise revenues on a given period of time, however, the total amount of money available for the buyback would be much higher.

Another way of implementing a wealth tax is to tax financial assets. In this case, coordination is required at the Eurozone level to decrease the possibility of tax evasion and reputational costs. The broader the net that is cast, the larger the tax base and the lower the required tax rate to meet funding needs. All Eurozone countries would have to undertake a policy that they would not necessarily have undertaken on their own in support of a common European debt reduction scheme.

Finally, inheritance taxes as a particular type of a wealth transfer tax on the next generation also induce fewer distortions than many other taxes. Someone who inherits a large amount of wealth may have a lower incentive to work due to their inherited estate, so in some cases an inheritance tax may actually increase incentives to work. The effect of an inheritance tax on bequests, however, is not clear. It may discourage saving, and investment in particular, if the inheritance is levied on the business assets of family-owned firms. Like any wealth tax, inheritance taxes do not take into account whether or not taxpayers have sufficient liquidity to pay the tax, and therefore its collection must be well thought through.[15]

Seigniorage

The ECB generates (non-inflationary) seigniorage revenues through the issuance of banknotes,[16] which are recorded as a (non-remunerated) liability on the balance sheets of the members of the Eurosystem, i.e. the ECB and the (currently 18) national central banks of the countries that form the Eurozone.[17] The counterparts to this liability – on the asset side of the balance sheets – are the so-called 'earmarkable assets', which yield an income that is distributed to the respective members. The basic principle is that 8% of the value of the banknotes are allocated to the ECB, while the remaining 92% is allocated to the national central banks, in the same proportion to which they have contributed to the ECB's capital. There is also income arising from securities purchased in the *Securities Markets Programme*. The Governing Council has decided that this income is due to the Eurozone national central banks in the financial year in which it accrues.

Part, or all, of this *non-inflationary* seigniorage income stream over a certain horizon could be used by the stability fund to perform the debt buyback operation. Unlike the other income streams described so far, seigniorage has the advantage of being a Eurozone-specific source of revenue and since it is collected by the ECB, it is less likely to be seized or taxed by delinquent governments seeking to renege on their obligation vis-à-vis the stability fund.

15 Other possibilities would be to increase the tax-deductible depreciation rate on new investment in plants and equipment or to enlarge investment tax credits (Feldstein, 2015). This could be accompanied by increases in corporate income tax. De facto, this would lead to a higher tax on old capital and a lower tax on new investments triggering economic growth. This option, however, might not lead to much additional revenue to supplement the tax buyback scheme.

16 Coins are issued by governments.

17 We define 'non-inflationary' as being compatible with a 2% inflation target.

The PADRE plan proposed by Paris and Wyplosz (2014a,b) is a national debt buyback that relies only on seigniorage revenues. As shown below, however, according to our calibration the fiscal resources coming from seigniorage that underlie the PADRE plan are unlikely to be sufficient to produce the (one-off) significant debt reduction that our scheme requires.[18] A further difficulty is that the ECB can no longer rely on committed seigniorage revenues to back its interventions. Earmarking seigniorage revenue implies that the ECB cannot readily access it, which may in principle threaten ECB independence. By way of an example, the ECB cannot use it to smooth out possible losses on its balance sheet, in turn implying that the ECB may in principle run into difficulties in pursuing its monetary strategy if and when it is forced to monetise part of these losses. This observation makes it absolutely clear that ECB interventions implying some risk of balance sheet losses do require a contingent fiscal backup for the ECB to pursue efficiently its statutory goal of price stability (Corsetti and Dedola, 2014). The lower the outstanding debt level, the lower the vulnerability to belief-driven runs, and the lower the risk that such a situation will ever arise. Importantly, in addition to a fiscal backup for possible OMT interventions, the treasuries also have to provide a guarantee for any unexpected shortfall in future seigniorage revenues as these are the most important shield of the independence of the ECB. In light of these considerations, and consistent with a prudential approach, our estimates of the amount of seigniorage revenues presented below will be extremely conservative.

These options (VAT, a wealth transfer tax and seigniorage) cannot be enacted via European institutional decisions, but can only be the result of a common agreement on country-specific reduction goals. Given the differences in the tax structures of the member countries, which are often designed to accommodate the economic particularities of each country, it may be preferable to leave the actual taxation scheme up to each member country. It must be ensured, however, that sufficient revenue is collected to lead to a significant reduction of debt via the debt buyback scheme.

Calibration of the 'national buyback' scheme

Having discussed the pros and cons of different sources of future revenue streams to back the stability fund, we take no position regarding which one – or rather, which combination – would be preferable, as heterogeneity across countries (regarding efficiency of collection of certain taxes, or wealth structures) and political and social preferences are important. Instead, we illustrate our 'national debt buyback' scheme using several calibrated examples to give an idea of the

18 Our proposal is quite different form the PADRE plan. Besides proposing a whole menu of different fiscal resources (and favouring a combination of these), we deal with the moral hazard issue associated with the debt reduction very differently. Furthermore, we squarely put the long-run governance of the Eurozone in terms of fiscal issues at the centre of our project. Our proposal is a true package aimed at restoring sustainable growth in the Eurozone by significantly improving governance for the long haul.

orders of magnitude involved, in cases where we feel the numbers are least subject to controversy.

The overriding priority in implementing the buyback plan is to make sure that the amount of debt reduction realised by using the securitisation of future revenues is enough to reduce the debt-to-GDP ratios of Eurozone countries to below 95%, which we pick as our critical threshold in Chapter 3.

Using seigniorage revenues without transfers across countries

We endeavour to produce very conservative estimates of the net present value (NPV) of future seigniorage revenues of the ECB when it meets its inflation target of 2%. This is the most robust way to guarantee that there is no interference at all with the price stability mandate of the ECB.[19] First, we focus exclusively on the issuance of banknotes and do not include any interest income, as the current size of the ECB balance sheet and its composition may not be permanent. Second, we use a conservative model to forecast future seigniorage revenues. De facto, we will be working with much smaller seigniorage NPV values than those considered reasonable in Paris and Wyplosz (2014a,b) and in Buiter and Rahbari (2012a,b).

Our estimates for the amount of seigniorage the ECB is able to produce while pursuing its price stability goal with a high degree of certainty are shown in Appendix A. Assuming real growth of 1%, a nominal interest rate of 5% and five decades of seigniorage commitment, and disregarding sources of income for the ECB other than this currency creation, we estimate that about €800 billion could be used safely. This is admittedly a conservative estimate of seigniorage, but we think appropriately so for prudential reasons.[20] Distributing the NPV of seigniorage to the participating countries according to the ECB keys, we calculate the possible debt reduction without redistribution for each country (Table 3) and the corresponding debt-to-GDP ratio we can achieve (Table 3, column 4). Column 5 of Table 3 shows the shortfall in billion euros between the post-buyback debt and the level of debt consistent with a 95% debt-to-GDP ratio (a negative sign indicates a shortfall).

19 We reiterate that this debt buyback operation has nothing whatsoever to do with debt monetisation; it is a purely fiscal operation.

20 Indeed there is one long-run risk factor we cannot disregard: it may be possible that, over some long time horizon (but perhaps within the next 50 years), the use of cash transactions will be progressively phased out, and money will become almost exclusively electronic. With the emergence of a cashless economy, the seigniorage of all central banks will be drastically reduced (in this respect, see recent proposals by Rogoff, 2014). In our estimates, this would translate into a drop in money demand. If this were to be the case, countries would have to either collect seigniorage in a different manner (for example, by requiring banks to hold non-remunerated reserves) or use a substitute income to pay for their debt vis-à-vis the stability fund.

Table 3. Distribution of total seigniorage of €800 billion according to ECB keys, and shortfall to reach the 95% debt threshold for a selection of high-debt countries[21]

Country	ECB keys	Seigniorage (€ billion)	Debt-to-GDP achieved post-buyback	Shortfall to debt at 95% of GDP (€ billion)
Belgium	3.46%	27.68	99.54%	-18.26
Cyprus	0.19%	1.52	98.69%	-0.64
Ireland	1.59%	12.72	103.84%	-16.26
Spain	11.82%	94.56	89.35%	59.72
Italy	17.84%	142.72	123.06%	-454.24
Portugal	2.53%	20.24	117.34%	-39.02
Pro memoria Greece	*2.79%*	*22.32*	*163.92%*	*-124.20*

After the buyback, most high-debt countries would still have debt-to-GDP levels substantially above 95%. Thus, the results show that a prudent buyback scheme ruling out either redistribution or additional revenues other than seigniorage would only go part of the way towards our goal of resetting debt to comfortable levels in the most critical countries. Going only part of the way would be insufficient, however, because it would prevent the desired switch to the long-run sustainable fiscal regime outlined in Chapter 3 from taking place (where the no-bailout clause is enforced and vulnerability to self-fulfilling runs is vastly reduced). To quantify the shortfall, we set the upper boundary for a desirable debt-to-GDP ratio at 95%. For our purposes, this implies that the debt write-down should bring Italy, Belgium, Portugal and Ireland down to below the 95% debt-to-GDP ratio threshold.

Greece is a special case, with a recent history of restructuring and a debt-to-GDP ratio still above 175%, mostly in the hands of official creditors. There are a number of arguments for treating Greece on its own and differently.

Complementing the scheme with VAT revenues – still no transfers

Based on our estimates, we take the view that a national debt buyback programme using only national seigniorage revenues can only bring us part of the way. Building on our conservative estimate of €800 billion of seigniorage in NPV over a time horizon of 50 years, redistributed according to the ECB keys, we now complement our revenues with other national fiscal sources. As noted above, one big advantage of seigniorage is that it is collected at the Eurozone level by the ECB and can be rebated directly into the stability fund. As a complement, perhaps the most robust solution would be to use fiscal resources earmarked for the European level (such as a fraction of VAT revenues) and rebate them straight into the

21 For estimates based on less conservative assumptions (revenues of €2,000 billion) see Appendix A, Table A3.

fund instead of sending them to countries via structural funds and agricultural spending. Another possibility would be to use part of the EU structural funds.

Currently, the EU's own resources comprise mostly of payments from the national budgets of member states, either based on gross national income or on VAT revenues. Tariff revenues only make up a small share of EU revenue. A share of VAT revenues could be paid by Eurozone countries into the stability fund, which could use this as collateral and issue debt in the same way as described above for seigniorage revenues. Revenues from securitisation would then be used to decrease the national debt level without any transfers across countries.

Increasing VAT revenues in each Eurozone member by the equivalent of one percentage point of GDP for the next 50 years would generate revenues over a 50-year horizon (t=50) in the order of

$$NPV(VAT) = Y_0 \frac{1 - \theta^t}{1 - \theta}\Delta,$$

where

$$\theta = \frac{1 + \gamma}{1 - r},$$

γ is the real growth rate of the economy, r is the real discount rate, Δ is the proportional tax rate and Y_0 is initial GDP. The NPV value of additional VAT receipts assuming a conservative growth rate of γ =1% in real terms and a real rate of r = 3% would be approximately €3,278 billion for the Eurozone (Table 5, first row). Without redistribution, this would be almost enough to bring all highly indebted countries below the 95% threshold.[22] Of course, in order to obtain an additional percentage point of revenue, the VAT rate increase would vary across countries.

For example in France, one would need a VAT increase of between two and three points to generate an additional increase of one point of GDP revenue increase; this is a considerable effort. Although lengthening the horizon would make it easier to raise the required amount, it seems a stretch to achieve the desired debt reduction for all countries using only national resources.

Nevertheless, a national buyback scheme could be the cornerstone to achieve a sizeable part of the debt reduction. Countries whose debt would still be above 95% could then be given a number of years (say, five) before the new regime described in Chapter 3 becomes legally binding. They could then take additional measures (such as one-off wealth taxes or whatever else they deem preferable), or it could be supplemented by additional sources of debt reduction.

22 Comparing column 2 of Table 5 and column 5 of Table 4 shows that most countries would see their debt-to-GDP ratios brought down close to 95%, except Italy.

Additional sources of debt reduction

As we have seen, the national buyback scheme may not be sufficient on its own to reduce debt levels sufficiently in all countries. Assuming that fiscal adjustment through traditional means is at the maximum pace consistent with economic recovery, this leaves two avenues, in principle, for accelerating debt reduction in high-debt countries:

- Schemes that introduce an element of redistribution across countries. These could operate either through the way in which ECB seigniorage is shared, or via sharing of additional revenue earmarked for debt reduction in the name of European solidarity (for example, revenue raised by a coordinated Eurozone-wide VAT increase).
- Schemes that, in effect, tax bondholders through a debt-equity (GDP bond) swap. These could take place without redistribution across countries, but would nonetheless require coordination because they would otherwise trigger reputational costs. Hence, these schemes also require 'solidarity', albeit of a non-redistributive nature. All countries would undertake an unorthodox policy measure that they would not necessarily undertake on their own, in support of a common European debt reduction scheme.

Schemes involving redistribution across countries

Pooling seigniorage

The required debt reduction is within the reach of a debt buyback programme based exclusively on seigniorage, if transfers are allowed across countries. Specifically, the total amount of debt reduction that would be needed to bring high-debt countries (excluding Greece) down to the 95% is €768.1 billion (see Table 4).

The estimated total amount of funds required to bring high-debt countries to the 95% threshold is therefore smaller than our most conservative estimate of seigniorage revenues over the next 50 years. To put it another way, by pooling the Eurozone current and future seigniorage resources over the next 50 years, the seigniorage debt buyback programme could be implemented in a way that would bring all countries' debt levels close to 95%. This suggests that the temporary mutualisation of one type of fiscal resources would have powerful effects, provided transfers across countries (even large ones) are accepted.

These transfers would come from future lower net payments to the treasuries of Eurozone countries from the ECB. Hence, it would imply a direct fiscal transfer, which may be politically unattractive and possibly subject to legal challenge. A politically more attractive way of implementing debt reduction could be to redistribute seigniorage on a per capita basis so that each Eurozone citizen receives the same amount. This would redistribute from the relatively rich to the poorer countries. However, it would not be enough to bring Italy, for example, back to sustainable levels of debt, as the ECB capital key of and its population share are very close.

Table 4. Debt reduction needed to achieve 95% level for highly indebted countries

Country	Debt level		Debt level at 95%		Debt reduction necessary to achieve 95%		GDP
	€ bn	%	€ bn	%	€ bn	%	€ bn
Belgium	427.8	106.4	381.9	95	45.9	11.4	402.0
Cyprus	18.6	107.5	16.5	95	2.2	12.5	17.3
Ireland	203.6	110.8	174.6	95	29.0	15.8	183.8
Spain	1039.0	98.3	1004.2	95	34.8	3.3	1057.0
Italy	2135.0	131.9	1538.0	95	597.0	36.9	1619.0
Portugal	225.2	128.9	165.9	95	59.3	33.9	174.7
Total (excl. Greece)					***768.1***		
Pro mem: Greece	*317.7*	*176.3*	*171.2*	*95*	*146.5*	*81.3*	*171.2*

Euro-Soli

Following the idea of the 'solidarity surcharge' (*Solidaritätszuschlag*, popularly known as the 'Soli') used to finance German unification, one could consider complementing the national buyback scheme described above with a solidarity tax levied on all the Eurozone members.[23]

A 'Euro-Soli' could not be raised on income taxes, as this would trigger several legal concerns. Currently, the EU's own resources mainly comprise payments out of member states' budgets based either on GNP or on VAT revenue. Tariff revenue only covers a small share of EU revenue. Thus, the EU has no power to tax, despite the term "own resources". However, this Euro-Soli could take the form of a surcharge on national VAT paid by member countries into the Stability Fund, which could use it as a collateral and issue debt in the same way as in the debt buyback scheme described above. Revenues from securitisation would then be used to reduce the debt level. Receipts from this tax would be distributed equally among Eurozone citizens. This fund could be administered either by the ESM or by the Commission.

We take one percentage point of GDP in VAT revenues as a reference (see the formula and assumptions above, based on a conservative scenario of a real growth rate of 1% and a real rate of interest of 3%).[24] The NPV of these additional VAT revenues would be approximately €3,278.4 billion (Table 5, second column).

23 The German solidarity surcharge is a general tax that is levied as a surcharge on personal and corporate income taxes of all German taxpayers (i.e. on West and East German residents) and, in line with general principles of budget law, it is not earmarked to finance the transfers to East Germany. While those transfers in the so-called solidarity pact fade out until 2019, the solidarity surcharge is not subject to such a sunset legislation. Thus, the revenue from the surcharge and the amount of transfers continuously diverge.

24 Again, we emphasise that generating one percentage point of GDP in revenues may require increasing VAT by several points, depending on the country considered.

If we redistribute these revenues on a per capita basis, we get a dividend of approximately €9,755.50 per citizen (€3,278.4 billion revenues divided by 336.05 million citizens in the Eurozone).

Table 5. The Euro-Soli scheme: A 'citizen dividend' of €9,755 per person at present value

Country	GDP (€ billion)	Own contribution 1% tax (€ billion)	Own contribution + Euro-Soli (€ billion)	Transfers (€ billion)	Transfers (% of GDP)	Transfer per year for 50 years (% of GDP)
Eurozone	10,070	3,278				
Belgium	402	131	109	-22	-5.5	-0.11
Germany	2,903	945	804	-141	-4.9	-0.10
Estonia	20	6	13	6.5	33.3	0.67
Ireland	184	60	45	-15	-8.0	-0.16
Spain	1,057	344	447	103	9.7	0.19
France	2,138	696	646	-50	-2.3	-0.05
Italy	1,619	527	594	67	4.1	0.08
Cyprus	17	6	8	2.8	16.2	0.32
Latvia	24	8	20	11.6	47.9	0.96
Luxembourg	47	15	5	-10	-21.1	-0.42
Malta	8	3	4	1.6	19.8	0.40
Netherlands	651	212	165	-47	-7.3	-0.15
Austria	330	107	83	-24	-7.3	-0.15
Portugal	175	57	101	45	25.5	0.51
Slovenia	37	12	20	8	21.5	0.43
Slovakia	75	25	53	28	37.6	0.75
Finland	203	66	53	-13	-6.4	-0.13
Pro memoria Greece	*180*	*59*	*108*	*49*	*27.3*	*0.55*

Table 5 shows the redistributional effects of such a scheme by calculating the difference between own contributions (from one percentage point of GDP in VAT revenues per year for 50 years) and received payments from the Euro-Soli (multiplying the per-citizen dividend of €9,755.5 by the population). Countries whose GDP share is smaller than their population share benefit from the scheme. Some smaller countries would benefit greatly – Latvia, Slovakia and Estonia would be among the biggest recipients with transfers above 30% of their respective GDP. These do not belong to the group of high-debt countries and their own contribution may already be sufficient to eliminate debt. Such extremes could be avoided by adapting the scheme. For instance, transfers could be capped in both directions and revenue goals could be lower for countries with low initial

debt levels. Conversely, Luxembourg would be a relatively big contributor, with payments per year of about 0.42% of its GDP for 50 years.

Nevertheless, it is notable that given the heterogeneity in GDP, giving all citizens an equal share of the VAT tax revenues generates some redistribution, which together, with a national debt buyback scheme, would be more than powerful enough to solve the legacy debt problem of the Eurozone. As we have already seen, if we pool seigniorage revenues, we could solve the legacy debt problem. Another possibility would be, for example, to realise a debt buyback based on the national seigniorage revenues (without pooling) and to complement it with the VAT and Euro-Soli revenues as described above.

For Italy, total revenues from the VAT and the Euro-Soli are €594 billion, of which €527 billion are generated by an increase in Italian VAT revenues over a horizon of 50 years. The rest is a transfer from those Eurozone countries whose GDP per capita is above the average. We note that this transfer amounts to 4.1% of Italian GDP (Table 5), or about 0.08% of GDP per year over the next 50 years. These combined revenues of seigniorage (€143 billion + €594 billion) are sufficient to bring the Italian debt-to-GDP ratio down to 86% (Table 6, last column). Most of this effort (by far) would come from the Italian taxpayer.

Table 6. Debt/GDP after the combined scheme

Country	Buyback via national seigniorage	Euro-Soli	Sum = BB + Euro-Soli	Debt-to-GDP
Belgium	27.7	108.9	136.6	72%
Cyprus	1.5	8.4	9.9	50%
Ireland	12.7	45.1	57.8	79%
Spain	94.6	446.7	541.3	47%
Italy	142.7	594.0	736.7	86%
Portugal	20.2	101	121.6	59%
Pro memoria Greece	*22.3*	*108*	*130.3*	*104%*

Together, the national seigniorage debt buyback plus the Euro-Soli scheme are sufficient to reduce the debt-to-GDP ratio of every high-debt Eurozone country to well under 95% (Table 6). Even Greece manages to get down to a debt-to-GDP ratio of 104%. Note again that by far the largest contribution would come from each country's own effort in increasing revenues, not from redistribution.

However, as already noted above, a one percentage point of GDP increase in revenues may be quite a stretch and in fact, too much for some low-debt countries. Of course a combination of a small amount of seigniorage redistribution combined with a Euro-Soli that is smaller in magnitude might do the trick; or a combination of the above and some wealth tax revenues. Or else, a combination of own effort and some redistribution may have to be supplemented with additional measures as described below.

Private sector participation through a debt-equity swap

All of the options above use public resources to reduce the debt overhang, thus avoiding losses for private creditors. Creditors may even stand to gain, since asset prices increase if confidence returns after a credible debt reduction. For this reason, it may be desirable and – if carefully designed – possible to implement a scheme that shares some of the cost of the debt reduction with private creditors without threatening financial stability.

One option could be a debt-equity swap, which could be country-specific but would still need to be coordinated to avoid stigmatisation. Economists have often advocated debt instruments with GDP-indexed payments to make the budget deficit less procyclical and to increase the chance that countries can meet their debt service payments in bad times. In essence, indexation to GDP provides a way to make debt more like equity. This shifts some risks to debt holders; however, in countries with high debt this might be efficient because it simultaneously reduces the risk of default and – by reducing the debt overhang – could increase long-run GDP growth. The latter would then be reflected in higher returns to bond holders.[25]

A coordinated debt-equity swap in Europe would work as follows. In all Eurozone countries, holders of government bonds would see a given share (say, 30%) of their holdings converted to GDP-indexed bonds, that is, bonds in which principal and/or interest payments depend on the level of GDP. To achieve the objective of reducing nominal debt *stocks* and, hence, debt-to-GDP ratios (rather than just debt service *flows*), one would have to opt for the more radical variant in which not only interest payments but also the principal payment are reduced in downturns. The market value of the new instruments would depend on exactly how the relationship between payments and GDP outcomes is defined.

The scheme would be symmetric in the sense that the share of bonds that is converted to 'equity' (GDP-indexed debt) would be the same across countries. However, the 'haircuts' – losses in the market value of the debt compared to the status quo – that the scheme imposes on investors could vary across countries. Countries with ample fiscal space could choose the characteristics of the GDP-indexed bonds so as to make the haircuts close to zero. In contrast, in countries with high debt, a debt-equity swap would make sense only if these countries are prepared to define GDP-bond characteristics that imply significant haircuts on investors – provided, of course, that the banking system can absorb the corresponding losses.

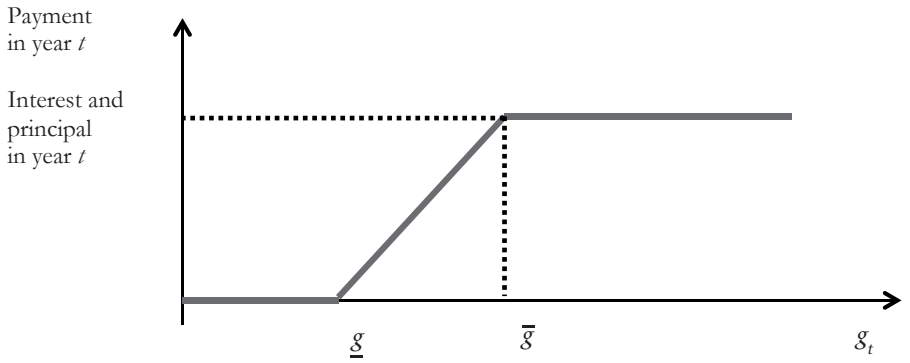
The advantages of the debt-equity swap over other forms of debt restructuring are that it would result in a better, more growth-friendly debt structure and that it could be undertaken in a coordinated fashion that would prevent individual countries from standing out and suffering disproportionate reputational losses. In a sense, the fixed reputational costs of debt restructuring would be diluted by the fact that there is a coordinated decision to restructure. But of course, the

25 Clearly, GDP-indexed bonds can only work properly if GDP figures are correctly measured, something that should be credibly achieved by Eurostat.

capital market and banking system costs of restructuring would still depend on the size of the haircut (Cruces and Trebesch, 2013).

The GDP bonds could be designed in a variety of ways. One possible design is that promised payments (interest and principal) in a given year are made in full if GDP growth during that year exceeds an upper threshold $\overline{g}$, are not made at all if growth is below a lower threshold $\underline{g}$, and are a linear function of growth linking the two extremes in the interval $[\underline{g}, \overline{g}]$. Figure 5 shows how the payment in year t depends on the growth rate g_t in that year.

Figure 5. Payment of a GDP bond, contingent on growth (g) in year (t)



The desired haircut, as a percentage of the market value of a bond that pays interest and principal always in full, can be obtained by varying the parameters $\underline{g}$ and $\overline{g}$, as shown in Appendix B. The following table reports the haircut for different parameter values. We assume that growth g_t is independent across years, and that $\log(1 + g_t)$ is normally distributed with mean $\mu = 1\%$ and standard deviation $\sigma = 3.5\%$. We set $\overline{g} - \underline{g} = 5\%$, and vary the parameter $\overline{g}$ and the risk aversion of the investors holding the bonds. We assume that bonds are priced by investors whose utility over consumption is time-additive with constant relative risk aversion coefficient γ. We consider two values of γ: $\gamma = 0$, i.e. risk-neutral investors, and $\gamma = 10$. Under the latter value, the expected excess return of an 'equity' claim, whose payoff is proportional to GDP, is 1.2%. Such an expected excess return is consistent with other calibrations (for example, Kamstra and Shiller (2009) argue for 1.5%). We set investors' subjective discount factor to 0.99. The bond's maturity and coupon rate do not influence the haircuts because the payoff of the bond in each year depends on the growth rate in that year and growth rates are independent across years.

Not surprisingly, the haircut is larger when $\overline{g}$ is larger because the probability of a reduced payoff by the bond is larger. Also, the haircut is larger when investors are more risk averse because the bond's risk is penalised more. Take, for instance, a debt exchange of €100 billion into a GDP-linked bond with an upper growth threshold at zero (and thus the lower threshold is at -5%). With risk-averse investors, this amounts to a haircut of €27.17 billion.

Table 7. Haircut achieved with a GDP-indexed bond for combinations of GDP thresholds ($\overline{g}$ - $\underline{g}$ = 5%) and level of risk aversion

	$\overline{g}$ = 1%	$\overline{g}$ = 0%	$\overline{g}$ = -1%	$\overline{g}$ = -3%	$\overline{g}$ = -5%
$\gamma = 0$	25.38%	17.63%	11.52%	4.03%	1.05%
$\gamma = 10$	36.68%	27.17%	19.02%	7.72%	2.37%

Of course, this is only an illustrative calibration for a GDP bond, but it shows that the debt burden can be substantially reduced through such instruments, while improving the risk-sharing properties at the same time.

3. Reforming the crisis lending framework

Pressing the restart button through a comprehensive debt reduction scheme would be useless or even counterproductive if the Eurozone were to quickly end up once again in a similar bind to the one it is in now. The new start has to lead the Eurozone down a radically different road and the proposed debt operation therefore has to go hand-in-hand with a credible mechanism that limits the build-up of excess debt. It is worth reiterating the principle guiding our approach: to implement a one-off coordinated policy to decrease the *legacy* debt in exchange for a *permanent* improvement in the institutions of the Eurozone in *steady state*. The new institutions have to prevent moral hazard and rule out any similar debt restructuring in the future.

Some may argue that this requires no further institutional reform and that the Eurozone has already agreed on a set of rules that have strengthened the fiscal and macroeconomic framework. For instance, the fiscal compact establishes both maximum deficit and debt reduction rules and the European Commission now has a larger say in the supervision and coordination of fiscal policies. The problem is making these rules stick. As noted above, a contract simply requiring countries to pursue a pre-established path of debt reduction is hardly more credible than the rules that failed to stop the imbalances building up and leading to the current Eurozone crisis. The danger is that the debt reduction objective will be systematically disregarded in good times, only to return to the top of the policy agenda when markets switch to their risk-on mode.

One way to enhance the credibility of fiscal institutions would be to adopt procedures akin to those governing municipal bankruptcies in the United States. In such a case, the state appoints an emergency manager who takes charge of a fiscal adjustment programme as well as negotiations with the creditors. One of the most famous and certainly the largest-ever US case was the bankruptcy of the City of Detroit, which filed for Chapter 9 bankruptcy in June 2013. The state-appointed emergency manager took control of the process and was granted wide authorities to rewrite contracts and liquidate city assets, and to reform pensions as well as public services such as water and sewers. Detroit exited from bankruptcy in December 2014 and the emergency manager handed back control to the local authorities.[26] In Germany, the State of Nordrhein-Westfalen has appointed emergency managers (colloquially known as *Sparkommissar*) charged with turning around the finances in over-indebted communities. In principle, a temporary handover of the fiscal reigns to a *Sparkommissar* can be an effective

26 See http://www.huffingtonpost.com/2014/12/10/detroit-exits-bankruptcy_n_6304526.html.

mechanism to manage fiscal crisis, and the threat of the loss of sovereignty may be a strong incentive to avoid accumulating too much debt. However, in Germany and the United States, such emergency powers are only deployed at the municipal level. It is not conceivable for a federal government to impose a dictate on the democratically elected bodies at the state level. In the Eurozone, it would seem even more unrealistic to adopt procedures involving a total, albeit temporary, loss of fiscal sovereignty at the country level. At the start of the debt crisis, the idea of a *Sparkommissar* was floated but it was very quickly buried again in the face of reactions of outrage in the crisis countries. Certainly, the appetite in the Eurozone for handing over wide-ranging fiscal authorities to the centre has not increased since then. A Chapter 9 legislation for countries of the Eurozone seems both unrealistic and undesirable.

However, there are market-based alternatives to strengthen fiscal governance and limit bailout. We propose an official-sector lending regime that achieves twin objectives. First, it creates incentives against over-borrowing, thus preventing the emergence of excessive debt levels. Second, should debt restructuring nevertheless become necessary, it should make it less painful for the debtor and for the official creditors, and thus counter the bias to procrastinate (i.e. to restructure too little too late).

The twin objectives

1) To create incentives for crisis prevention by discouraging over-borrowing (the ex ante problem).

Over-borrowing and its counterpart, over-lending, result if markets do not adequately perceive and price sovereign risk. As discussed in Chapter 1, in 'risk-off' periods, sovereign risk almost disappears and fundamental differences in indebtedness are under-priced. Then there are 'risk-on' periods when sovereign spreads suddenly jump and may trigger creditor runs. Not surprisingly, the absence of an insolvency regime for sovereigns exacerbates this problem. Conversely, a well-designed framework for orderly restructuring may help markets price sovereign risk more adequately and more continuously.

A key reason why markets may fail to price sovereign risk correctly is if they reasonably expect other parties to carry the losses from a default. This is a well-known moral hazard problem: private creditors and debtors expect to benefit at the expense of official creditors (other countries), domestic taxpayers, or both. At the bottom lie a commitment and a time-inconsistency problem: in tranquil times the official sector promises not to bailout private creditors, but in crisis times, out of fear of contagion, it will. The result is excessive debt accumulation. This is not limited to the public sector; the same problem arises with private debt if regulators fail to curb a lending boom and socialise private debt in a crisis.

2) To make debt crisis more manageable and reduce the cost of restructuring (the ex post problem).

The economic, financial and political costs of debt crises are massive both for the debtor country and for other countries that may suffer from contagion. Thus,

debtor governments and official creditors will tend to gamble for resurrection and extend loans even when debt sustainability is already questionable. This is also why any debt restructuring that takes place is typically "too little and too late" (CIEPR 2013; IMF, 2013b).

The difficulty of orchestrating an orderly restructuring is only one part of the overall cost, but it has certainly received most attention. At the core lies a collective action problem among creditors: it may be in the collective interest of all creditors to agree to a restructuring since the probability of a full repayment is non-existent; however, it will be in the interest of every single creditor to hold on to the full claim while other creditors take the loss. These holdouts benefit at the expense of other (private or official) creditors, which makes agreement on restructuring difficult or impossible.

Special problems in a currency union

In a currency union, both the *ex ante* and the *ex post* problem are more severe. The *ex post* problem of a high cost of restructuring is more pronounced, because countries in a currency union lack an instrument that can mitigate the cost of debt crises, namely the control of monetary and exchange rate policy. As a result, debt reduction efforts are economically and socially more costly for any given debt and deficit levels, and debt sustainability problems arise at lower levels of debt than in comparable countries with their own monetary authorities. In principle, higher costs at the country level should serve as a deterrent from over-accumulating debt. However, high default costs are not confined to the country, they spill over to the rest of the currency union.

The externalities of disorderly default are higher in a currency union not only because of tight financial and trade linkages. Trade and financial linkages can also be high between countries that do not share a currency, but there is one large externality that is unique to a currency area: the risk of a break-up of the common currency. A disorderly default in one part of the currency union could have massive implications for its other members – even members whose direct exposures to the afflicted country are not very high. Thus, in a common currency area the accumulation of excess debt in one country entails much larger risks for the other members than for comparable countries.

This is an argument about excess debt, which is different from sustainable debt. Debt sustainability describes the ability (*capacity*) of the country to service its debt and depends on a variety of county-specific factors, such as fiscal and institutional capacity. Excess debt is a measure of the externality that a default would impose on the rest of the currency union. The externality of excess debt depends on the *size* of the crisis country as well as on the ability of central institutions in the currency union to reduce the fall-out from default. A country that is 'too big to fail' because of the large externality it would impose on the rest of the area will enjoy a large bargaining power and only limited incentives to avoid building up excess debt. Therefore, the *ex ante* problem is also more serious.

In the Eurozone, given the externalities involved, the ESM will have an even more pronounced bias towards large-scale crisis lending than the IMF. This can

give rise to moral hazard at two levels: at the expense of the European taxpayer if official loans themselves have to be written down, but also at the expense of the domestic taxpayer, who is required to repay official loans that are used to service debts to private creditors. The consequences are the under-pricing of debt and inefficiently high debt accumulation, particularly in countries with weaker institutions and political systems that are not fully responsive to taxpayer interests.

Under these circumstances, a deep debt crisis can only have two outcomes: either it will lead to exceptionally high adjustment burdens on the debtor country (if the official sector refuses to bail out and accept some transfers), or it will create even more moral hazard (if the official sector does bail out). The bottom line is that the Eurozone needs an additional instrument to deal with these problems.

How not to do it: The experience with Greece

The experience of Greece has been, and continues to be, traumatic for all parties involved. When the dramatic extent of the Greek deficit first came to light and the country was losing market access, the Eurozone was not equipped to deal with a sovereign debt crisis. The architecture of the Eurozone did not foresee such an event – the no-bailout clause was supposed to act as a powerful deterrent. This turned out to be a mistake and the externalities of a debt restructuring on the rest of the currency area were deemed too high and unpredictable. A multilateral financing facility was hastily put together and the IMF was put in charge of designing a programme of adjustment that would bring Greece back to sustainability.

Under the original rules governing exceptional access (exceptional access is use of IMF resources exceeding the limit of 200% of the quota annually, or 600% of the quota cumulatively) the Fund would have been prevented from assisting Greece unless it determined that debt was sustainable "with high probability". Failing this determination, the Fund could only lend if a deep enough restructuring restored sustainability (with high probability). The staff assessment in May 2010 was that debt sustainability was in the grey zone, i.e. debt was considered sustainable but not with high probability; the staff report states that, "risks regarding debt sustainability are undeniable high" (IMF, 2010, p. 25). It goes on to state that nevertheless, Fund support was justified given the *systemic concerns arising from spillover effects* and recommends an SDR 26 billion support programme (about 26 times the Greek quota). Public debt was expected to increase from 125% to almost 150% of GDP before starting to decline.

To approve this programme, the Fund had to amend its expressional access framework introducing an additional criterion: the systemic exemption. This allows the criterion of "high probability" of debt sustainability to be waived if there are "significant uncertainties" regarding debt sustainability and a "high risk of international systemic spillovers" (IMF, 2014b, p. 33).

The experience of the Fund with the systemic exemption turned out to be traumatic. Not only did the subsequent decline of the Greek economy and the steep rise in debt warrant the undeniably high risks to sustainability, but the

Fund was also left with a lending framework that potentially set no limits to lending into questionable debt dynamics and no conditionality for protecting its resources. The fear of international spillovers is bound to play a role in every major debt crisis, and the systemic exemption is an enormous loophole for time-inconsistent behaviour.

At the European level, out of the trauma of the Greek crisis emerged first the EFSF and then the ESM, a permanent institution of the Eurozone designed to provide temporary financial support to countries that have lost market access. The lively debate of these new institutions included a number of reform proposals designed to limit bailout and to put rules around bail-in (e.g. GCEE, 2011; EEAG, 2011; CIEPR, 2013; Mody, 2013; Fuest *et al.*, 2014). However, in October 2010, Chancellor Merkel and President Sarkozy went for walk on the beach at Deauville. They came back with an agreement to "[…] in the future providing the necessary arrangements for an adequate participation of private creditors[…]" in the permanent crisis mechanism (the ESM).[27] This proposal met with instant criticism and eventually came to be identified as the cause of the subsequent further escalation and expansion of the debt crisis to other vulnerable countries. Although it is not certain that the 'Deauville effect' was the cause of the rise in spreads (Mody, 2014), it certainly did scare policymakers. The Deauville effect reinforced the reluctance in many quarters to engage in any discussion of debt restructuring (present or future) because of the fear that this would trigger immediate market panic.

The next step in the Greek saga was the recognition that the debt was indeed unsustainable and a restructuring inevitable. The Troika programme of 2012 was conditional on the conclusion of a substantial write-down in Greece's bonded debt. In the debt exchange concluded in March 2012, private investors agreed to a substantial write-down, which the IMF called the largest and steepest debt reduction agreement in history.[28] It is important to note that the Greek restructuring worked, in the sense that it achieved high participation and deep haircuts, but could not serve as a viable template for future restructurings. The Greek restructuring was special in several ways: (1) the preponderance of domestic-law debt allowed one-step aggregation via an act of parliament; (2) debt was concentrated in regulated institutions on which strong moral suasion could be exerted; and (3) creditors were offered exceptionally large cash incentives (Zettelmeyer *et al.*, 2013). In other Eurozone countries, there is often less domestic-law debt (it was 86% in Greece) and creditors are usually more dispersed. Even for Greece the restructuring template cannot work again, since the exchanged bonds are now exclusively foreign-law bonds and will be harder to restructure in future. Also, it is unlikely that the official sector would again provide (to Greece or to any other Eurozone country) ample cash financing to incentivise private creditors. Holdouts in the Greek restructuring who had bought blocking minorities in small foreign bond series were paid out in full. Therefore, the Greek restructuring of foreign law bonds set a bad precedent that may further embolden holdouts.

27 Franco-German Declaration, Deauville, 18 October 2010.

28 See http://www.imf.org/external/pubs/ft/survey/so/2012/CAR031512B.htm.

Despite the debt exchange, the lengthening of maturities and a reduction in the interest rate on debt (now mainly held in the official sector), the sustainability of debt continues to be highly questionable – in the words of the latest programme review of the IMF, it "remains a serious concern" (IMF, 2014d, p. 23). The goal of reducing debt levels from today's level of about 175% to 120% by 2022 hinges on a marked acceleration of growth (to about 3.5%), positive inflation rates and a sustained primary surplus of about 4% of GDP. With the election of a belligerent new government that has unmistakably promised to obtain debt relief, the Greek drama seems set to continue.

A better lending framework for the IMF

One consequence of the experience with Greece and other considerations is that the IMF has been rethinking its regime for dealing with sovereign debt. It has proposed amending the exceptional access framework is to be made more flexible and the systemic exemption is to be abolished (IMF, 2014b). These proposed changes would use the Fund's new risk-based approach to assessing debt sustainability to guide the judgement as to whether and when debt restructuring is necessary. The proposed lending has the following elements:

1. **Reprofiling** as an additional policy option in cases of sovereign debt distress where debt is considered sustainable but not with high probability. A reprofiling is a voluntary market based debt operation that extends maturities without reducing principal or, generally, coupon. Importantly it is a light restructuring that is not deep enough to reach the "high probability" bar, as required under the current framework. In this respect, the proposed change would make the underlying exceptional access framework more flexible. A reprofiling is to be deployed if the country has already lost market access and the adjustment program is expected to improve sustainability and help restore market access. Reprofiling should not be a repeated operation.
2. **Removing the systemic exemption**. With the underlying framework having been made more flexible there is no need for the systemic exemption. As discussed above the use of the systemic exemption did not address the underlying sustainability problem in Greece, did not help stop contagion to other Eurozone countries, and added to moral hazard in the system.
3. The IMF's board already approved recommendations for addressing collective action problems in debt restructuring by **strengthening the contractual framework** (IMF 2014c). In particular, the power of holdouts should be limited by amending the pari passu provision and including aggregation features in collective action clauses. Pari passu clauses should exclude the interpretation that New York courts have given to 'rateable' payments (which would imply that Argentina has to pay out holdouts in full). The ability of holdout creditors to resist restructuring by buying up a blocking majority in a single issue would be eliminated through collective action clauses with a voting

procedure that enables bonds to be restructured in a vote across all affected instruments.

4. The proposed lending framework relies on a risk-based approach to **assessing debt sustainability (DSA)**, introduced by the Fund in 2013, in their implementation. The new DSA involves a much higher degree of structure on assessing debt sustainability for "higher scrutiny" cases, in particular for advanced economies it requires "higher scrutiny" if the debt-to-GDP ratio is above 60% or if public gross financing needs[29] exceed 15% of GDP (lower thresholds apply for emerging markets). In this case, the staff guidance note (IMF, 2013a) requires a number of additional risk assessments, *inter alia* estimating sensitivity to macro-financial shocks, the realism of the baseline scenario and the vulnerability of the debt profile. The shocks include real GDP, primary surplus, real interest rate, exchange rate and contingent liabilities.

   In addition, the DSA guidance determines benchmarks for the debt and for gross financing needs and uses these to classify risks to the debt burden and liquidity as high, medium or low (see Table 8, top panel). For advanced economies, the debt benchmark is set at 85% of GDP and the gross financing needs at 20% of GDP. These benchmarks were derived using a signal approach and indicate the level that best predicts the occurrence of a debt distress event while minimising the sum of missed crisis and false alarms (IMF, 2013a, Appendix II). The debt-to-GDP level obtained for advanced countries was 70% and was augmented by 20%, resulting in the 85% benchmark (Table 8, bottom panel).

Table 8. Risk assessment: Macro-fiscal risks and contingent liabilities and debt burden benchmarks

	Baseline above benchmark	Stress test above benchmark
High (red)	Yes	Yes
Moderate (yellow)	No	Yes
Low (green)	No	No
	Debt-to-GDP ratio	GFN-to-GDP ratio
Emerging markets	70	15
Advanced economies	85	20

Source: IMF (2013a, p. 32).

Risks to the debt profile are also assessed in relation to benchmarks. For instance, a bond spread (over US or German bonds) of more than 400bp is moderate risk, and above 600bp high risk. An increase of short-term debt (as percentage of total debt) above 1.5 is high risk, as is a share of public debt held by non-residents of above 45%.

Finally, a heatmap is used to summarise the risks to debt sustainability. Table 9 is an example of such a heatmap taken from the fifth programme review of Greece (IMF, 2014c). It is deeply red, since the risks to debt

29 Gross financing need equals the primary deficit minus interest and principal expenditures.

sustainability are high in almost every dimension, with the exception of the change in short-term debt (presumably a programme condition) and the market perception indicator.

The market perception is yellow because spreads, at the time, were 'only' 400bp. However, too much comfort should not be derived from this since market perceptions can change very quickly. By comparison, the dynamics of most other indicators in the heatmap are extremely slow moving.

Table 9. Heatmap summarising risks to debt sustainability

Debt level	Real GDP growth shock	Primary balance shock	Real interest rate shock	Exchange rate shock	Contingent liability shock
Gross financing needs	Real GDP growth shock	Primary balance shock	Real interest rate shock	Exchange rate shock	Contingent liability shock
Debt profile	Market perception	External financing requirements	Change in the share of short-term debt	Public debt held by non-residents	Foreign currency debt

Source: IMF (2014c, p. 63).

Overall, the proposed IMF lending framework seems to strike a balance between flexibility through policy options and addressing the commitment problem through a much more structured sustainability analysis and closing the loophole of the systemic exemption. For the Eurozone most of this framework can be applied directly; however, under the more severe commitment problems we suggest some adaptation.

The present lending framework of the ESM

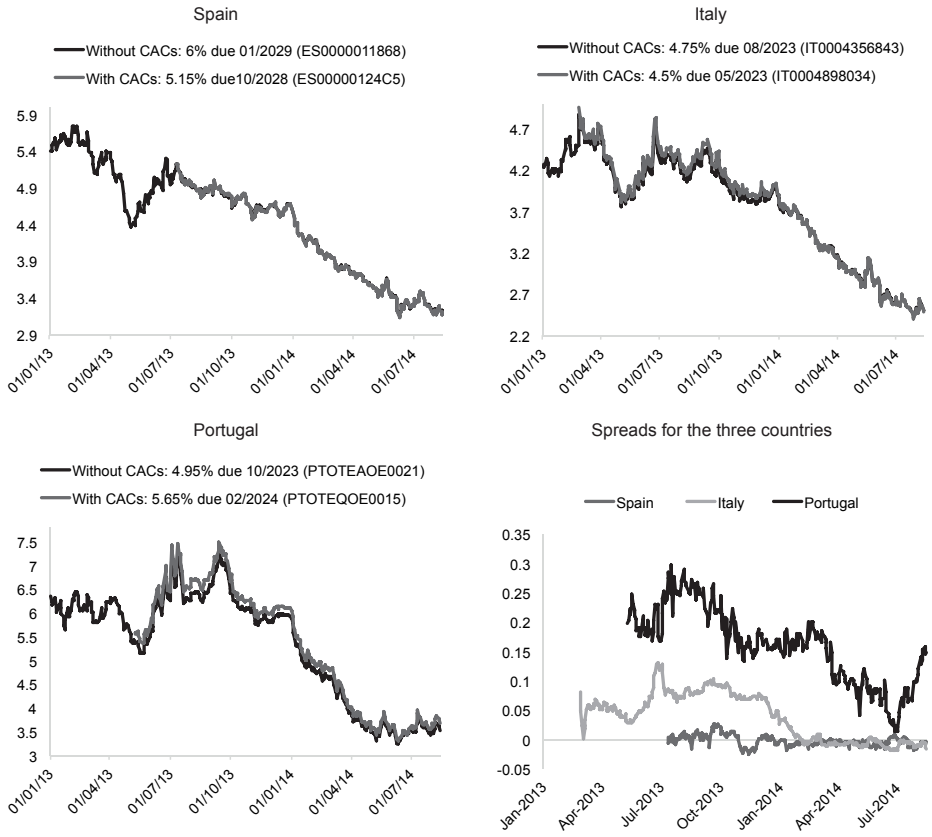
In the Eurozone, after the Deauville scare, there was no appetite to condition ESM lending on debt restructuring. Thus, the Treaty establishing the ESM only states in the preamble (12): "In accordance with IMF practice, in exceptional cases an adequate and proportionate form of private sector involvement shall be considered […]".[30]

More concrete was the attempt to deal with the collective action problem: Article 12(3) of the ESM Treaty states that "[c]ollective action clauses shall be included as of 1 Jan 2013 in all new Eurozone securities with maturity above one year in a way which ensures their legal impact is identical". A new standardised collective action clause (CAC) model for the Eurozone was designed and agreed by the Economic and Financial Committee, which has also monitored the progress in implementation. All Eurozone members have since amended their legislation or implemented the new standards on a contractual basis (EU, 2014). The model Eurozone CAC even includes a 'mild aggregation' feature via an aggregate voting threshold of 75%, but they also require a single-series decision threshold of 66⅔% for each individual bond.

30 http://europa.eu/rapid/press-release_DOC-12-3_en.htm.

At present, it would not seem that the new Eurozone CACs are having much impact on market prices. Große Steffen and Schumacher (2014) examine the differences in the yields of comparable bonds with and without the new Eurozone CAC.[31] Figure 6 illustrates that the spreads are minimal: in Spain they are virtually zero (0.2bp, on average), for Italy they are 3bp on average. Only in Portugal did bonds with CACs have higher yields initially, which declined to almost zero by mid-2014.

Figure 6. Yields (spreads) of comparable bonds with and without CACs



Source: Große Steffen and Schumacher (2014).

This behaviour of spreads may be due to the recent period of relative calm and a generalised 'risk-off' mood of markets. Investors possibly estimated the probability of default in this period to be almost zero.

31 Previous studies have shown a limited effect of the old standard CAC on bond prices (Eichengreen and Mody, 2004).

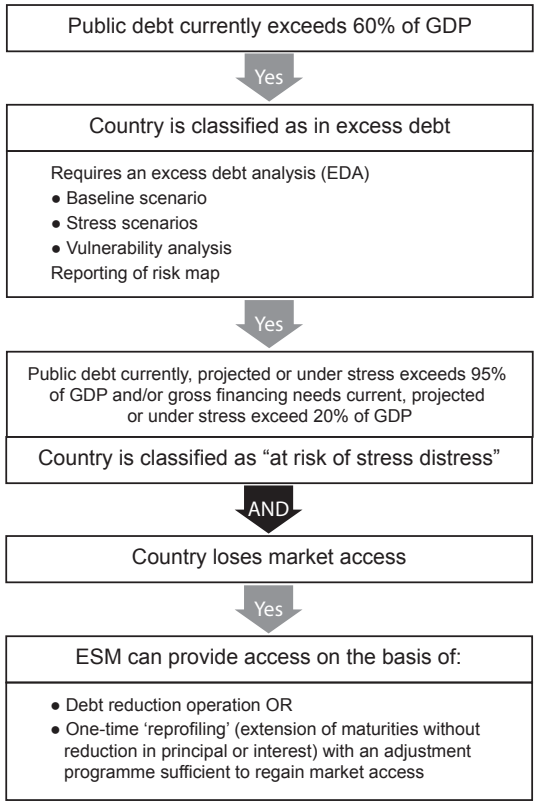
However, if CACs were effective and credible, they should signal differences between fundamental risks even in tranquil periods – this being the essence of market discipline.

It appears that Eurozone CACs alone will not be sufficient to instil market discipline. The contractual framework may have to be further strengthened by including a stronger aggregation feature (single-limb voting). In addition, pari passu clauses should also be harmonised to eliminate the interpretation of rateable payments (IMF, 2014c). More importantly, the lending framework of the ESM should be tightened to make timely debt restructuring a credible option.

Adapting the lending framework of the ESM

We propose to adapt ESM lending policies in line with the lending framework of the IMF and its debt sustainability analyses for advanced economies, while taking account of the higher vulnerability of the common currency area. As noted above, within a common currency area the commitment problem arising from high externalities – the excess debt problem – is more severe. The proposed lending framework is illustrated in Figure 7.

Figure 7. ESM lending regime



Countries exceeding a 60% debt-to-GDP ratio are considered as having "excess debt". This is in line with the "higher scrutiny" criterion in the IMF classification and is already enshrined in the Stability and Growth Pact. A case of excess debt requires a risk-based debt sustainability analysis, including vulnerabilities of the base scenario and explicit modelling of macro-financial shocks applying the same template as the IMF analysis.

If current or stressed debt burdens exceed the benchmark of 95% and/or the gross financing need (current or under stress) is above 20%, then the country is classified as red in the heat map, i.e. "at risk of debt distress". The benchmark of debt-to-GDP is somewhat higher than that used in the IMF debt sustainability; however, this seems warranted because the thresholds are to be binding ESM policy. Also we de-emphasise the debt profile indicators, which mainly proxy for market access. As mentioned above, a low bond spread is a weak indicator of debt distress and it can change very rapidly.

It is important to note that the red classification of "at risk of debt distress" does not imply a need for an immediate debt restructuring. If other factors, such as a benign debt profile, ensure the availability of secure funding, there is no reason for immediate action.

The loss of market access is the decisive criterion for ESM action. When an "at risk" sovereign loses market access, then ESM lending policies should have two options: to require either a debt restructuring or a debt reprofiling as a condition for official sector lending. The reprofiling option would only exist once, since repeated reprofiling would be a clear indication of more severe solvency issues.

This lending framework allows for some flexibility, since the assumptions of the debt sustainability analysis and the design of the shocks will always require judgement. In terms of the policy reaction, the option to reprofile gives policymakers a possibility to give the 'benefit of the doubt', but only once. At the same time, the strengthened framework binds ESM policy and clearly constrains the parameters for the use of public funds for private-sector bailouts.

It is worth reiterating that this framework should become binding after excess debt has been eliminated through a comprehensive debt reduction operation, as laid out in the previous chapter.

4. Diversification of sovereign risk and a safe asset

The latest step in a series of non-conventional monetary measures was the 22 January 2015 announcement of sizeable quantitative easing (QE). While this is an important measure to combat the risk of deflation and stagnation, the bruising debate that preceded the decision has also highlighted the limits to the central banks' room for manoeuver. The ECB finally decided to conduct QE with only minimal mutualisation, leaving 80% of the sovereign risk in national central banks. In Germany, resistance to any further mutualisation of sovereign risk in the ECB balance sheet has increased steadily, and threatens to dominate monetary policy decisions.

One of the limiting factors in the implementation of QE was the short supply of European safe assets. In this chapter, we propose the creation of a permanent safe asset that does not require any mutualisation. The stability fund bills used to finance our debt reduction scheme in Chapter 2 also represent safe assets; however, they would be only a temporary instrument.

In addition, we propose a regulatory solution to reduce the sovereign risk concentration in bank balance sheets. It is true that European banks are much better capitalised today and thus less likely to need support, and also that a Eurozone authority is in charge not only of supervising the banks, but also of their resolution, potentially relying more on private funds in the form of bail-ins and less on the national exchequers. But the 'Banking Union' is unfinished business: it does not involve a common deposit insurance scheme or a sufficiently robust crisis resolution mechanism such that the budgetary consequences of a bank rescue would still fall mostly on the shoulders of the concerned country's taxpayers. The risk, as in the Eurozone phase of the sovereign crisis, is that a state facing a financial shock places its banks at risk, and insolvent banks feed back to the state finances.[32]

Proposal: Immunising banks and creating a liquid safe asset

The basic idea: A synthetic, market-provided pool of bonds. Regulators and the ECB can achieve the desired diversification by announcing that, in the medium term:

- For sovereign bonds to attain a risk-free weighting, they will have to be held by banks in some given fixed proportions, for example holding each country's debt in a proportion equal to its share in Eurozone GDP. The

32 See Hellwig (2014) for a discussion.

regulation will be changed eventually, but initially an announcement without any actual regulatory requirement may be sufficient.
- Similarly, the liquid assets requirements in the new 'liquidity coverage ratio' could only be fulfilled through holdings (in the level 1) of sovereign bonds in these same fixed proportions.
- Finally, the ECB could also announce that, in the conduct of its monetary policy operations, it would buy and sell country bonds in proportionate packages, with debt shares again equal to GDP shares.

We would expect financial markets to start working in earnest towards the issuance of synthetic risk-free assets in these proportions.

A twist: tranching. Of course, there is one immediate objection to this proposal – the debt issued in this way would not in fact be a safe asset, as it would include debt from all countries including some whose debt sustainability is questionable. Moreover, if the ECB were to hold these bundles of sovereign bonds, any default would trigger a large redistribution and, as a result, the ECB may end up fully insuring the private sector from sovereign risk. This would eliminate any restructuring option as well as any market discipline, which is exactly the opposite of what we are trying to achieve (see Chapter 3).

To achieve the desired result, we need a safe as well as a risky asset. This could be done through securitisation, as Brunnermeier *et al.* (2011) have proposed. But our proposal here differs from theirs in a crucial way. Brunnermeier *et al.* suggested that a synthetic risk-free asset (what they call "European Safe Bonds" or "ESBIES") could be created by a European debt agency as the safer tranche of a synthetic security with the shares above. In our view, the ECB could lead the markets to create this security by regulatory intervention (see Garicano and Reichlin, 2014).

- The ECB could stipulate that only the senior tranche of the security so produced can receive an AAA rating and be counted as risk-free for the purposes of the risk-weighting and liquidity coverage ratio calculations.
- This could involve the intervention of a (small) ECB office that would declare senior synthetic bonds as conforming 'European Safe Bonds' when they fulfil these criteria, similar to the role of Fannie and Freddie in the US in declaring some mortgages with certain loan-to-value ratios, ratings, and so on as conforming.
- Finally, the ECB could declare that only the senior tranche would ever be used in a QE exercise to ensure that the central bank does not take any fiscal risk. The junior tranches would harness market discipline by pricing sovereign default risk.

Advantages of the proposal

There are several attractive features of this proposal for both monetary policy and financial stability objectives.

1. The proposal would solve three problems. It would substantially reduce the geographic bias in the flight to safety as the safe asset is (regulatorily)

a European-wide one, and would eliminate the moral hazard that the risk-on/risk-off mechanism induces: governments can default in this world, as the banks are protected from the fallout. Markets would thus monitor governments instead of second guessing the (bailout) intentions of the ECB. Also, it would eliminate the diabolic loop, since a sovereign in trouble does not jeopardise its own banks. And finally, it would reduce the geographic segmentation of the Eurozone markets.

2. An additional advantage is that this proposal would create a large safe asset. As Caballero and Fahri (2014) argue, citing a Barclays calculation, the shocks to Italy and Spain together with the drop in AAA asset-backed securities (ABS) and agency debt has drastically reduced the supply of safe assets, from 36.9% of world GDP to 18.1%. The creation of a large Eurozone-wide security would reverse this trend and go some way towards moving the economy away from the 'savings glut' and its distorting consequences.
3. The proposal would provide a better option for sovereign quantitative easing than that which is currently envisaged by the ECB, since it would preserve market discipline (the junior tranche would be untouched and would be bought and sold in the market) while avoiding the risk-decentralisation problems of the current scheme, which we have discussed in Chapter 1.

Finally, let us emphasise that this synthetic debt *would not* involve *any* risk-sharing among different governments or any debt mutualisation. Each government would continue to issue its own debt and face its own interest rates in the market, and the junior tranches would reflect default risk.

Like any proposal, this one also implies costs.

First, the transition to the new regulatory regime will affect (notional) profits in periphery banks, since they will have to partially substitute higher yielding bonds for the risk-free synthetic ones. This cost, however, would be partially reduced as an effect of QE purchases by the ECB.

Second, positive risk weights for sovereign bonds may increase financing costs for vulnerable countries, possibly rekindling solvency concerns in countries with high levels of public debt. Our main approach to dealing with this issue is to reduce the debt overhang in a speedy manner through debt buyback and relief.

Third, the key unknown of such a scheme is whether a market for junior debt could exist at prices similar to those implied by current yields.

Having outlined these potential problems, we want to stress, however, that this proposal is the only one on the table that can potentially provide a solution for the functioning of monetary policy and break the sovereign market home bias without killing market mechanisms, while at the same time incentivising the creation of a Eurozone safe asset that does not involve debt mutualisation.

Note also that there are other proposals on the table for dealing with the home bias in MFI's sovereign holdings. In particular, rules on 'limited exposure', currently being discussed by regulators, would be an alternative to what we propose here. However, such rules would not be an answer to the safe asset problem, and nor would they provide a target for ECB quantitative easing.

Conclusion

The arguments for addressing the legacy debt problem are strong.[33] Orderly deleveraging is key to avoiding a lost decade (or longer) and to making sure the Eurozone does not follow in the footsteps of post-1980 Latin America or post-1990 Japan. It is key to ensuring long-lasting financial stability. It is key to enabling reforms that make the no-bailout clause credible. Absent political union, the only way to enforce proper sustainable governance in the Eurozone is to get rid of moral hazard by enforcing the no-bailout clause. If one agrees with that statement, then it follows that all Eurozone countries have an interest in resolving the legacy debt problem.

We propose the orchestration of a one-off coordinated debt reduction based primarily on an agreement by participating countries to commit revenues to retiring debt. In addition, elements of solidarity and a debt equity swap could make the debt reduction deal viable and equitable. Importantly, countries could participate in the scheme only if they were legally bound to the new fiscal regime once the restructuring is done.

To guard against moral hazard, it is essential to put institutional mechanisms in place to ensure that the debt relief remains a one-off operation. In addition to existing contractual commitments (the fiscal compact), this requires an effective ESM lending regime that limits bailout and creates market-based incentives against returning to excessive debt levels. After the legacy debt and contagion through the banking system have been eliminated, debt restructuring will be a credible option since no country will be 'too big to fail'.

Finally, we emphasise that the solutions highlighted in the report are strongly complementary and would generate large welfare improvements for Eurozone citizens if jointly implemented.

33 Our proposals are not aimed at Greece. Greece is a special case and will need special treatment.

Discussion

This section reflects the comments on the draft report by the participants in the CEPR-Tommaso Padoa Schioppa Chair Conference at the EUI, 26 November 2014. The final report benefited immensely from these discussions and was largely rewritten.

Introduction

Opening the workshop, conference host **Richard Portes** addressed the central role taken up by the ECB in the Eurozone Crisis. Referring to his inaugural address as the holder of the EUI's Tomasso Padoa-Schioppa Chair a few days earlier, he elaborated on the early reflections of former ECB Executive Board member Tomasso Padoa-Schioppa on the necessary and sufficient conditions in a monetary union and, more specifically, on the ambiguity of the ECB's role in EMU regarding financial stability. The ECB has evolved towards the central institution in the EU, not just the Eurozone. Yet, trust in the institution as measured by Eurobarometer has been falling over recent years, and this is a cause for concern. Moreover, the current economic situation is dire: the adjustment burden is too high and it is not politically feasible for the taxpayers of southern countries to cope with a burden of such magnitude. "So when I reflect, I am very often pessimistic", he added. Yet, perhaps the package discussed during the workshop can help us to get out of the situation we are in, Richard Portes concluded.

Presenting the group of authors, **Beatrice Weder di Mauro** outlined their twin rationale: (1) the need for a proactive voice of European economists – often silent on remedies – on ways out of the crisis; (2) the need to produce cross-border economic analysis as opposed to nationally confined analyses. Encouraging participants to be open in sharing their views, she reminded them that the report is still a working document and that feedback would be collected and implemented in the final version. However, the proposal should not be seen as something to pick and choose from – it is a package that features strong complementarities, as incentives work together.

Beatrice Weder di Mauro then underscored the substantial advances made on EMU's institutional side and expressed hope that recent innovations would have an important impact. Turning to market dynamics, she noted that Eurozone breakup fears seem to have been successfully allayed, at least judging by the spreads. What remains unaddressed, however, is the question of the high and still rising level of public debt in Europe; the focus of the report. Suggesting ways to overcome this mountain of debt, the report rests on two main assumptions: (1) the debt overhang limits growth, and (2) the current set of fiscal incentives is

not credible. As part of a new quid pro quo, it therefore suggests a mechanism for dealing with the legacy of debt through debt relief and debt buyback in exchange for better fiscal and financial governance. This one-off effort would generate several benefits: it would install the improved fiscal governance more firmly, it would provide a structural solution to the diabolic loop, and it would create a European safe asset, all this while addressing the moral hazard problems and enhancing the credibility of the Treaty's no-bailout clause. However, the proposal has inherent shortcomings: private debt is not addressed, while growth is not the main topic. In terms of political feasibility, it is fair to say that the report is both ambitious – at a time where expectations for European reform have shrunk – and reasonable – as the proposals made do not require changes to the Treaty. It will, however, require political will.

1. Delinking banks and sovereigns

Peter Praet (ECB), discussant

Peter Praet insisted on the necessity of truly understanding the nature of the link between banks and sovereign by taking an approach to the issue that goes beyond just securities portfolio exposure. In this regard, taking the case of Italy, for instance, there is almost a one-to-one relationship between banks and sovereigns for CDS. The relevant issue is not the size of the portfolio held by banks in governments bonds; otherwise the solution would be simpler. Instead, the regulator's main focus should be on the risk concentration involved. Sovereign risk is indeed a risk per se, the same as any other risk. To take into account sovereign risk when calculating regulatory ratios, the ECB has imposed a reduction of the filters. The ECB has also developed a solution in between book value and market value to better capture sovereign risk during stress tests. Besides, the high correlation between sovereign bonds is a crucial issue. Therefore, any portfolio rebalancing and diversification will not solve the problem - Italian banks, for instance, have started to sell Italian debt and to buy other countries' debt, but this will not solve anything.

Furthermore, it is crucial to understand that a link exists between sovereign risk and both the macroeconomic conditions and the degree of exposure to the national economy. The CDS of non-bank entities are less correlated with the national economy because they are often international firms that can rely on geographical diversification; the relationship is not one-to-one, as it is for banks. The risk-sharing ability of the private banking sector should be restored: for now, the diversification is a mere illusion because the interbank market is subject to sudden stops. There are some benefits to geographical diversification, and diversification of risk-sharing is therefore a key issue within a banking union.

The geographical diversification did not work because of some supervisory restrictions. All comprehensive calculations for stress tests were conducted on a consolidated basis, but supervisors have not recognised the geographical or cross-borders risk-sharing issue. The problem with treating the balance sheets of banks as a single consolidated book is that backstops are still national. Besides, many banks do not transform into one single European bank for tax reasons.

Peter Praet then raised direct issues regarding the practical feasibility of the proposal. He was not opposed to the idea that the ECB would buy a synthetic AAA tranche backed by a portfolio of sovereigns; however, he expressed strong doubts that it could be engineered. More specifically, he asked how it would be possible in practice to engineer the senior tranche. In theory, it is possible under the assumption of complete markets, but in reality it might be tough to implement. The existence of incentives for the market to create such a senior tranche is unclear. He also expressed his skepticism about what could constitute a safe asset in general, and how such an asset could deal with catastrophic risk. For instance, the AAA assets collapsed during the crisis because they were not truly safe in the end.

He also stressed that there is a wide range of other possible ways to achieve some of the objectives the report focuses on – imposing some limits on the exposure of banks' balance sheets to specific portfolios, putting sovereigns on the same level of risk as other risky assets, risk-sharing in the ECB balance sheet, and buying AAA directly on the market, among others – which could have the same effects in terms of portfolio rebalancing.

Elena Carletti, Universita Bocconi, EUI and CEPR, discussant

Elena Carletti raised three main points: the reasons behind home bias, the feasibility of creating a safe asset, and finally the fact that the report might not be dealing with the two directions of the loop between banks and sovereigns.

Contrary to what carry trade arguments would suggest (that all banks should behave the same), not all banks have invested in the debt of periphery countries, i.e. in the most profitable investment. Instead, banks' holdings of sovereigns are marked by a strong home bias. This feature could be a consequence of a bank strategy aimed at hedging against a possible Eurozone break up. There are other reasons that can account for the home bias – risk-shifting is a first argument. Another possible explanation is that banks have realised that they are the buyers of last resort of the sovereigns of their countries, and have therefore tried to reduce the probability of default of their home state by buying bonds. Possible discrimination between national and foreign creditors could also be a possible explanation. During a default episode, foreign banks fear being treated less favourably than in their home country and therefore prefer home sovereigns.

Elena Carletti asked whether the safe asset of the report that she referred to as a Eurobond would truly be safe. She advised the authors to use the data from stress tests to identify the bundle of existing safe assets in the data and to carry out simulation exercises. Following the logic of the report, institutions other than banks should be holding the junior tranche. Which institutions could these be? If the shadow banking system were to hold them, banks would bear some of the risk in the end, as the shadow sector is connected to banks to some extent. She asked to what extent this proposal would increase not only the cost of banks, but also the cost of funding for sovereigns. She also discussed the question of the composition of the Eurobond in the presence of such heterogeneity in countries' level of debt. The use of GDP weights imply that countries like Germany and France would have a high proportion in the bundle, while countries with a high

level of debt and a low level of GDP, like Italy and Spain, would have a smaller proportion.

Assuming then that the proposal is feasible, Elena Carletti examined how it could deal with the loop, which actually goes both ways: from fiscal weakness to bank weakness, and from banks to sovereigns. The report seems to address only one side of the loop – from sovereigns to banks. She insisted that the report should also deal with the direction from bank weakness to sovereigns. To deal with bank failure, the only existing instrument is the resolution fund, but its capital amounts to only 1% of the capital deposited into banks in the member state. Therefore, this resolution fund is not meant to deal with aggregate crisis by construction. But it is not even in a position to deal with individual crises – some banks account for a huge part of their domestic GDP (e.g. IMG accounts for 60% of German GDP).

General discussion

Simon Tilford pointed out that unless GDP starts to recover, debt would become unsustainable in a number of countries. But he expressed strong doubts that either sovereign debt or the loop is really holding back economic recovery. In France and Italy, for instance, banks funding costs are very low. The stagnation seems to be rather the result of a private sector deleveraging in the absence of any mechanism that could offset the macroeconomic impact of this deleveraging. As a consequence, the proposal would not be a game changer unless it was suddenly accompanied by an expansion. He stressed that we are currently in a special environment and that multipliers should be very high so that increasing expenditures might have a positive impact on the economy.

Karsten Wendorff shared two of the views expressed in the report: first the no-bailout commitment must be credible, and second the banking system needs a safe asset. However, he was not convinced by the approach suggested in the proposal that he referred to as a "financial repression" one. He argued that forcing the system to buy Portuguese assets, for instance, and deciding that without this specific bond, there could be no safe asset, was not the appropriate response. A more straightforward approach would be to construct AAA bonds by deciding institutionally that from now on, all national European bonds would be split in half – into a junior and a senior tranche. The senior tranche would be the national safe asset. Then a share of different individual countries' senior tranches could be perceived as AAA on the market.

Marcus Miller started by welcoming the idea of using a warehouse. He argued that this part of the proposal should be taken even further, as it does not yet allow for solving the sovereign debt problem itself. He suggested using this warehouse to hold the sovereign debts in the form of GDP-indexed bonds, which would reduce the debt service cost of sovereigns. He stressed that the reprofiling of the payments of sovereign debt should be done *ex ante*, rather than *ex post*.

Gabriel Fagan argued that the report is in fact proposing not one safe asset but two. The proposal has one disadvantage: the issuance of the single bond by a decentralised market makes it less liquid than if it were issued by a debt agency.

Agnès Bénassy-Quéré underlined the three objectives the report intends to tackle: diversifying the holdings of banks, creating a liquid safe asset, and dealing with legacy debt. First, she expressed doubt that one single report could deal with those three objectives. There are other possibilities for achieving the diversification of the asset holdings of banks, for instance, like maximum exposure. There are also other solutions to creating the liquid safe asset. The reason why these two objectives are linked is actually because of the third one, the legacy debt issue. The alternative to what the report suggests is the restructuring of the debt. Therefore, she was skeptical about the merits of linking the three objectives. Second, she discussed the resilience of the proposal: what would happen to seigniorage revenue if banks notes were to disappear, for instance, or if there were any other shock on the size of this revenue? Also, what would the impact of earmarking such revenues be on the sustainability of the remaining debt? Third, she expressed some concerns about fairness: is it fair to push the burden onto future generations when this debt is not a compensation for future investment but only for current expenditure? In the report, the idea of conducting the SWAP at the market value rather than at par value is rejected. But even if the very existence of this plan will impact market prices, it could still be possible to rely on past market value. Indeed, fairness would require imposing part of the cost onto existing bondholders. Finally, she discussed the ECP policy of outright monetary transactions (OMT) and their future if this plan were to be implemented: how could OMT be implemented in this framework? If OMT are added to this plan, there would no longer be a match between the capital ownership of the ECB and the swaps in terms of shares of GDP, which she stressed is a nice feature of the plan. Indeed, if on top of the proposed plan, the ECB buys bonds of a specific country, it would move the shares. She also asked what would happen if seigniorage revenue could no longer be used to cover potential ECB losses.

Reza Baqir formulated two main questions in order to understand the proposal better. Will all junior debt tranches be identical? In the report, it is suggested that there will be a fixed proportion in which the debt will be held in the financial warehouse. Suppose this warehouse exists and is holding on its asset side sovereign debt, if part of this debt needs restructuring, how would the process work in practice between the financial warehouse and the investors?

Angel Ubide made three main comments. First, he expressed his disagreement with the view that quantitative easing (QE) could be used to deal with moral hazard issues; he stressed that monetary policy is about setting the right interest rate. Those two questions should be clearly separated. Creating a safe asset is a good thing, but it would not allow the ECB to perform QE without generating moral hazard. Second, the authors of the report seem to think that there is currently no market discipline in financial markets, but the forward spreads for Italy at a five-year point are still at 200 basis points. This spread means that financial markets do not believe that the EMU is a credible monetary union over a five-year time horizon. Third, to generate the safe asset proposed in the report, banks need to be willing to securitise it; the liquidity provision would rely on their willingness. But currently, banks are not willing to warehouse any risk. So

how could the banks be convinced to provide this asset? The authors should examine this issue.

Ludger Schuknecht argued that risk-sharing can work for a small crisis involving small banks, but is not suited to deal with big crises impacting big banks. For these, risk-sharing might raise political issues. He is not convinced that it is desirable to solve the debt overhang problem with this proposal, as this instrument would pack many debts into one unique bond, which might undermine market incentives. He thinks that the instrument should be more market-based rather than a pure forced creation. He underlined that the existing distortions in the system (small creditor limits, lack of diversification) prevent the creation of such an asset by the market. Getting rid of those distortions could be sufficient to prompt the spontaneous emergence of this asset.

Charles Wyplosz expressed doubts that this report should be taken as a whole package, of which all elements (or none) have to be implemented (i.e. a take-it or leave-it package). When formulating policy recommendations, the market failure should be clearly identified at each stage. Otherwise, the risk is to have solutions to problems that have not been clearly identified. Is there a common market failure that the comprehensive package is dealing with, or a bunch of different market failures that would actually not require a single comprehensive package? He also asked why a home bias is observed. Regarding the question of QE and the safe asset, he pointed out that financial engineering would not achieve the goal but would only operate a risk-shifting. The potential problem is that risk will show up elsewhere, and will ultimately be born by the lower tranches corresponding in the end to a concentration of risk in financial institutions. When risk materialises, financial institutions will be holding this risk and governments will need to bail them out. This proposal is thus a mere displacement of risk. Besides, he stressed that the main problem in Europe is that the Central bank still does not want to be the lender of last resort. The pretence that the ECB will buy AAA assets is only an illusion and not a solution as long as it does not embrace the role of lender of last resort.

Stefano Micossi expressed his confusion regarding the question of the QE discussed here and asked what is the objective of the QE. In his view, QE should lower the return on riskier assets. For the monetary policy to have real effect, it should operate some risk or income redistribution. It is absurd to conceive of QE as resulting in no redistribution; the ECB has to take on risk. He then asked what was the strategy to follow – increasing inflation in order to avoid restructuring, or restructuring and performing QE with a safe asset?

Carlo Monticelli found the notion of a comprehensive package to be interesting. However, to pursue fully this notion and achieve a truly comprehensive package, a political element is needed. The idea of political integration should not be left out if the notion of a comprehensive package is adopted. Second, delinking sovereigns can be a sufficient solution for a small crisis, but not for a systemic crisis. During a systemic event, it is indeed necessary to take on fiscal risk; pretending otherwise is either sheer ideology or a misunderstanding of past crises. It is an illusion to think that there will be no bailouts in the future; history shows that bailouts have always and will always occur. Lastly, the notion of QE

and a safe asset is nonsense. For the transmission of monetary policy to work, the relative prices of assets need to move.

Natacha Valla underlined the four dimensions of the issues at stake: high risk/low risk and public/private debt. First, the implementation of the proposal would lead to an abrupt public deleveraging, whereas the deleveraging of the private sector would be a slow adjustment. This differentiated process would create a shock in the risk profile of bank balance sheets' outstanding debts. Therefore, she asked why the focus is restricted to public debt only and why the same logic is not applied to the private sector. Why are there two different treatments? Second, she feared that the proposal might be excluding one instrument from the toolkit of the ECB: the purchase by the ECB of risky assets of banks. A crowding out of other risky assets held by the banks by the safe assets could indeed undermine this policy.

The authors then responded to some of the issues raised.

First, **Luis Garicano** strongly disagreed with the view that to have a real monetary policy effect, redistribution – especially between countries – is needed. The rules of the monetary union have been set – there will be a common currency but no risk-sharing – and it is necessary to work within those constraints. He also underlined that crises are not ineluctable, as shown by the example of Canada, where there has been no financial crisis for 200 years. He also stressed that bailsout policies should be stopped. Second, regarding the two sides of the loop, he pointed out that the monetary banking union would take care of the other side mentioned by Elena Carletti. Third, responding to the issue of the risk-shifting implied by the proposed safe asset, he stressed that the safe asset would not be an usual CDO. Furthermore, the risky tranches would be held not only by banks but also by hedge funds or even a retail market segment, if it were to develop. Fourth, regarding the question of the warehousing risk, he agreed that there might be a liquidity issue. To solve this, he suggested the creation of a facility hosted by the ECB whereby the different bonds would be pooled and which would finance the operation until the package is put together. In case of default, the contract would apply so that the ECB itself would not be bearing any risk as in any securitisation operation, the bank issuing the security is not impacted. Fifth, regarding the issue of the degree of market discipline currently in the market, he noted that there is not as much as there should be. Market discipline indeed goes beyond the trading horizon of investors. A mix of market discipline and rules is therefore necessary. He argued that having a potentially feasible default is necessary in order to have market discipline. He finally stressed that the proposal could be implemented without any risk concentration and that the safe asset is a market-based asset.

Lucrezia Reichlin first reminded the conference that the safe asset allows two different objectives to be achieved: it solves the loop issue and it gives the ECB a natural instrument for QE. But she stressed that the proposal does not rule out another type of QE implying risk transfers, and the reason the report has focused on a different approach of QE is because risk transfers are not accepted in the Eurozone. The EMU finds itself in a specific situation, as it is a monetary union

without fiscal integration. And as QE implying a risk transfer is a fiscal policy, this is why the report constantly checks that there is no risk transfer involved. Second, she insisted on the fact that an effect on the interest rate is possible even without implying any redistribution, so that the proposal would have some economic effects. Finally, she explained that the issues tackled by the report could only be partially addressed by regulation, as the collateral policy of the ECB is a macroeconomic issue, which the report also addresses. The proposal has both a regulatory and a monetary policy element. Using the safe asset as a collateral in the provision of liquidity by the ECB would avoid the loop – this is the macroeconomic dimension of the report, which goes beyond a pure regulatory focus.

2. Fiscal governance

Clemens Fuest found the report fascinating and that it tackles a challenging subject. He warned the authors, however, that such a debt restructuring would raise significant legitimacy issues. He discussed the rationale of the debt restructuring scheme chosen compared to functional alternatives. Questioning why the restructuring should be done in this way and not differently, he regretted that the criteria to justify the authors' choice were not made explicit. In line with this suggestion, he recalled that national taxpayers need not always be the only victim of a debt restructuring and listed four possible victims of a restructuring: creditors, national taxpayers, expenditure beneficiaries (e.g. public employees, pensioners, users of public services, etc.) and taxpayers of other countries. Along these lines, he asked what should be done to deal with legacy debt today and in the future, and concluded the following: creditors should take losses in future crises but not now; national taxpayers should be involved now but less in future crises; public expenditure beneficiaries should be affected now but less in future crises; and foreign taxpayers should take a hit now but not in future crises.

Clemens Fuest then asked what the criteria for the allocation of the losses are and considered that also here, one would need to be more explicit about the underlying allocation criteria, which could be numerous (e.g. fairness, incentives, ability to pay, financial stability or growth impacts). Addressing these criteria would be likely to lead to different solutions for different countries, moving away from the 'one-size-fits-all' logic of the report. To illustrate this, he highlighted the varying levels of external debt and private sector holdings in Spain and Italy and, on this basis, advocated individual country programmes. He then evaluated the possibility of taxes playing a more systematic role in debt restructurings, for example by making ESM assistance conditional on a tax adoption.

Such a tax – a real estate tax would be a good candidate – would generate a lot of revenue without causing too much economic damage. Except that such a condition could also delay the ESM application, would not provide cross-country insurance and, ultimately, would breach a country's fiscal sovereignty as a country cannot be forced to collect the tax . Clemens Fuest closed his intervention by asking more specific questions about the restructuring procedure. He wondered how the trigger for restructuring would work exactly, expressed concerns about

the relevance of an automatic and immediate restructuring if the debt ratio reaches 90%, pointed towards alternative approaches (see Fuest et al., 2014) and speculated whether it could make sense to let countries issue junior debt above the 90% threshold.

Fearing the consequences of the seriously damaging loop between high debt and low growth, **Christian Mumssen** focused his intervention on the link between fiscal governance and high public debt. He brought forth recent figures documenting over-borrowing, but also clarified that this is not Europe's problem alone. Pointing towards the private sector debt developments, he underlined that the private sector is another key problem that has led to the crisis. Using graphs based on Eurostat, ECB and IMF data, he showed how cumulated indebtedness (i.e. governments, firms and households) took off substantially from 2003 to 2008, with Ireland, Portugal, Spain and Greece providing examples of significant firm debt growth. He concluded that both public and private debt matter, in reference to the report's disregard of the latter.

He then addressed misconceptions on debt developments and insisted on the fact that only a few countries came into the Crisis with high debt levels. Among the key countries affected by the crisis (i.e. Greece, Italy, Portugal, Cyprus, Ireland, Spain), only Greece and Italy entered the Crisis with high debt levels (above 100% in 2007). He recalled the crucial role played by bank bailouts in beefing up public debts, and mentioned that at times massive fiscal adjustments were needed to keep bailing out banks. In this light, he figured that bail-in has already helped somewhat to prevent an accumulation of debt.

As far as the fiscal governance of Europe is concerned, Christian Mumssen explained that the lack of compliance with the SGP is a cause for concern and reminded the audience that the key problem lies with the lack of incentives in good times, which is a Maastricht failure. Against this background, he presented the average government budget balance over 2004-07 and insisted on the inability of some countries to build fiscal buffers in good times. He opined that we need to come back to a fiscal regime that features incentives in good times and good enforcement and that also leads to growth, as debt sustainability is also about policies to promote growth. Linking this point to the proposals of the report, he argued that there is an ex ante problem. Governments are not a model economic agent, they have a shorter time horizon and they are far from being punished for not building up buffers. Lastly, Mr Mumssen wondered, in light of the 2009 Crisis, if the proposal could be simulated to see the effects on Ireland and Portugal.

In the Q&A, **Juan Francisco Jimeno** agreed with the general ambition of the report to implement the same debt restructuring framework across Europe, yet he cautioned the authors about the very different situations one encounters in case of debt restructuring, pointing towards various financing conditions, growth, pension situations and, last but not least, fiscal limits. Observing that the general thrust of the report on CACs is rather negative, **Reza Baqir** asserted that CACs are not bad – although aggregated CACs are better – and underlined that one can achieve a lot using them. Turning to the issue of the debt-to-GDP threshold, He suggested that anticipated debt to GDP would be a more relevant indicator

for debt sustainability and argued that markets would have a similar reasoning. Questioning the relevance of the debt threshold used in the report as an objective value to trigger a debt restructuring, **Angel Ubide** urged to authors to explain the rationale of the numerical thresholds *d* and *D* and expressed the view that one cannot define *ex ante* if these thresholds are going to be optimal.

Charles Wyplosz reminded the audience about the two causes of the crisis: the collapse of banking supervision on the one hand, and fiscal indiscipline on the other. While it is obvious that there is a need for a banking union, the crucial issue is that Europe did not address the absolute need for fiscal discipline, as the homework was not done at the time of the Maastricht Treaty. There is therefore a feeling that we are solving the symptoms, not the problems. **Karsten Wendorff** asked when debt restructuring takes place and under what conditions. He explained that it is important to consider that the debt ratio is not the only criterion for debt sustainability. He also noted that there is a huge uncertainty in adjustment circumstances to determine whether a country is willing to tax or reduce its expenditures. With a view to ensuring investor and market discipline as part of a more orderly process, he referred to a proposal made by the Bundesbank in 2011 in which an automatic debt prolongation of three years was designed if a party enters the ESM. Defending the rationale of the report, **Jeromin Zettelmeyer** explained that the report was underpinned by a policy failure, not a market failure. One aspect of it was the missing incentives problem (to build appropriate buffers) while another was the abuse of European mechanisms to address not only liquidity, but also solvency issues. He recalled that the approach advocated is not about socialising the debt, but about repaying the debt.

Carlo Monticelli would have liked the report to engage more with the current policy debate on how to reconcile the current fiscal governance with incentives for structural reforms. He agreed that debt restructuring needs to be discussed, but he warned that one cannot think out loud about debt restructuring without provoking domino effects on the market due to the ambient moral hazard obsession. Alluding to the Catch-22 nature of this situation, he added that if markets smell this issue, the whole system falls apart.

Yannis Manuelides asked if the prolongation of bonds proposal was similar to that made by the IMF and encouraged the authors to explain more – and possibly to assess – how the automatic prolongation would work exactly. Reacting to the one-size-fits-all nature of the framework proposed, he noted that one should not assume that a European legal rule will work everywhere in Europe in the same way. He notably referred to varying court decisions. **Charles Wyplosz** engaged with the report's implicit premise that one has a complete choice between two polar models of fiscal decentralisation and centralisation. What is essential is rather finding a better combination of responsibilities rather than opposing the two models. **George Alogoskoufis** argued that both market and policy failures have caused the crisis. He advocated a clear and consistent enforcement of the rules. **Ludger Schuhknecht** liked the proposal and agreed with its underlying principles. He emphasised the need to settle for a commitment device that has a trigger and later added that he viewed the loss of market access as the most important trigger. **Charles Wyplosz** expressed strong criticism of the idea

of building a debt-restructuring mechanism based on a threshold that has no economic meaning and explained that like the SGP, this mechanism could not work.

Reacting to the points raised on the one-size-fits-all nature of the proposal, **Beatrice Weder di Mauro** stressed that the problems were the externalities of excess debt on the rest of the Eurozone and not the perfect measurement of sovereign solvency. She made the point that loss of market access is indeed the real trigger for resorting to the ESM, but this should not trigger a restructuring of debt every time. The ESM should only be restricted from lending without private sector participation in case of excess debt. **Hélène Rey** concluded by observing that this package is not about cyclical adjustment. Rather, it is about pressing the reset button and setting the right fiscal governance concomitantly.

3. Dealing with the legacy debt

Ludger Schuknecht (German Ministry of Finance), discussant

Ludger Schuknecht found this chapter of the report to be a promising one. The issue of the legacy debt is indeed crucial in his opinion. At current interest rates, the debt is sustainable but the resilience to a shock is not obvious. He asked whether having a stabilisation fund large enough to make a difference in terms of sustainability would be feasible, as it would require a huge commitment in terms of revenue. Besides, the political feasibility of the project would be uncertain if there were some mutualisation involved.

If the fund is very large, it raises some time-consistency concerns. If the one-off feature of the intervention is not fully credible, it could create expectations of bailout, thus undermining the market incentives and defeating some elements of the proposal. The proposal could therefore be perceived as a first step towards a Eurobond or a monetisation-like solution. Could an asset based on the stability fund be considered safe? If it is based on seigniorage revenue over fifty years or on any national revenues, it is not clear that at some point a country could not simply repudiate, raising again the issue of time consistency.

Regarding some of the details of the proposal, and from an accounting point of view, it seemed to him that even debts held in this fund would still be allocated to national debt ratios.

He also asked whether this proposal would affect national reform incentives and national fiscal policies. If it is clearly a one-off operation, it should not have too much of an influence, but if it is perceived as a first step towards mutualisation, it would create disincentives to implement national reforms. Consequently, the long-term impact of the proposal could be to damage stability if it reduces the incentives to undertake national reforms.

As a complement to the present proposal, fiscal governance could be useful to make the one-off feature more credible. He noted that over the last fifteen years of the EMU, there has been a trend towards erosion of rules and towards a greater degree of flexibility in fiscal governance in the face of real-time problems. The current debate indeed opposes economic arguments – in favour of flexibility –

with arguments focusing on the commitment and credibility of institutions – in favour of a strict observance of fiscal rules.

He also discussed the issue of earmarking revenues and asked whether the mechanism could be made more incentive-compatible; it could be designed as a non-linear process favouring disproportionately high-debt countries in exchange for a higher contribution on their part. They could, for instance, commit state assets or a more significant part of their future revenues. Therefore, he rather favoured the idea of a *national* debt redemption fund. The main benefits would be an increase in transparency and a signal of commitment.

Regarding the issue of a wealth tax, he pointed out that if this source of revenue were to be considered, then the solution should even be more extreme and make the holders of bad debt pay.

To conclude, he would favour the contractual approach to deal with debt sustainability rather than the proposed debt facility, which does not seem like the best solution.

Charles Wyplosz, Graduate Institute, Geneva and CEPR, discussant

Charles Wyplosz liked the report very much and the heated discussions have demonstrated that it certainly tackles the relevant issues.

The premise of the report is that the level of debt is excessive, which is of course a debatable issue. There are two main arguments for why legacy debt can be excessive. The first is that excessive debt is bad for growth; it corresponds to a redistribution through a distortion – the taxes – that are not innocuous, and the government is vulnerable in case of a bad shock that can render any expansionary fiscal policy impossible. The second argument is that excessive debt creates the conditions for self-fulfilling attacks. Furthermore, it is easier to tackle some problems if there is no legacy debt. Besides, he stressed that the excessive level of debt is an issue that must be conceptually clearly separated from the solvency issue.

If it is accepted that legacy debt is too high in a number of countries, an optimal time-consistent policy should be implemented. Such a policy faces some challenges: the credibility of the one-off feature and the risk incurred by bondholders, and consequently by banks. A solution could be to find a scheme to achieve transfers between countries, but this is not politically feasible.

A solution is the PADRE plan that implies no debt reduction: it is a debt restructuring without reducing the debt. It has three main features. First, it allows the debt to be rescheduled, but 100% of the debt will be serviced so that the bondholder and consequently the banks are not hurt by the operation. He insisted that debt instruments should to be removed from the market place and 'buried' to avoid self-fulfilling attacks. Second, the PADRE plan makes use of a 'pot of gold': seigniorage revenue. It does not constrain the ECB, as seigniorage revenue is irrelevant for monetary policy. The ECB, instead of sending the seigniorage revenue to the national central bank, sends it to the debt agency, which is innocuous. The plan even actually increases the independence of the ECB: the ECB will have more freedom to increase the interest rate if the legacy debt is removed, as a higher interest rate would no longer hurt any country. Third, the

plan consists of a one-off operation in order to not raise any moral hazard issue. The one-off feature is credible because the contract includes a 'covenant' dealing with moral hazard, an element that does not appear in the present proposal. Also the whole present value of seigniorage revenue is committed so that the operation cannot be repeated, as the revenue is gone once and for all.

Charles Wyplosz then identified the differences between the PADRE plan and the current proposal. First, in the PADRE plan all future seigniorage revenues are committed, whereas in the present proposal there are limits to drawing upon seigniorage. However, he emphasised that limiting the time commitment breaks up the two constraints that governed the design of the scheme: not harming any bondholder and avoiding any transfers. The limit to fifty years is thus not desirable in his view. Second, the present proposal deals weakly with the one-off issue by only relying on market pressure for the government to behave. He instead suggested adopting the tough contractual condition – the covenant – included in the PADRE plan. If a country misbehaves, the agency turns the infinite maturity asset into a finite maturity one with an interest rate and throws the asset on the market place. He argued that such a threat would be a powerful mechanism able to deliver strong incentives. Third, he added that the involvement of the ECB is not necessary and that a debt agency would be sufficient. Finally, he pointed out that an asset whose value is the present value of seigniorage revenue is the best asset that one could imagine, as a claim on central bank seigniorage revenue seems like the safest possible asset – except in the case in which there would not be cash in the future.

General discussion

Richard Portes expressed his concerns about the actual size of the existing debt and hopes that the report could attract the attention of policymakers to the debt overhang problem. The authors' pessimistic assumption in their simulation of interest rate at 3% is not very consistent with a very low growth of 1%; such low growth would rather imply low interest rates.

Nicolas Carnot expressed his doubt that the plan would actually lead to a reduction of national debt. He pointed out the disingenuousness of the proposal regarding the debt reduction, as future taxpayers still honour the debt; indeed, the proposal removes revenues from seigniorage in the future. Therefore, he stressed that intertemporally there might not be any debt reduction due to this removal of future revenues. The proposal actually reduces the service of the debt today and alleviates the debt burden today only, giving space for a looser fiscal policy now. **Hélène Rey** intervened at that moment to remind participants of what the effects of the proposal are. The proposal allows risky debt to be replaced with non-risky debt, which is an effect on the net present value of the debt. The other effect is on the denominator and the removal of the self-fulfilling crisis. **Nicolas Carnot** agreed on this, but he would like to see those ideas stated more clearly in the report.

Gabriel Fagan found the report to be very interesting. He pointed out that debt service capacity would be determined in the future; if revenues in the future

are reduced, the debt that can be serviced will decrease. He advised the authors to take that into account when assessing the amount of 'safe' debt.

Stefano Micossi started by establishing a distinction between good and bad times during which conditions for restructuring are different ("fair weather" versus "bad weather"). First, during good times, the rational approach *ex ante* could be either restructuring or repayment. Any hypothesis on restructuring raises the issue of stability, as the risk of jumping to the bad equilibrium is difficult to avoid. Furthermore, during good times, politicians have cyclical incentives to restructure. On the other hand, repayment does not raise the issue of financial stability. If repayment is preferred, the choice is then whether to repay with or without bonds. Solving the one-off problem is crucial. It is not clear which is the externality attached to the bond solution. He came to the conclusion that the best solution during good times is a wealth tax or some other kind of tax, because any other solution would be worse in terms of incentives. In bad times, restructuring is only contemplated after the loss of market access. If a country needs external support, for instance from the IMF, this should be done on a case-by-case basis and also only after market access has been lost.

Carlo Monticelli reaffirmed the need to distinguish between insolvency and excessive debt, as already underlined by Charles Wyplosz. The focus of the report is on excessive debt rather than insolvency. Any debt is in a sense excessive: if a mortgage could be turned into a zero coupon bond, this would of course increase permanent income. However, the distinction between solvency and excessive debt becomes blurred when discussing this proposal or any proposal of this type, thereby creating a dangerous confusion. This is why he expressed some concerns about the proposal. The proposal is not a debt restructuring but a securitisation of future seigniorage revenue, which he found to be a very clever solution. However, he considered this solution to be dangerous and not politically viable. He instead favoured a policy that would solve the legacy debt issue through growth, and expressed concerns that the current proposal would take the momentum for such a growth-oriented policy away. The best case against the proposal is demonstrated by the fact that with the higher growth hypothesis of the report, the debt problems of many countries, for instance Italy, disappear – the debt overhang issue can be solved by growth itself. Lastly, the proposal might violate the Maastricht Treaty: first, it could be perceived by some as monetary financing, even if it is not actually the case; and second, it reduces the independence of the ECB by committing and earmarking the seigniorage revenues, which are a central component of independence.

Marcus Miller agreed with some previous remarks that there is some pass moving accounting going on in the proposal: hypothecating revenues to some off-balance-sheet agency reduces the debt. However, he argued that this would not be a big enough effect. A better solution could be to tax the banks, as they caused the debt to build up (i.e. collecting private revenues from the institutions responsible). The plan could then be renamed a "morally acceptable debt reduction exercise" rather than a "political acceptable debt restructuring exercise" (PADRE).

Fabrizia Peirce expressed her surprise at some of the comments regarding the nature of the debt reduction, because she understood from previous interventions by Charles Wyplosz and Hélène Rey that the proposal was about gross debt reduction rather than solvency. She would have liked some further clarifications on that point. The debt reduction could be led by two different concerns: either the issue of liquidity, or pure gross debt reduction (i.e. the excessive debt approach). If the debt reduction is about the issue of liquidity, the lender of last resort could take care of it. Another possibility for dealing with the liquidity issue is to provide collateral to the lender of last resort. The seigniorage revenue could be held as a collateral for the ECB's provision of liquidity. Focusing now on the gross debt reduction, she argued that it should be clarified why the seigniorage revenue is the right asset rather than any other revenue that the government could use to reduce the amount of debt. She expressed his sympathy with the view that the amount of public debt is a problem, and more specifically a financial stability problem rather than a solvency one. However, she noticed that there is a component relating to solvency in the report, as redistribution and transfers seem to be contemplated. We have to decide whom to distribute the money to, and why. The mechanism is not clear enough in the report. The proposal seems to imply the bailout of current creditors if it includes transfers. She pointed out that the two issues – stability and solvency – should not be dealt with together within the same report, and should not be part of the same solution.

Jeromin Zettelmeyer participated in the early preparation of the report so he responded to some of the issues raised. He presented the economic principle underlying the proposal. The EMU finds itself in a situation of a combined recession and fiscal problem without any control over fiscal policy. The textbook answer to such a situation is to commit to future fiscal adjustments and reforms and to use the fiscal space thus created intertemporally to boost demand in the short run. The proposal actually aims to implement the same idea. The way to commit to future fiscal adjustment proposed in the report involves two things that bring the report together. The first mechanism is assigning a revenue source that allows priority to be given to debt reduction in the future; this is the first part of the plan. It might be possible to only declare that the government commits a specific revenue source , but it would not be fully credible. In the report, this is done instead by picking a source of revenue and committing through a contractual structure in advance to dedicating this revenue exclusively to debt reduction. As the revenue chosen is outside of the control of governments, there is no moral hazard involved. Once this commitment has been made, debt can be reduced immediately though buyback operations. The second part of the plan is a fiscal regime that is supposed to create incentives to avoid a new process of debt accumulation.

Karsten Wendorff argued that the solution to debt is indeed a fiscal policy rather than a monetary policy – inflating debt away is not a politically acceptable solution. He suggested that to have a clear effect on the market, it might be easier to have a pure market-based approach: declaring that the seigniorage revenue will be committed to debt for the next 50 years and seeing how much can be

raised on the market after that announcement. This way, prices would be fairly set in the market. He also observed that changing the structure of the debt might not have economic effects and would not increase solvency. Turning risky debt into risk-free debt means that the rest of the debt becomes riskier. In his view, it would not change the risk premium on the market for the rest of the debt. Besides, the authors' simulation shows that Italy could pay back the debt with seigniorage revenues and a 1-point increase in VAT, and therefore does not need any redistribution.

Peter Praet expressed his concerns about several issues in the proposal. Governments could indeed use the seigniorage revenue, or any future streams of revenue, and securitise it in order to reduce debt. But the risk management of the ECB should not be influenced as a result of such a policy. It is difficult to price those securitised seigniorage revenues. Consequently, this operation could interfere with the risk management of the ECB if the ECB accepts as safe an asset whose value is actually uncertain. The problem is that it is difficult to assess the present value of seigniorage revenue in the presence of uncertainty (technological change, for instance). Besides, it is always possible to maquillage public finances, increasing uncertainty over the true risk-free nature of the 'safe' asset.

Reza Baqir disagreed with previous remarks stating that the proposal would have no more than an accounting shifting effect. If the debt ratio is indeed decreasing, this generates value by 'raising the size of the pie': it provides a credible commitment to addressing market concerns, which should increase growth. Hence, this proposal has a real economic effect.

George Alogoskoufis liked the proposal mainly because it creates a pre-commitment to fiscal adjustment and therefore removes the uncertainty about the future servicing of the debt. However, he suggested that every government could pre-commit to giving some percentage of their GDP to this stability fund, instead of the proposed solution. As it is a fiscal operation and not a monetary operation, why use seigniorage revenue?

Angel Ubide first expressed doubts that this commitment would work. He warned that investors would probably apply a discount to the net present value of seigniorage revenues at the time of buying the bonds so that it would not be possible to collateralize 100% of the revenues. Second, it seems that the proposal undermines the operational independence of the ECB, as it is renouncing a source of revenue. Following the intervention of some of the authors, who objected to that point, he replied that the authors should explain clearly why the operational independence of the ECB would not be impacted.

The authors then gave a brief answer to some of the issues raised. **Hélène Rey** first reiterated the extent to which time consistency is essential for the one-off feature of the operation to be credible, as many commentators underlined. She reminded the conference that solvency is not the focus of the report, but the excessive level of debts. The authors tend to believe that there is an excessive level of debt in the Eurozone and the report aims at dealing with this issue. The restructuring mechanism is also built to prevent too much debt accumulation in future and thus to limit future excessive debt. An externality arises from an excessive level of debt because when the amount of debt is too high, the sovereign

becomes too big to fail. The authors believe that to enforce credibility in the fiscal framework, default must be allowed for, as the US experience has shown. Second, regarding the economic effects of the plan, many commenters have already underlined the pre-commitment part that allows debt to be reduced. But Hélène Rey stressed that reducing gross debt would have other effects: it reduces the probability of having huge spreads and reduces the net present value of the debt. Third, she noted that many comments have focused on the seigniorage revenue issue, but this is only one part of the proposal. She stressed that the revenue could, as some have suggested, arise from sources other than seigniorage, but that in order to have no redistribution, it was necessary to be conservative in the choice of the revenue. However, she pointed out that redistribution should not be a taboo in the Eurozone and should be discussed. Besides, the advantage of seigniorage revenue is that a repudiation by governments is not possible, as the income is received directly by the ECB. Therefore, seigniorage revenue makes the whole plan more credible. She also responded to criticisms of the proposal to limit the duration of the stream of seigniorage revenue to 50 years, arguing that the authors chose to limit this duration in order to have credible and conservative estimations, as beyond 50 years the uncertainty would be too high and akin to science fiction. Fourth, regarding the suggestion of taxing banks, she would not be opposed to the idea but she stressed that in a general equilibrium, depositors would be impacted.

Lucrezia Reichlin responded to the comment that the proposal might be neutral. She emphasised that neither Ricardian equivalence nor the Modigliani-Miller theorem hold in the real word.

4. Political feasibility

Being a package, the report is only as politically feasible as its weakest link, or a sufficient substitute for that weakest link, said **Philippe Legrain**. As far as the first proposal is concerned (limiting the exposure of banks to sovereign debt), he suggested that the bigger question is whether governments and banks have any interest in breaking their incestuous ties, pointing at the interest of governments in enjoying a captive market for their bonds. He conditioned the success of a QE programme on large purchases and on the generation of joint benefits for governments and politically tied banks that exceed the expected costs of breaking the sovereign-bank link. The problem, however, is that such a large-scale purchase of government bonds, or of an asset derived from them, is not compatible with the views of the German policy establishment, not least the German Constitutional Court. Assessing the second proposal (a sovereign debt restructuring regime), Philippe Legrain challenged its underpinning premise, namely that the updated Stability and Growth Pact and the Fiscal Compact are politically sustainable. Recalling the high pressure of the context in which those rules were adopted, he underscored that in the absence of panic, both southern and northern voters increasingly reject undemocratic constraints on their legitimate political choices about taxation, spending and borrowing. So if a credible no-bailout clause were to be restored, as the report advocates, the fiscal straightjacket should no longer

be politically necessary, as markets will discipline borrowers, with the ultimate threat of default. Yet, if one considers the opposition of the ECB to a Greek debt restructuring, the political capture of governments by banks and the fact that the ESM is clearly not independent of Eurozone governments, one wonders whether such an independent actor actually exists to enforce restructuring, maybe the "post-DSK IMF", he speculated.

Discussing alternative forms of debt reduction, Philippe Legrain dismissed the commitment of future seigniorage revenues as scarcely politically plausible given the low inflation/deflation context, the implications for the ECB's independence and the possibility that electronic money may reduce seigniorage revenues sooner than within 50 years. Turning to new taxes as a way out, he insisted that the Eurozone VAT would require more solidarity and would be hard to justify politically, since it would unfairly hit taxpayers rather than reckless creditors. Next, he hinted at the possibility of a coordinated debt-equity swap but doubted that AAA countries would want to participate. Suggesting that the report dances around the elephant in the room, he recalled that the Eurozone cannot avoid confronting the biggest obstacle to genuine debt write-downs: the opposition of powerful creditors, both official and private. The latter hold large sway over the Eurozone and EU institutions and can use that control to enforce iniquitous conditions on debtor countries, whose policy elites, in turn, are now politically associated with those policies. Against this background, he suggested a more overt way out: convening a debt conference that would craft a broader grand bargain, like the London agreement to write down Germany's debts in 1953. Finally, he pointed out two limitations of the report: the fact that it sidesteps the case for fiscal stimulus, and that it does not engage with the huge overhang of private-sector debt, which makes zombies of banks and causes a large shortfall of demand.

Discussing the overall proposal, **Angel Ubide** explained that debt overhang is a problem because one worries about future tax levels and expropriation. He invited the authors to consider solutions to the problem of debt restructuring both 'through the flow' and 'through the stock', recognising that stock-related solutions would bring about welfare problems. He then addressed the institutional shortcomings of EMU, be they monetary, fiscal or banking-related. He stressed that the ECB's inflation mandate of close to but below 2% generates too much uncertainty and room for interpretation. However, design failures, he argued, are also to be found in EMU's fiscal institutions, which are fundamentally asymmetric and feature an inherent tightening bias. Europe is left with institutions that do not define the aggregate fiscal stance of the Eurozone

Engaging with the diabolic feedback loop between sovereigns and banks, Angel Ubide acknowledged the home bias but invited the authors to go deeper in the reflection. He argued that at the core of the feedback loop problem lies the fact that "we don't have European banks". Hinting at the achievements in the realm of the banking union, he emphasised the fact that as of today, we have European supervisors but no European banks. Promoting cross-border ownership of banks should therefore be part of the attempts to break the link between sovereign and bank. Going back to the big challenge ahead for Europe,

he unambiguously called for Eurobonds to have a sustainable EMU. Pointing to the general muddling through strategies implemented so far and to the fact that Europe has been in this crisis for five years now, he called on governments to get their acts together and come up with a Eurobond in whatever form. He recalled that Europe's institutions were designed for a different environment and that the current climate, one which is characterised by the advent of populism across European countries, would require such a measure, not least to help the establishment parties.

In the Q&A, **Charles Wyplosz** expressed strong skepticism towards Eurobonds. He disagreed with Angel Ubide and wondered what problems Eurobonds would solve. Picking up on the recommendation to confront populist parties, **Ludger Schuknecht** invited the audience not to get blackmailed by Podemos or the Front National. He also recalled the huge progress made in addressing the Eurozone crisis and concluded that the overall narrative is much more positive than the picture painted before. Denying any complacency, he stressed again that one should not forget what was achieved ("*man muss die Kirche im Dorf lassen*"). Referring to fiscal mutualisation, Lucrezia Reichlin questioned whether the report was getting around the problem and recalled the political context in which a full fiscal union is not on the agenda to justify the measures proposed in the report. Reacting to the points raised on the design flaws of EMU, **Luis Garicano** underscored that the only way Europe is going to work is to go back to Maastricht, as in this framework, countries had a level playing field in some form. On QE, he voiced his doubts that it would lead to a significant redistribution.

Beatrice Weder di Mauro summarised the discussion and suggested that based on the constraints voiced, ('no transfer, no mutualisation, no fiscal expansion'), it is unclear which options are left. She then recalled the redistribution problems raised by attempts to deal with legacy debt in a situation of excessive debts and stressed that a key issue is that they can easily be attacked from the left and the right. **Simon Tilford** did not buy into the idea that the French, Spanish, and Italians will be that compliant in the absence of a credible bailout/debt-restructuring regime. As regards the magnitude of the increases of debt to GDP, he restated the importance of the denominator effect and regretted that people were being too complacent as according to him, Europe is looking at years and years of low growth. Addressing the political feasibility of the proposal, **Carlo Monticelli** contended that the key political problem is more deep-seated, referring to the overall dissatisfaction of the electorate with the notion of Europe and the euro. Despite the sense of urgency, he missed the political leadership to win the hearts and minds of European citizens. He also explained that he was convinced by QE.

As the discussion drew to a close, **Richard Portes** regretted that the ideas present in the report do not penetrate because they face a power narrative, based on bad macro. Turning to the proposals of the report and judging from the way that market discipline can be destabilising, he encouraged the authors to find and show examples of where it has actually worked – i.e how things work when it becomes 'dirty' – so that the proposal becomes more convincing. Reacting to the points made on institutions, he argued that EMU's institutions have not progressed very fast, referring for example to the ESM (which he deemed

as “nothing really serious”) to illustrate incremental change. Concluding the workshop, he thanked all participants for their contributions and for taking the time to come to Florence.

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Appendix A: Calibration of national debt buyback from seigniorage

Estimating the NPV of seigniorage

We define seigniorage as the change in the monetary base. Calculating seigniorage revenues requires estimating future currency demands and computing the net present value of future money supplies matching these demands. Currency demand is proportional to the nominal price level and to GDP, with a certain amount of elasticity. It is therefore necessary to take a stand on future growth rates of the economy in the Eurozone, on future inflation rates (taken to be 2% under the mandate of the ECB) and on the value of the output elasticity. We are therefore estimating the non-Inflationary loss absorption capacity (NILAC) of the ECB (Buiter and Rahbari, 2012a,b).

As derived in Buiter and Rahbari (2012a,b), seigniorage at date t is given by

$$S_t = S_0[(1 + \pi)(1 + \gamma)^{\alpha}]^t[(1 + \pi)(1 + \gamma)^{\alpha} - 1]$$

where π is the inflation rate, γ is the real growth rate of GDP, α is the output elasticity of money demand and S_0 is the initial stock of currency. We use an estimate of the output elasticity of currency demand of 0.8. NILAC estimates are not very sensitive to this parameter. They are, however, quite sensitive to assumptions on the discount rate and the growth rate.

Long-run estimates of the real rate are taken to be between 1% and 3%, implying a nominal rate of between 3% and 5% given the ECB monetary mandate of a 2% inflation target. The average annual growth rates for the long run in the Eurozone are pessimistically assumed to be between 1% and 2%. We note that with such low growth rates, lower real rates could very well be the norm (the secular stagnation hypothesis). This would tend to increase our estimates of seigniorage. We first compute the NPV of seigniorage on a 100-year horizon.

Our estimates of the ECB non-inflationary seigniorage revenues range from €1,000 billion to €4,500 billion on a long horizon of 100 years, depending on the value of the discount rate and the growth rate. Similar figures are estimated by Buiter and Rahbari (2012a,b) and Paris and Wyplosz (2014a,b) for the range of parameters they consider. We emphasise again that these estimates are conservative, in that we define seigniorage revenues as including only the revenues stemming from cash issuance. We disregard the revenues coming from interest payments on the assets held by the ECB (the securities markets programme, or SMP, for example).

Table A1. Our horizon: 100-year seigniorage (€ billion)

Nominal interest rate	Annual real growth rate		
	1%	1.5%	2%
3.0%	2,360	3,299	4,592
3.5%	1,094	2,586	3,544
4.0%	1,527	2,069	2,791
4.5%	1,265	1,688	2,243
5.0%	1,066	1,404	1,838

Yet, one could question the pertinence of using an infinite horizon (or even a 100-year horizon) for the debt buyback plan. The longer the horizon, the more uncertainty and the more future fiscal resources are committed. In practice, investment horizons and financial instruments rarely exceed 50 years.

When the horizon is shortened to 50 years, non-inflationary seigniorage revenues barely reach €2,000 billion in our most optimistic combinations of growth rates and interest rates. In fact, a conservative estimate total seigniorage revenues for a 50-year horizon would probably be in the range of €1000 billion, and a pessimistic one about €800 billion (Table A2).

Table A2. Horizon: 50-year seigniorage (€ billion)

Nominal interest rate	Annual real growth rate		
	1%	1.5%	2%
3.0%	1,233	1,561	1,950
3.5%	1,094	1,380	1,717
4.0%	976	1,226	1,520
4.5%	876	1,096	1,353
5.0%	790	985	1,211

National seigniorage revenues are not enough to bring debt- to- GDP ratios to below 95%

Based on the estimates in Table A2, if (a) our proposed debt buyback were to rely exclusively on seigniorage revenue, and (b) this revenue were to be distributed across countries according to the ECB capital shares, the reduction in the initial stock of debt would hardly be sufficient to bring crisis countries back to the debt safety zone. Consider first the optimistic case where 50 years worth of seigniorage revenues amount to €2,000 billion. Allocating this amount according to the ECB keys, Italian debt would still stand at 110% of GDP after the buyback, Greek debt at 145% of GDP, Irish debt at 93%, and Portugal would just make it below the 100% debt-to-GDP level (see the last column of Table A3).

Table A3. Total Seigniorage of €2,000 billion distributed according to ECB keys

Country	ECB keys	Seigniorage	Shortfall (€ billion)	Achieve
Belgium	3.46%	69.20	23.26	89.21%
Cyprus	0.19%	3.80	1.64	85.52%
Ireland	1.59%	31.80	2.82	93.46%
Spain	11.82%	236.40	201.56	75.93%
Italy	17.84%	356.80	-240.16	109.83%
Portugal	2.53%	50.60	-8.66	96.74%
Greece	2.79%	55.80	-90.72	145.3%

Note: Shortfall (€ billion) is the amount required to reach the 95% debt threshold.

To quantify the shortfall, we set the upper boundary for a desirable debt-to-GDP ratio at 95%. For our purposes, this implies that the debt write-down should bring Italy, Belgium, Portugal, Ireland, and possibly Greece and Cyprus, to below the 95% debt-to-GDP ratio threshold. In the table, the penultimate column reports an estimate of how many billion euros short we would be of reaching the boundary of the 'safety zone' (a minus sign signifies a shortfall).

For estimates for the pessimistic scenario of €800 billion of seigniorage revenues, see Section 2.

Appendix B: Calculation of the haircut for GDP bonds

We assume that the bonds are priced by investors whose aggregate consumption is equal to GDP and whose utility over consumption is time-additive with constant relative risk aversion coefficient γ. We consider first the case where the bonds have one-year maturity. Their price is

$$P_0 = E\left[\frac{u'(c_1)}{u'(c_0)}X_1\right],$$

where P_0 is the price at year zero, X_1 is the payoff in year 1 described in Figure 5, and c_t is consumption in year $t = 0,1$. Under CRRA utlility,

$$\frac{u'(c_1)}{u'(c_0)} = \frac{c_1^{-\gamma}}{c_o^{-\gamma}} = (1 + g_1)^{-\gamma}.$$

Denoting by C the maximum value of the payoff X_1 in Figure 5, we can write X_1 as

$$X_1 = \begin{cases} 0 \text{ for } g_1 < \underline{g}, \\ C\dfrac{g_1 - \underline{g}}{\overline{g} - \underline{g}} \quad \text{for } \underline{g} \le g < \overline{g} \\ C \text{ for } \overline{g} \le g_1. \end{cases}$$

Combining the three equations above, and using the log-normality of $1 + g_1$ we can write the price P_0 as

$$P_0 = \frac{1}{\sqrt{2\pi}}\int_{z_1}^{z_2} e^{-\gamma(\mu+\sigma z)} C\frac{e^{\mu+\sigma z} - 1 - \underline{g}}{\overline{g} - \underline{g}} e^{-\frac{z^2}{2}} dz + \frac{1}{\sqrt{2\pi}}\int_{z_2}^{\infty} e^{-\gamma(\mu+\sigma z)} C e^{-\frac{z^2}{2}} dz.$$

where we set $\log(1 + g_1) \equiv \mu + \sigma z$ for a standard normal random variable z, and

$$z_1 \equiv \frac{\log\left(1 + \underline{g}\right) - \mu}{\sigma},$$

$$z_2 \equiv \frac{\log(1 + \overline{g}) - \mu}{\sigma}.$$

Denoting by $\Phi(.)$ the cumulative distribution function of the standard normal distribution, we can write the above integral as

$$P_0 = Ce^{-\gamma\mu+\frac{1}{2}\gamma^2\sigma^2}\left[\frac{e^{\mu+\frac{1}{2}(1-2\gamma)\sigma^2}}{\overline{g}-\underline{g}}[\Phi(z_2+(\gamma-1)\sigma)-\Phi(z_1+(\gamma-1)\sigma)]\right.$$
$$\left.-\frac{1+\underline{g}}{\overline{g}-\underline{g}}[\Phi(z_2+\gamma\sigma)-\Phi(z_1+\gamma\sigma)]+[1-\Phi(z_2+\gamma\sigma)]\right].$$

The price of a bond that pays C always in full can be derived from the above expression by setting $z_1 = z_2 = -\infty$, and is

$$P_0^* \equiv Ce^{-\gamma\mu+\frac{1}{2}\gamma^2\sigma^2}$$

The haircut h in Table 7 can be derived from the two equations above by

$$h = 1 - \frac{P_0}{P_0^*}.$$

When bonds have maturity longer than one year, the above calculation can be done separately for each coupon or principal payment because consumption growth is independent across years.

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