Rethinking the European monetary union

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Introduction

The question presented

The question posed by the Wolfson Economics Prize has been defined as follows:

"If member states leave the Economic and Monetary Union, what is the best way for the economic process to be managed to provide the soundest foundation for the future of growth and prosperity of the current membership?"

In addition, six specific aspects of the broader issue have been outlined:

1. The optimum monetary reconfiguration.
2. Implications for sovereign debt, private savings, and domestic mortgages.
3. Implications for international contracts denominated in Euro.
4. The effects of the stability of the banking system.
5. Approaches to transition.
6. The institutional implications.

Each of these aspects involves complex issues in its own right, and it is not feasible to deal comprehensively with all aspects in a single paper. As a result, we focus our energies on what we feel are the most important areas, especially those areas where we believe we have something new to add to the process and policy debate.

The goal of our paper

The goal is to *provide truly practical solutions* to the problems the Eurozone is currently facing, with policy recommendations meant to maximise growth and prosperity while taking into account economic, legal and political constraints.

We seek to *move beyond a conceptual discussion* whenever possible, providing quantitative estimates of the size of the forces actually at play. Such quantification is needed to make sound policy choices to the benefit of the citizens in the Eurozone and beyond.

A number of important parameters needed to conduct a detailed applied macro analysis cannot be obtained through official statistics. To overcome this obstacle in the empirical analysis of Eurozone break-up, *we construct our own datasets,* which are presented in detail in appendices and summarised in the main text. Specifically, we create two novel data sets:

- The first data set provides a *detailed breakdown of Euro-denominated assets by legal jurisdiction*.

- The second data set provides estimates of *foreign currency external liabilities for Eurozone countries following exit from the EMU.*

The main aim of our paper is to address the challenges European policymakers are currently facing. A serious and detailed cost-benefit analysis of various forms of break-up has so far been missing from the debate, and we try to fill this gap. Our concrete approach allows us to dispel the myth that any type of break-up is necessarily devastatingly costly and should be avoided by all means. Rather, we elaborate on how to mitigate the fall-out from single country exits and other forms of limited break-up. Since any form of break-up, much like entry, involves ultimately political decisions, we attempt to address practical methods by which policymakers and other stakeholders can minimise the cost and disruption from the large undertaking of exit, redenomination, and devaluation in a way that ensures a return to growth and stability.

The structure of the paper

PART I of the paper contains three chapters dealing with *Europe's challenge and how to analyse it:*

In **Chapter 1**, we outline *the key choice ahead for Europe*, focusing on the Eurozone's fundamental choice between further integration or a break-up, whether limited or complete.

In **Chapter 2**, we proceed to discuss *why a break-up of the Eurozone has no precedent*. We show that there are essentially no comparable episodes in history, even if there have been many currency dissolutions. We emphasise the special and important issues associated with the Euro's role as an international currency.

In **Chapter 3**, we extract guiding principles for redenomination from *legal analysis*. Certain legal constraints are binding, and we set the stage for relevant applied macro analysis of heretofore obscure issues associated with break-up. We highlight that the large size of various foreign law exposures is critically important in determining key macroeconomic effects in a break-up.

PART II of the paper has four chapters focusing on *optimal reconfiguration:*

In **Chapter 4**, we define a *framework for analysing optimal reconfiguration in the current crisis setting,* to justify the purpose of exit and redenomination. We emphasise both the importance of maximising the benefits of devaluation and minimising the costs from financial losses and political fall-out.

In **Chapter 5**, we analyse negative *balance sheet effects* from external liabilities in foreign currencies following exit from the EMU (based on the guiding principles for redenomination).

In **Chapter 6,** we estimate the *spill-over effects* to remaining EMU countries from exits (based on the guiding principles for redenomination).

In **Chapter 7**, we summarise our findings in the context of *overall costs and benefits associated with various break-up scenarios*, and outline the *ex post optimal configuration*.

PART III of the paper has two chapters that address *managing the transition,* focusing on the key policy steps ahead of and immediately after a limited or full-blown break-up, with the goal of achieving the optimal reconfiguration as set out in part II:

In **Chapter 8**, we discuss *preparedness and contingency planning*, stressing the importance of adopting a risk management approach to possible break-up scenarios in minimising transition cost.

In **Chapter 9**, we turn to *managing exit and capital flight*, stressing that capital flight is a difficult problem to solve but is not a binary process, and we propose measures to reduce it.

PART IV of the paper contains two chapters with *conclusions*:

In **Chapter 10**, we summarise key policy insights and proposals from the previous chapters, by highlighting seven specific elements of our analysis.

In **Chapter 11**, we present a synthesis of how to *rethink the European monetary union.*

Beyond the main text, we provide considerable additional detail in various appendices, including background information on detailed data construction and data analysis.

Since we wanted to discuss the above mentioned issues in detail, there are other relevant areas that we do not cover, mainly due to space limitations. These include the process for dissolution of the ECB in a full-blown break-up, optimal monetary policy strategies for newly independent national central banks, the nature and legal basis for fiscal and political union for the remaining Eurozone countries, and other post-exit macro policies to ensure maximum stability and growth.

Terminology

We use the term *Eurozone* to describe the institutional construct whereby, currently 17 countries are joined together by a common monetary policy, a common currency, and other elements of coordinated economic policy. We use *EMU* interchangeably with Eurozone (i.e., we do not use EMU to refer to the signatories to the treaty which formed the basis for the introduction of the Euro).

GIIPS stands for Greece, Ireland, Italy, Portugal and Spain.

We use the term *exit* to describe individual countries departing from the Eurozone (i.e. a limited break-up).

We use the term *full-blown break-up* to describe a situation where all Eurozone countries move back to national currencies, the Euro ceases to exist and the ECB is dissolved.

We use the term *current membership* to refer to the current currency union members, as they are the parties most central to the question.

TFEU stands for the Treaty on the Functioning of the European Union.

Acknowledgements

Part I:
Europe's challenge
and how to analyse it

Chapter 1:
The big choice ahead for Europe

Before we turn to the practicalities of various Eurozone break-up scenarios, it is useful to think about the basic choice Europe, and the Eurozone in particular, is currently facing. This is a historical time. European policymakers will need to make important decisions one way or another about how to deal with the challenges posed by the tensions within the EMU. It is a basic choice between increased integration or a form of break-up.

The European monetary union was never an optimal currency area in an economic sense, at least not based on standard criteria as spelled out in the literature on the subject (Bayoumi et al. 1992; Takagi et al. 2003). The process around the introduction of the Euro was designed in order to allow economic convergence to happen ahead of Euro adoption. The convergence criteria spelt out were meant to be filtering mechanisms, which only admitted countries when they were deemed suited to give up monetary independence.

In reality, however, political considerations dominated. The Maastricht criteria for economic convergence were repeatedly overruled: Italy entered the European Monetary Union and adopted the common currency at its outset despite having much higher government debt than the 60% limit spelt out in the convergence criteria. Meanwhile, Greece joined the common currency in 2001, despite having broken a number of entrance criteria, including criteria pertaining to deficit and debt levels.

Policymakers and some economists hoped that the currency union itself would be a catalyst for convergence (Frankel 1997) so that even if member countries were not suitable ex ante, they would be suitable ex post, once the common currency had been in effect for some time. That was the theory at least, although there was also plenty of academic research questioning this logic (Krugman 1993). In the end, the political dimension – the desire to see additional European integration for reasons beyond the pure economic – dominated.

Academic research pointed out the weaknesses in the institutional setup from the outset and the dangers involved from a forward-looking perspective. Most importantly, while the EMU worked with a common central bank (the ECB), it did not have a common Treasury. There was no common fiscal body that could work towards smoothing out asymmetric shocks facing member countries. This was a departure from the norm of most successful currency unions, such as the United States, Canada or Switzerland. In addition, the ECB's role as a lender of last resort was not well defined. In fact, the founding treaties explicitly prohibited the ECB from taking on such a role, as it was perceived as inflationary and undemocratic for the ECB to provide financing for individual states in a system of independent sovereign nations.

Initially, these institutional weaknesses were not particularly visible in the functioning of the EMU. The first ten years of the Euro were generally regarded as successful (Trichet 2008); Eurozone financial markets were generally well-behaved in the initial years after the launch, and the ECB managed to gradually build credibility as an inflation-focused central bank.

The global financial crisis, which hit global markets and the global economy particularly hard from 2008, tested this structure of the EMU in an unprecedented way. The initial epicentre was the US subprime market, which shocked the Eurozone through leveraged vehicles like synthetic CDOs. Eventually, however, the crisis became more Europe-centred due to sovereign debt concerns and continued banking sector instabilities. Initially, the deleveraging happened on a broad basis, across essentially all Eurozone countries. Later, a clear pattern of divergence started to become clear. In 2010, the deleveraging process continued in countries in the Eurozone periphery, while economic

performance normalised in core Eurozone countries, especially in Germany. Soon tension concentrated in Greece permeated vulnerable Eurozone countries, and bond spreads widened dramatically in a number of countries. European policymakers responded with a strategy based primarily on fiscal austerity, coupled with a number of short-term lending facilities, to fill the gap from the disappearance of market-based financing options. To tide the markets over, the ECB began its Securities Market Programme to purchase government debt.

This austerity-based strategy is now being tested at its core. In Greece, the strategy never yielded the desired results, as primary deficits and growth continued to lag set targets. The failure of the strategy necessitated a debt restructuring (partial default) in March 2012; a possibility European policymakers had fully ruled out less than two years earlier.

The policy decisions themselves have also taken a toll. In particular, the damage inflicted on investors from the Greek PSI would have been far less (and far less discriminatory) had a default happened in 2009 when market access was denied. Official sector financing has subordinated most debt holders. Moreover, the legally questionable decision to treat the ECB differently from other bond holders on its own holdings of Greek debt has made this subordination problem explicit and has potentially limited the ability of the ECB to intervene in bond markets in the future (unless it effectively guarantees solvency of the sovereign). Meanwhile, the ECB's decision to flood the market with LTRO money in late 2011 and February 2012, although it helped banks to refinance their coming redemptions via repos with the ECB, has prompted many banks to take advantage of the so-called 'carry trade' and load up on sovereign debt that was funded from the ECB. This then has inextricably linked stable banks to weak sovereigns and limited the ability of policymakers to intervene in more strategic ways.

Some would argue that special circumstances, such as those around particularly weak processes for tax collection in Greece, may have played a role in the Greek failure to achieve successful fiscal stabilisation. This type of argument is substantially weakened, however, by recent developments in countries such as Spain. Despite attempting a fairly ambitious program of expenditure cuts, revenue increases, and structural reforms, the Spanish austerity program has also run into trouble over the past year. Fiscal targets for 2011 were missed by a wide margin and deficit targets for 2012 were unilaterally adjusted higher by Spain in a departure from the agreed process. Meanwhile, the Spanish unemployment rate is skyrocketing on the back of the deepening recession (it reached a record high of 24.4% in the first quarter of 2012).

Developments in Spain have been the catalyst for a clear shift in the debate: widespread doubts about the viability of the current austerity strategy are now being expressed in the peripheral countries and elsewhere. Importantly, the recent election results in France and Greece can be viewed as signals of growing opposition to the austerity focused approach.

The escalating Eurozone crisis has exposed the flaws in the design of the European monetary union. As a result, European policymakers are now facing a historical dilemma: how to remedy the institutional setup in order to secure lasting stability and growth while maintaining the democratic legitimacy of the European project.

There are two fundamentally different possible remedies:

- *Increased integration*, including elements of a fiscal union with sufficient capacity to undertake transfers large enough to counter the effects of asymmetric shocks.
- *Disintegration in the form of break-up of the Eurozone*, allowing countries to return to independent monetary policy and to regain competitiveness through currency depreciation.

The path chosen so far by policymakers is neither toward significant additional integration (fiscal union) nor toward disintegration (break-up). Elements of moderate additional integration have been undertaken with implicit fiscal transfers allowed under strict conditionality (austerity) but with serious capacity constraints that keep these institutional arrangements from being permanent fiscal transfer mechanisms.

The current path of austerity may be approaching a dead-end. It appears to have exacerbated the challenges involved in an already painful deleveraging process in certain countries. At a minimum, the process has lost credibility that will be hard to regain, and this confidence crisis will add to the costs involved in the process overall, including significant loss of output and rising unemployment.

The implication of dwindling investor confidence and increased financial market instability is that European policymakers will soon have to take a stance about the fundamental direction of the Eurozone: more or less integration? If the political backing for additional integration is not there, the only viable alternative is a form of break-up.

The possibility of any form of break-up was entirely dismissed by policymakers up until the end of 2011. While and policymakers are increasingly embracing the possibility of a Greek exit[1], a full-blown break-up remains largely a taboo topic.

In this context, it is worth stressing that it is possible to have a limited break-up, involving exits of a limited number of countries, while increasing integration within the remaining Eurozone member countries. In fact, tension around a break-up could well be a catalyst for an additional important step toward integration, including some degree of fiscal union.

Regardless, there is clearly increasing likelihood of some form of break-up, and it is time to think hard about how to manage the process in the best way possible.

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[1] Following the first round of the Greek election in early May, we have even had reports that Eurozone governments are making contingency plans for a Greek exit from the Euro at the national level.

Chapter 2:
Why a Eurozone break-up has no precedent

If we look back long enough, there are plenty of examples of currency unions which have failed. The more recent examples include the break-up of the Czechoslovak currency union in 1993 and the break-up of the Rouble-zone from 1991-93[2]. In this Chapter, we outline why a break-up of the Eurozone is a truly unprecedented event. As a result, inference based on previous currency union dissolutions in history must be made with great caution.

In thinking about the issues facing the Eurozone, it is natural to try to learn from the history of previous currency union break-ups. However, upon closer inspection, there are a number of important differences between the situation the Eurozone is facing now and the situations other currency unions on the verge of break-up faced in the past. This does not mean that history cannot provide any important lessons, but it does imply that one needs to be very careful in drawing general conclusions based on economic trends that characterised previous break-ups[3].

There are three main reasons why it is difficult to use past experiences with currency union break-ups as a template for developments in the Eurozone today:

- The relative size of the Eurozone economy and its financial markets
- The degree of financial development in the Eurozone
- The Euro's role as an international currency

Below, we discuss these three aspects of the Eurozone that render its break-up irreconcilably different.

The size of the Eurozone economy and its financial markets

In terms of its economy and financial markets, the Eurozone plays an important role globally, especially as compared to past break-up countries. The Eurozone nations currently account for roughly 20% of global GDP (measured in current US dollars at the market exchange rate), with GIIPS countries alone accounting for 6.7% of global output.

In the chart below, we compare the size of the Eurozone economy to the economic size of past currency unions that faced break-ups, by looking at their share of world GDP at the time of break-up. Figure 2.1 clearly illustrates that the Eurozone stands out in terms of economic importance as measured by GDP (size of the bubble), accounting for an unprecedentedly large share of the global economy compared to previously disassembled currency unions.

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[2] In Box 2.1, we show a list of 67 examples of currency union break-ups spanning the period from 1918 to today, along with data we have collected on the size of these economies in relation to world GDP at the time of break-up and the level of GDP per capita in real terms at the time of the break-up.
[3] The breadth of literature analysing past currency union break-ups is not large, but the key papers include Bordo et al. (1999), Bordo (2010), Nitsch (2004) and Rose (2007). The problem with applying these historical studies to the question at hand, however, is that past currency union break-ups typically involve countries which had a fundamentally smaller impact on global markets and economies than would the Eurozone today. In general, most past examples involve very small countries, with limited financial development. This means that any direct comparison with Eurozone countries will be somewhat inaccurate.

Figure 2.1: Timing, size and level of development in past currency union break-ups
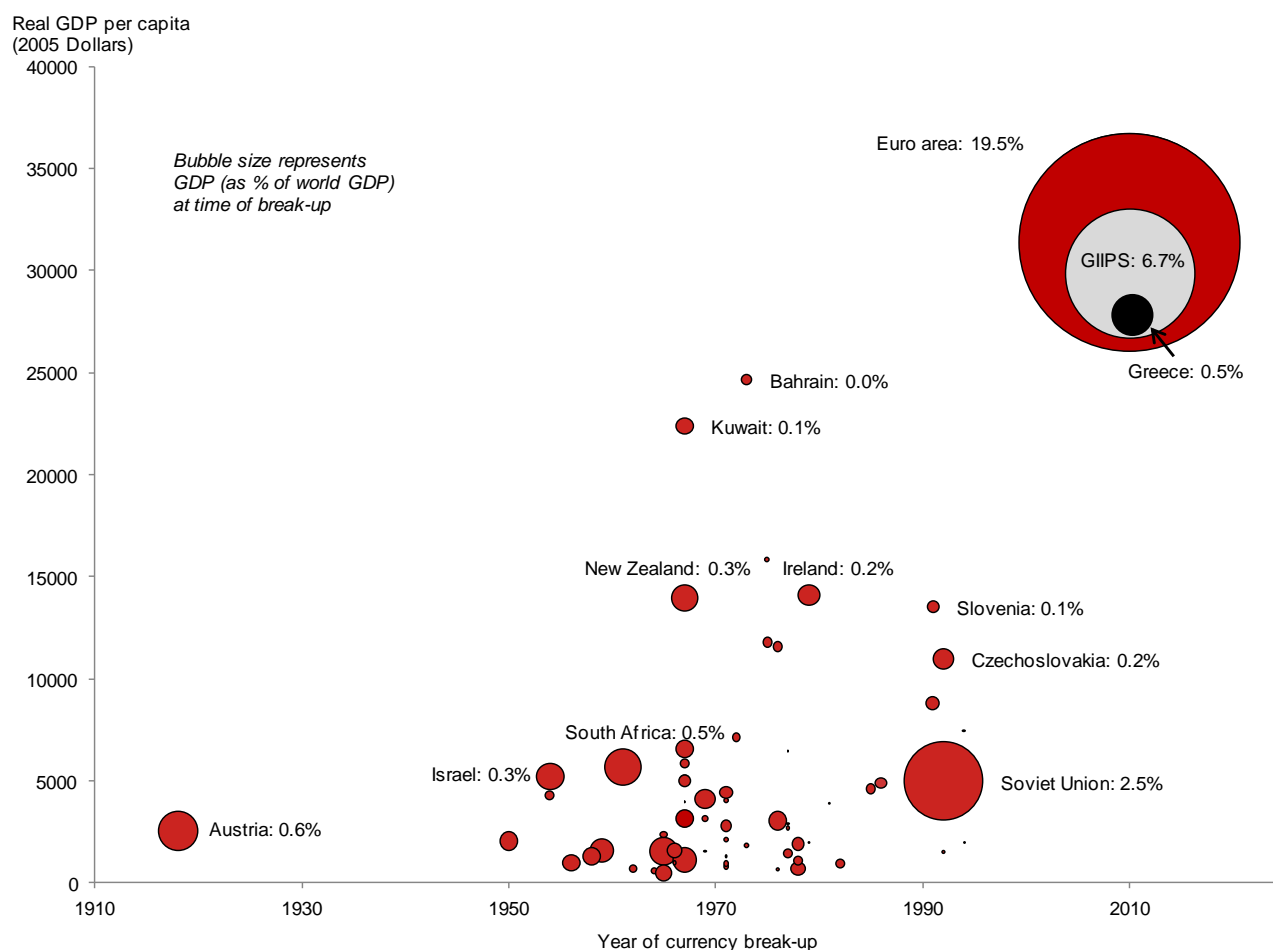
Note: Size of bubbles reflects GDP as a share (%) of world GDP at the time of break-up. GDP per capita at the time of break-up is measured in 2005 Dollars, and we have included a full-blown Eurozone break-up, a limited break-up involving only GIIPS countries, and a unilateral Greek exit in 2012 for illustrative purposes. Due to data restrictions, Austria is the only country included from the Austro-Hungarian break-up.

Source: Authors' calculations, Penn World Tables, World Bank, Peterson Institute for International Economics, CIA World Factbook

Around the time when the Soviet Union was disintegrating and the Rouble-zone broke down, the Soviet region accounted for only 2.5% of global GDP. This is the largest share of world GDP in our list of previous currency union break-ups, but is just 1/3 of the size of the current GIIPS country economies relative to current world GDP. Economic output, however, is only one metric of the importance of the Eurozone in the global economy. If we look at the size of Eurozone financial markets, we will find that the relative importance of the Eurozone is even greater. For example, Eurozone banks account for 35% of global bank assets and for 34% of global cross-border lending[4]. Conversely, the Soviet Union was not very integrated in the global financial system at the time of its currency union break-up. This helps to explain why there were limited global implications from that currency separation process, but it also highlights that the situation in the Eurozone today is very different, considering the size of the economies and their importance in financial markets from a global perspective. The table below further illustrates that economic and financial market disturbances in the Eurozone have important global implications, which have generally not carried nearly the same weight in past currency union break-ups.

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[4] One could perhaps argue that this figure is partially distorted by cross-border lending within the Eurozone itself.

Figure 2.2: Financial and economic positions of previous currency union break-ups

	Previous 67 currency union break-ups (averages)	GIIPS	Eurozone
Share of world:			
GDP	0.1%	6.7%	19.5%
Debt market	-	8.6%	19.8%
Equity market	-	2.4%	9.6%
Banking system			
Assets	-	6.6%	35.0%
Cross-border positions	-	8.2%	33.9%
GDP per capita (2005 prices)	5885	29946	31392

Note: World measure of debt market adopted from McKinsey survey based on data from Dealogic, BIS, SIFMA, S&P, and McKinsey proprietary analytics.

Source: Authors' calculations, World Bank, Bloomberg, BIS, The Penn World Tables, Peterson Institute for International Economics, CIA World Factbook

The degree of financial development in the Eurozone

The large size of Eurozone financial markets is not only a function of the economic girth of the region; it is as much a function of the very high degree of financial development in the region[5]. It is hard to compare the degree of financial development in the Eurozone with that of regions which experienced currency union break-ups in the past. One simple and available proxy we can use is a measure of GDP per capita in inflation-adjusted terms. The y-axis in Figure 1 displays real GDP per capita for the currency unions in our sample. It is clear that the Eurozone stands out in this metric (as it did in its size). To be specific, the real GDP per capita in the Eurozone is about 5 times as high as the average observed in previous examples of currency union break-ups in our sample. Since leverage is generally a rising function of income, the difference in financial leverage between the Eurozone today and past experiences of currency union break-up is likely to be even more pronounced than the real GDP per capita proxy would suggest.

Moreover, there are going to be significant differences between a break-up of the Eurozone and past currency union break-ups in relation to capital mobility[6]. In turn, new circumstances govern the risk of capital flight in this break-up scenario; staggeringly more mobile capital would create transition costs exponentially higher than those in historical examples.

The Euro's role as an international currency

Finally, we want to stress that the Euro's role as an important international currency raises new issues associated with a break-up that have not been in play in earlier periods of currency union break-up. There are many facets to the Euro's international role—it accounts for 25% of global foreign currency reserves, it is widely used in global debt capital markets (including outside the jurisdiction of the Eurozone countries), and finally there are tens of trillions of Euro-denominated derivatives contracts which are subject to English and New York law.

The relevance of the Euro's international role is especially clear in the case of a full-blown break-up, where the Euro ceases to exist. In such a scenario, there would be no precedent for how to redenominate tens of trillions of international law contracts into new currencies. In the absence of a

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[5] Indeed, financial development was an explicit ex ante goal. One of the arguments for creating the Eurozone was that it would see an integration of financial markets, leading to improved liquidity and efficiency.
[6] This is partly due to advances in technology, which have made cross-border movement of capital extremely easy. The regulatory environment is also important, since capital movement is unrestricted within the Eurozone (as stipulated in the founding treaties).

carefully considered plan for dealing with the unprecedented redenomination issues, this scenario could freeze the global financial system and create very large legal and economic transition costs.

The international aspect of the Euro also raises issues in a limited break-up scenario in which the Euro lives on in some form. To address these issues, we examine the widespread international use of the Euro through two lenses:

The Euro's global share in:

- **International currency reserves:** Recent COFER data from the IMF suggests that 25% of global reserves are denominated in Euros.
- **Official sector deposits:** 19% of global central bank deposits are Euro-denominated, according to the BIS.
- **Cross-border loans:** The BIS also reports that 34% of all cross-border bank loans are denominated in Euros, although this figure includes intra-Eurozone cross border activity.
- **Global FX market turnover:** 39% of FX market turnover involves the Euro, according to the BIS's tri-annual survey.

The foreign law share of Euro denominated instruments:

- **Sovereign bond issuance in the Eurozone:** 7% of sovereign bonds issued in the Eurozone are issued under foreign law, according to our calculations described in Appendix II.
- **Non-sovereign bond issuance in the Eurozone:** A more substantial 30% of non-sovereign bonds are issued under foreign law, according to our calculations described in Appendix II.
- **Euro denominated derivative contracts:** The foreign law share of Euro denominated derivatives amounts to around 95%, according to informal sampling done by the authors.

From either perspective, the Euro is inextricably intertwined with global markets. The Euro is a principal reserve and trading currency and a significant portion of securities issuance in Euro is completed under foreign law. This issue is not unique to the Eurozone. For example, it has been common for decades for emerging countries to issue bonds under foreign law. However, the size of this issue in the Eurozone has no homolog. As we outline in detail in Chapter 5, the magnitude of foreign law external liabilities for Eurozone countries exceeds – by a wide margin – what has been the norm in other countries in the past. This means that balance sheet effects associated with redenomination and currency depreciation are potentially of magnitudes larger than we have seen in past currency separation examples, with important implications for growth.

What we can and cannot learn from history

In addition to the specific issues quantified above, there are at least two broader differences. First, a disorderly break-up process could make it difficult to continue to cooperate at the EU level, and could lead to a reversal of decades of trade integration. Such an unwinding of achievements of the EU is likely to be highly destructive to European economic performance, and is a consideration which cannot be appreciated by looking at historical examples of currency union dissolutions.

Second, there is also the broader issue of the unprecedented level of indebtedness in developed market countries, including the Eurozone countries. This creates new challenges that need to be incorporated into the analysis and for which history offers no good 'event studies'.

These differences do not mean that an understanding of historical experiences is not helpful. Many of the underlying fundamental economic issues are the same, even if key parameters are different in the context of the Eurozone. In addition, there may be specific lessons which remain applicable for the Eurozone, such as those relating to the logistics around the introduction of new notes, for example.

But one must be cautious when applying the experience around past currency union break-ups. There are a number of reasons why a break-up of the Eurozone entails entirely different and more complex issues than post currency union break-ups, and could create much more severe damage to the economies of member states, if not managed efficiently and thoughtfully.

In the following chapters, we will zero in on a number of these special issues, including the prevalent use of the Euro in international contracts, the outsized balance sheet effects associated with Eurozone break-up, the potential cost associated with breakdown in political cooperation, and special challenges with regard to transition.

Box 2.1: Historical currency union dissolutions

This currency union break-up list contains 67 countries that experienced an exit from a currency union (1918- present), based on a list constructed by Andrew K. Rose in his study entitled Checking Out: Exits from Currency Unions (2007). In addition to the countries in his list, we also consider the Austro-Hungarian break-up of 1918 and the Rouble-zone break-up of 1992. Eurozone aggregate figures include all 17 countries currently using the Euro as their currency.

Country	Year of break-up	GDP (% of world GDP)	Real GDP per capita (2005 Dollars)	Country	Year of break-up	GDP (% of world GDP)	Real GDP per capita (2005 Dollars)
Algeria	1969	0.2%	4092	Macedonia	1992	0.0%	6266
Angola	1976	0.1%	3009	Madagascar	1982	0.0%	914
Austria	1918	0.6%	2555	Malawi	1971	0.0%	778
Bahrain	1973	0.0%	24642	Mali	1962	0.0%	708
Bangladesh	1965	0.3%	1541	Malta	1971	0.0%	4015
Barbados	1975	0.0%	15866	Mauritania	1973	0.0%	1807
Bosnia and Herzegovina	1992	0.0%	1521	Mauritius	1967	0.0%	5112
Botswana	1977	0.0%	2695	Morocco	1959	0.2%	1572
Burundi	1964	0.0%	597	Mozambique	1977	0.0%	1438
Cape Verde	1977	0.0%	2900	New Zealand	1967	0.3%	13962
Comoros	1994	0.0%	1979	Nigeria	1967	0.2%	1108
Croatia	1991	0.1%	8810	Oman	1975	0.0%	11771
Cuba	1950	0.1%	2046	Rwanda	1966	0.0%	953
Cyprus	1972	0.0%	7142	Sao Tome and Principe	1977	0.0%	6473
Czechoslovakia	1992	0.2%	10980	Seychelles	1967	0.0%	3972
Dominican Republic	1985	0.0%	4574	Sierra Leone	1965	0.0%	2366
Equatorial Guinea	1969	0.0%	1549	Singapore	1967	0.1%	4974
Eurozone	**N/A**	**19.5%**	**31392**	Slovenia	1991	0.1%	13533
Gambia	1971	0.0%	1303	Solomon Islands	1979	0.0%	1963
Ghana	1965	0.1%	507	Somalia	1971	0.0%	934
GIIPS	**N/A**	**6.7%**	**29946**	South Africa	1961	0.5%	5699
Guatemala	1986	0.0%	4874	Soviet Union	1992	2.5%	5004
Guinea	1969	0.0%	3169	Sri Lanka	1966	0.1%	1570
Guinea-Bissau	1976	0.0%	666	Sudan	1956	0.1%	976
Guyana	1971	0.0%	2121	Suriname	1994	0.0%	7435
Iraq	1967	0.1%	3164	Tanzania	1978	0.1%	675
Ireland	1979	0.2%	14091	Tonga	1991	0.0%	5631
Israel	1954	0.3%	5207	Trinidad & Tobago	1976	0.0%	11565
Jamaica	1954	0.0%	4257	Tunisia	1958	0.1%	1291
Jordan	1967	0.0%	5833	Uganda	1978	0.0%	1072
Kenya	1978	0.1%	1905	Vanuatu	1981	0.0%	3872
Kuwait	1967	0.1%	22409	Zambia	1971	0.1%	2801
Libya	1967	0.1%	6545	Zimbabwe	1971	0.1%	4426

Note: Statistics represent values at time of break-up. See Chapter 2, Footnote 1 for more detail on data compilation.

Source: Authors' calculations, Rose (2007), Penn World Tables, World Bank, Peterson Institute for International Economics

Chapter 3:
Guiding principles for redenomination:
Legal aspects

While monetary unions have come and gone, it is clear that none were as closely legally and financially intertwined as the Eurozone. In addition, the Euro has become a major means of settlement for international contracts. This adds significant complexity to the redenomination process. Just which Euros stay Euros and which will be redenominated? Or even more puzzlingly, what should happen if the Euro ceases to exist? Solving the redenomination puzzle starts with looking at the legal underpinnings of the Euro and the universe of obligations and assets on various balance sheets. Extracting the guiding principles for redenomination, based on legal analysis, is a necessary first step in quantifying key parameters for macroeconomic analysis of break-up.

Key legal parameters in the redenomination process

There are a number of legal parameters which will have a strong influence on the process of redenominating financial instruments, including bonds, loans and deposits.

The **first legal parameter** to consider is the *legal jurisdiction of an obligation*.

During the introduction of the EUR, it was common to have currency clauses in contracts which explicitly tied the contract to a governing jurisdiction. A standard form for this clause would be "*Payment is to be made in EUR or the currency of <sovereign> from time to time under <country> jurisdiction*". These clauses are far less frequent now, and it is common instead to state that the currency must be EUR without tying it to one specific jurisdiction.

Nonetheless, we can establish:

- If the obligation is governed by the *local law* of the country which is exiting the Eurozone, then that sovereign state is likely to be able to convert the currency of the obligation from EUR to the new local currency (through a new currency law).

- If the obligation is governed by *foreign law*, then the country which is exiting the Eurozone cannot by its statute change a foreign law[7].

The **second legal parameter** to consider is the *method* for break-up. Is the method a legal or a multilateral framework, or is it done illegally and unilaterally? The method of break-up has different consequences in terms of international recognition. Specifically, it may be important to distinguish between *lawful and consensual withdrawal* versus *unlawful and unilateral withdrawal*

The **third legal parameter** to consider is the *nature of the break-up*, and what it means for the existence of the Euro as a functioning currency going forward. There are many possible permutations, but they can be grouped into two main categories:

- *Limited break-up: Exit of one or more (likely smaller) Eurozone countries*. In this scenario, the Euro will likely remain in existence.

- *Full-blown break-up*: In this scenario, the Euro would cease to exist, the ECB would be dissolved, and all existing Eurozone countries would convert to new national currencies or form new currency unions with new currencies and new central banks.

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[7] If there is no currency clause explicitly tying payment to the law of any one country, then it may be up to the courts to determine the implicit nexus of contract. This is an example of one of many special considerations, as discussed in detail in Appendix I.

This leaves a matrix of scenarios to consider, depending on legal jurisdiction, method of break-up and nature of break-up.

Figure 3.1: Redenomination risk on Eurozone assets

Securities/ Loans/ Obligations	Limited Break-up Scenario: Euro remains currency of core Eurozone countries		Full-blown Break-up Scenario: Euro ceases to exist
	Unilateral withdrawal	**Multilaterally agreed exit**	
Governed by International Law	**No redenomination: Euro remains currency of payment** (except in case of insolvency where local court may decide awards).	**Mostly no redenomination: Euro remains currency of payment but certain EUR contracts could be redenominated using Lex Monetae principle** (except in case of insolvency where local court may decide awards).	**Redenomination into:** *– Local currencies by applying Lex Monetae principle* *– ECU-2, if directive* *– Hard currency (USD, GBP, etc.) at court determined exchange rate if no legislative or EU directive*
Governed by Local Law	*Redenomination into new local currency* *(through change in local currency law, unless not in the interest of specific sovereign)*		

For obligations issued under *local law*, it is almost certain that redenomination into new local currency would happen, through a new currency law. This is the case regardless of the method and nature of the break-up (unilateral, multilaterally agreed, and full blown break-up scenario). For example, Italian bonds, issued under local Italian law, are highly likely to be redenominated into a new Italian currency if Italy exits the Eurozone.

For obligations issued under *foreign law*, the situation around redenomination is more complex. We will go into more detail in Appendix I. But it is helpful initially to highlight the big picture:

Limited Eurozone break-up:

- **Unilateral withdrawal** and no multilaterally agreed framework for exit: foreign law contracts are highly likely to remain denominated in Euros. For example, Greek Eurobonds issued under UK law should remain denominated in Euros.

- **Exit is multilaterally agreed**: there may be certain foreign law contracts and obligations which could be redenominated into new local currency using the *Lex Monetae* principle, if the specific contracts in question have a very clear link to the exiting country. However, the large majority of contracts and obligations are likely to stay denominated in Euros.

Full blown Eurozone break-up:

In a scenario where the Eurozone breaks up in its entirety and the EUR ceases to exist, contracts cannot for practical purposes continue to be settled in Euros. In this case, there are three basic solutions.

1. **Nexus to one country:** Obligations are redenominated into new national currencies by application of the Lex Monetae principle. There is also significant rationale for the legal basis of the argument of Impracticability or Commercial Impossibility. The more common

concept of Frustration of Contract is unlikely to apply (Proctor 2010), since payment is always possible.

When no specific nexus is established to a country which previously used the EUR, (and thus the Lex Monetae principle cannot be used), the following measures could be taken:

2. **No specific nexus- Legislative:** An EU directive could be implemented ensuring that existing EUR obligations are converted into a new European Currency Unit (ECU-2), reversing the process observed for ECU-denominated obligations when the Euro came into existence in January 1999. This directive would be applied in EU courts (e.g., UK courts).

3. **No specific nexus- Judicial:** Failing legislative guidance, Euro obligations could be settled in the (hard) currency of the contract, such as GBP or USD, as per terms implicit in English and NY Law contracts, with exchange rates as determined by directive by legislation or by Courts. As we detail in Appendix I, there is even case law providing precedent for such a solution.

The practical importance of foreign law financial instruments

As we show in detail in Appendix II, Euro denominated exposure in foreign law contracts is very large. The main buckets of foreign law Euro denominated instruments can be broken down as follows:

- **Bonds**: Around EUR2 trillion foreign law bonds, including government, financial and non-financial bonds.

- **Loans**: Around EUR3.8 trillion in foreign law cross-border Euro-loans globally.

- **Currency derivatives**: Around EUR15-25 trillion (predominantly foreign law) in notional amounts outstanding.

- **Interest rate derivates**: Around EUR150 trillion (predominantly foreign law) in notional amount outstanding.

In relation to a full-blown break-up, where the Euro ceases to exist, the size of derivatives exposures governed by foreign law could be particularly important. In relation to limited break-up scenarios (individual country exits), the legal jurisdiction of assets and liabilities such as bonds, loans and deposits will be important in determining *balance sheet effects* associated with currency movements of new national currencies versus the (remaining) Euro around a Eurozone exit.

Applying legal logic to macro-analysis of a break-up

The key message of this chapter is that certain legal and contractual aspects of the redenomination process will be of crucial importance in determining macro-economic outcomes and in guiding policy in order to lessen the impact of an exit or break-up.

Contracts inside the jurisdiction of Eurozone member countries can be changed, as we have seen lately in Greece, where laws governing sovereign bonds were changed to insert collective action clauses in Greek law bonds just before the Greek debt restructuring. On the other hand, foreign law contracts and laws governing such contracts cannot easily be changed. For example, Eurozone governments have little ability to influence English law and almost no ability to influence New York law, both of which matter greatly in the context of global financial contacts. This means that the legal constraints embedded in foreign law financial instruments tend to be binding.

This general framework will apply in connection with individual countries' exit from the Eurozone. Exiting countries will only be able to change domestic legislation, such as domestic currency laws, and thereby redenominate domestic law contracts. Foreign law contracts, on the other hand, will remain largely unaffected and stay in Euros.

In connection with a full-blown break-up, the situation is more complex. Still, it may be feasible to use EU directives to change laws pertaining to the entire EU, including English law. But that is only the case if European leaders can agree. In the absence of EU-wide agreement, it will only be possible to change laws and interpret contracts differently domestically.

As previously stated, the binding legal constraints associated with foreign law contracts matter greatly for macro analysis. As we will outline in the following sections:

- Legal and contractual parameters, particularly the proportion of foreign law liabilities, will determine the size of balance sheet effects in exiting countries with important implications for output dynamics.

- Legal and contractual parameters, especially exposure to local law assets in exiting countries, will determine the magnitude of spill-over effects from exits from the Eurozone through currency losses for banks and other creditors.

In the table below, we show a stylised breakdown of cross border positions grouped according to major assets classes. We highlight in particular the difference between foreign and local law instruments.

Figure 3.2: Classification of a Eurozone sovereign's cross-border positions by legal jurisdiction

External Assets	External Liabilities	
FDI	FDI	
Portfolio equity securities	Portfolio equity securities	
Portfolio debt securities	Portfolio debt securities	Portfolio debt securities
Mortgage instruments/covered bonds	Mortgage instruments/covered bonds	
Other assets, cross-border bank loans	Other liabilities, cross-border bank loans	
Other assets, cross border deposits	Other liabilities, cross border deposits	
Derivatives	Derivatives	
Central bank assets	Central bank liabilities	

(foreign law)	Liabilities noted as local law are subject to redenomination in the case of exit from the Eurozone, whereas foreign law assets and liabilities are likely to stay denominated in Euros.
(local law)	

Note: There are minor exceptions to the general classification outlined in the table. For example, a small proportion of Euro-denominated derivatives is traded under local law and could be redenominated. Moreover, external assets in the form of debt securities could, in special cases, be local law. These issues including exceptions to the general guiding principles for redenomination are discussed in detail in Appendix I. Central bank assets and liabilities would include TARGET2 balances, as well as traditional foreign currency reserves.

The table highlights the following basic points about a given country's external assets and liabilities:

The full range of external assets from FDI assets to central bank assets will generally fall under the jurisdiction of foreign law, with some rare exceptions. It is the liability side that is more interesting, since they consist of a mix of local and foreign law instruments.

Liabilities in the form of FDI, portfolio equity securities, mortgages, and deposits, tend to always be governed by local law (from the perspective of residency of the issuer). For example, a US foreign direct investment in Spain, a Spanish liability according to cross-border positions, will be governed by the local laws of Spain; and a Spanish cross-border deposit in a Dutch bank, a Spanish asset according to cross-border positions, will be governed by Dutch law.

Liabilities in the form of debt securities can be either local or foreign law, depending on the specific bond documentation (as discussed in detail in Appendix I). For example, a German investment in an Italian government bond, will be under the jurisdiction of the specific bond in question, local (if an Italian law bond / BTP) and foreign (if English, or other non-Italian law bond).

Liabilities in the form of cross-border loans (loans from a foreign bank), central bank liabilities, and liabilities in derivative form, tends to be governed by foreign law (from the perspective of the residency of the borrower) including international treaty law (for central bank liabilities). For example, a loan by a Japanese bank to a French corporation, a French liability according to cross-border positions, will be foreign law (likely either Japanese or English law), and a liability in the form of an currency forward agreement between an Italian corporate and a US bank would often by governed by New York law.

This may seem like a minor technical detail of interest mainly to lawyers and other specialists. As it turns out, however, the *legal aspects which guide the redenomination process are crucial for a number of macroeconomic effects* that will play a key role in economic performance following break-up and redenomination.

Part II:
Optimal reconfiguration

Chapter 4:
Framework for reconfiguration
in the current crisis setting

To determine optimal reconfiguration in the current crisis setting, we focus on a framework which emphasises the importance of maximising benefits from devaluation and minimising the spill-over effects from financial losses and political risk. This approach allows us to analyse optimal reconfiguration while taking into account the key constraints imposed by the crisis and existing institutional set-up.

The debate about optimal monetary policy in Europe has often taken place in the context of whether the Eurozone is an optimal currency area (OCA). This discussion and the academic research in the area have typically focused on the variability of output around a (fixed) long-term trend. However, the OCA literature does not address the reconfiguration issue in the current crisis setting.

The key concern today is an escalating crisis, with severe negative implications for output, including real risk of depression dynamics in some countries. Importantly, the crisis has reached a dimension where it may impact longer-term growth in certain countries through sovereign debt default risk, banking sector tensions, political instability and even institutional break-down. In addition, the crisis has triggered notable reform efforts in some countries, rendering past parameters in the OCA literature obsolete in many cases.

The current challenge for policymakers is not to minimise traditional swings in output around an underlying trend; rather, it is to avoid a downward economic spiral—a bad equilibrium path—with elevated risk of continued banking sector tensions, political crisis and depressed long-term growth prospects.

Against this background, we will discuss the issue of optimal reconfiguration of the Eurozone in the context of the parameters which we believe are most important to growth in coming years. These are the parameters that matter most for overall macroeconomic outcomes in the current crisis setting. Consequently, we will not adopt a traditional OCA framework when discussion reconfiguration. Such a framework might have been appropriate ex ante (before the Eurozone was initiated), and it is arguably regrettable that the key results of this literature were ignored when the Eurozone was launched. But it is not a suitable framework ex post, given the special macro-dynamics in a crisis environment and given the large potential adjustment costs associated with dismantling the current structure.

Instead, we adopt a framework focused on maximising positive growth effects from reconfiguration, while minimising negative growth effects. We highlight five specific effects that are crucial in the current setting, taking into account both economic and political constraints involved.

These are not the only effects at play, but they are likely to be among the most important ones. Moreover, focusing on these specific effects allows us to quantify the specific effects, country by country, in the following chapters and accompanying appendices. The five effects can be grouped into two country-specific effects and three Eurozone-wide spill-over effects:

Country-specific effects:

1. **The effect of currency depreciation on output through trade:** *An intermediate goal of optimal reconfiguration should be to allow significantly overvalued exchange rates to adjust, and to permit independent monetary policies to be tailored to boost growth.* The immediate benefit would be to avoid debt deflation, weak output, and deteriorating debt dynamics. This approach would help achieve a more favourable growth path with support from greater financial stability and reduced default risk.

2. **The effect from currency depreciation through balance sheet effects.** *An intermediate goal of optimal reconfiguration should be to reduce negative balance sheet effects associated with currency depreciations.* Given large (implicit) foreign currency external liabilities across Eurozone countries, there is risk of a large negative impulse on output through the balance sheet effect. An optimal plan for break-up would seek to reduce these negative balance sheet effects through market mechanisms (risk sharing/hedging) and through official sector financing initiatives, as well as debt relief, where needed.

Eurozone-wide spill-over effects:

3. **The effect on bank losses from currency depreciation and increased defaults associated with exits***. An intermediate goal of optimal reconfiguration should be to control spill-over effects, to remaining Eurozone countries in order to secure financial stability regionally and globally.* Financial losses linked to break-up dynamics could be significant for banking systems outside the exiting country. A key consideration in the planning process should be to control and manage the fallout, to ensure orderly conditions in financial markets, and to avoid excessive deleveraging and contagion within the financial system.

4. **The effect on sovereign finance from defaults linked to exits.** *An intermediate goal of optimal reconfiguration should be to manage spill-over effects from exits on sovereign finances in remaining Eurozone member countries in order to maintain debt sustainability and financial stability for the region.* Controlling spill-over effects associated with official sector losses, on official sector loans and on the ECB balance sheet, should be a key component of ensuring overall financial stability.

5. **The potential effect on growth from break-down in political cooperation.** *An intermediate goal of optimal reconfiguration should be to avoid political instability and break-down in European cooperation.* A break-up process could happen as a function of 'political accidents' and could involve hard default on obligations to the official sector. An optimal plan for break-up would seek to avoid instances of political instability at the country level and institutional levels—events could have a negative growth impact through declining trade and financial market integration.

In the following two chapters, we focus mainly on the balance sheet effect and the two spill-over effect dimensions for the 11 main Eurozone countries in our sample (points 2, 3, and 4 above). We discuss the issue of pinpointing currency misalignment in Appendix III, and the potential costs associated with break-down in European cooperation in Appendix VI.

In Chapter 7, we try to synthesise feasible reconfigurations, taking into account the constraints imposed by the current crisis as well as the significant potential costs associated with breaking down current structures. We note that the optimal configuration ex post (after the crisis and with EMU structures already in place) is not necessarily the same as the optimal configuration ex ante (pre-crisis and before setting up the Eurozone). In this context, we also note that the costs associated with transition will be important in determining optimal reconfiguration. We will deal with minimising transition costs in detail in Part III, which focuses on key aspects of managing the transition.

Chapter 5:
Balance sheet effects for exiting countries

In Appendix III, we have analysed which Eurozone countries could potentially benefit the most from currency depreciation through trade effects. The conclusion is that the GIIPS countries and Belgium and France stand to benefit the most. Still, it is important to realise that the effect from currency depreciation on trade is only one effect. In this chapter, we focus on the negative effect currency depreciation may have on exiting countries through balance sheet effects.

Implicit in the debate about a Eurozone break-up is the notion that currency depreciation would garner positive output effects for countries leaving the Eurozone. The assumption is that a more competitive exchange rate would cause a boost to exports and facilitate import substitution, and this would see growth supported by overall improved trade performance, possibly with a lag through the J-curve effect.

This is only one of the relevant effects from currency depreciation, however. The recent literature on financial accelerators and balance sheet effects has shown that there are other important considerations at play in connection with currency depreciation. These balance sheet effects are derived from the fact that countries with external liabilities in foreign currencies are going to experience deteriorating net worth and cash flows as a function of currency depreciation, with negative implications for credit availability and investment (as explained in more detail in Appendix IV).

Measuring balance sheet effects

Balance sheet effects associated with currency moves have the potential to be a significant drag on growth, but this channel is not well appreciated in the context of Eurozone countries because they currently borrow predominantly in their own currency. In a break-up scenario, however, *exiting Eurozone countries would be exposed to foreign currency risk on foreign law liabilities.*

Crucially, such negative balance sheet effects are likely to be large in Eurozone economies given the high degree of financial development, and given large latent foreign currency exposure in the form of foreign law external liabilities. In a break-up, foreign law liabilities would stay denominated in Euros and they would constitute foreign currency liabilities for the exiting country, which can only redenominate local law instruments into a new currency.

In Appendix IV, we explain in detail the methods we have used to construct a new data set of relevant external liabilities.

Figure 5.1: Defining relevant external liabilities in a redenomination scenario

| Total foreign liabilities | → | Proportion governed by foreign law | → | Relevant external liabilities |
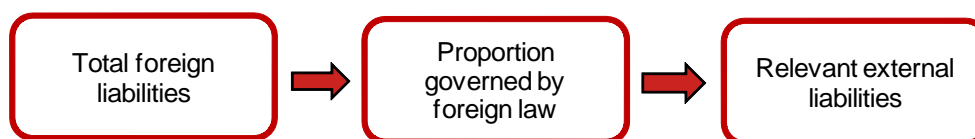
Note: Relevant external liabilities in the context of Eurozone break-up are the liabilities which will constitute foreign currency external debt ex post break-up.

The data construction essentially involves breaking down total external liabilities into local law liabilities (which can be redenominated) and foreign law liabilities (which will stay in Euros in a limited break-up scenario). The relevant component of external liabilities in relation to estimating balance sheet effects is the part governed by foreign law, which will constitute foreign currency liabilities following exit from the EMU. We note that although the analysis of strains on the country balance sheets can be an input into a default decision, we conduct our calculations assuming no default. Instead, we will address the possibility of default in Chapter 6.

The chart below illustrates the importance of this issue by comparing relevant external liabilities for Eurozone countries with the historical level of foreign currency debt in selected emerging market countries ahead of large currency moves.

Figure 5.2 simply displays headline figures of gross relevant liabilities at the country level for Eurozone countries[8]. It shows that Eurozone countries tend to have high relevant exposures. In this chart, Ireland has the largest exposure at 172% of GDP, followed by Portugal and Greece at 139% and 130%, respectively. Overall, most Eurozone countries have very significant relevant external liabilities, averaging more than two times the average for emerging markets in the past. The average exposure for Eurozone countries is 102% of GDP, compared to an average of 41% for the EM countries in our sample.

Figure 5.2: Balance sheet effects: Foreign currency liabilities in EM countries and the Eurozone
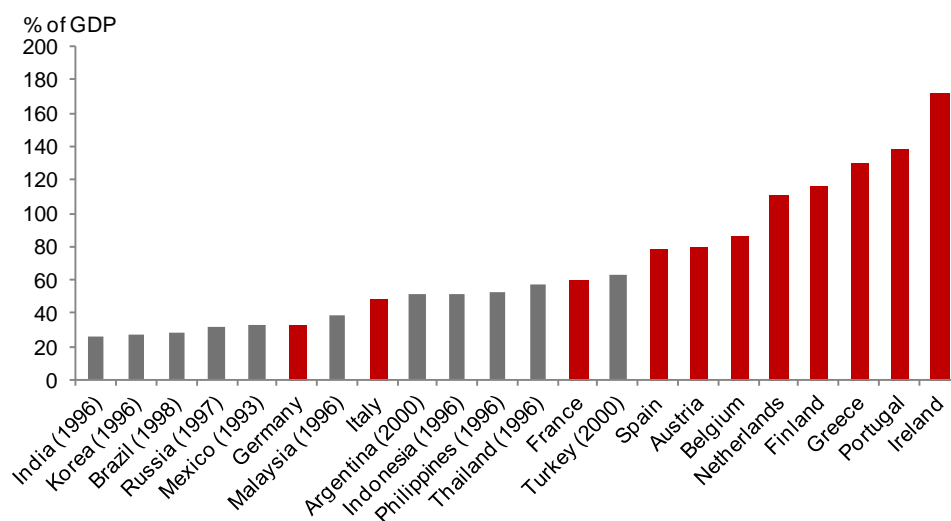
Note: The Eurozone figures are based on the relevant external liabilities calculations in Appendix IV, which measure foreign currency liabilities following an exit from the Eurozone.
Source: Authors' calculations, Lane (2007)

Output effects from balance sheet effects

It is generally accepted in the literature that negative balance sheet effects (Frankel 2004; Towbin et al. 2011) played a large role in negative output developments following large depreciations in a number of emerging market countries, such as the Asian countries following the Asian crisis in 1997-1998. Since the output effect associated with the negative balance sheet effect from large foreign currency external liabilities has potential to dominate the positive trade effect from currency

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[8] We choose to focus only on the 11 largest Eurozone economies because the main economic imbalances exist within this group of countries, and because data limitations make it difficult to collect the necessary data for some of the smaller Eurozone countries.

depreciation, this aspect matters greatly in the context of growth considerations in break-up scenarios.

We are not aware of any research which quantifies the impact of the balance sheet effect on output in the context of Eurozone countries following a redenomination process. An important goal of ours is to fill this gap in the literature. Our approach is to use our own metrics of relevant external liabilities and compare them to output effects as estimated in the emerging markets literature.

One way to measure the size of the balance sheet effect is to pinpoint a level of foreign currency external liabilities for which the negative balance sheet effect fully negates the positive trade effect. A threshold level of around 30% of GDP has been estimated for emerging markets (Céspedes 2005). Foreign currency liabilities above this level imply a negative balance sheet effect that dominates the positive trade effect.

Obviously, these are only rules of thumb, but they help to illustrate that the liability exposures in place in the Eurozone could easily lead to very large balance sheet effects. When examining potential break-ups, we consider the GIIPS countries plus Belgium and France to be the most likely countries to exit the Eurozone, in part because they are the countries which have overvalued exchange rates currently (see Appendix III). Importantly, each of these countries shows a level of external liabilities well above the 30% threshold, with Italy and France being the lowest at 49% and 59% of GDP, respectively; Spain (78%) and Belgium (86%). Interestingly, the three countries with the largest relevant external liabilities in the Eurozone are Greece, Portugal, and Ireland; all with relevant external liabilities in excess of 100% of GDP.

To illustrate more specifically for Greece, Portugal and Ireland, we can use regression estimates from the literature to map the foreign currency external liabilities into an output effect. Applying the estimated coefficients in Céspedes (2005), we find a very large negative output effect amounting to 7-9% for Ireland, Portugal and Greece[9]. This is the estimated drag on output that would ensue, assuming no debt relief or restructuring around the exit.

Balance sheet effects at the sector level

Up to this point, we have looked at relevant external liabilities for the countries as a whole. From a practical stand-point, however, it is likely to be important in which sectors and specific entities these exposures are concentrated. For example, if exposures are concentrated in the corporate sector, they may be hard to offset through official sector financial support.

Figure 5.3: Sector breakdown of gross relevant external liabilities

(% of GDP)	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
Public position	20%	17%	11%	11%	8%	109%	100%	16%	2%	66%	23%
Central bank	11%	14%	1%	8%	2%	49%	77%	12%	0%	36%	16%
General government	9%	3%	10%	4%	6%	61%	23%	3%	2%	30%	6%
Private position	59%	69%	105%	48%	25%	20%	72%	33%	108%	73%	56%
Bank	44%	50%	84%	36%	19%	16%	24%	21%	87%	48%	34%
Non-bank	16%	19%	21%	11%	6%	4%	49%	12%	21%	25%	22%
Total relevant external liabilities	**80%**	**86%**	**116%**	**59%**	**33%**	**130%**	**172%**	**49%**	**110%**	**139%**	**78%**

Source: Authors' calculations, National central banks, World Bank, BIS

The table above breaks gross relevant external liabilities into its key sector components. A few numbers stand out:

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[9] Specifically, we apply the estimated coefficient on the interaction term (the product of FX depreciation and size of foreign currency external liabilities) to our specific parameters for Eurozone countries, i.e. the product of estimated FX depreciation (as outlined in Appendix III) and the relevant external liability positions.

- In terms of public sector relevant external liabilities, the program countries (Greece, Ireland and Portugal) all have very large relevant public external debt, in the region of 65%-110% of GDP. This stems from a mix of official sector loans (the General Government line item) and ECB funding to NCBs (the Central Bank line item).

- In terms of private sector exposure, the Netherlands, Ireland, Portugal and Finland show the largest exposures (all above 70% of GDP). For Ireland and the Netherlands, this is partially a function of issuance by multinationals in those jurisdictions as a function of tax issues, and for Finland, this is a function mainly of bank debt.

- For corporates (the main component of non-banks on the liability side), Ireland, Portugal and Spain have the highest relevant exposures, at 49%, 25%, and 22% of GDP, respectively, pointing to large negative balance sheet effects in an exit scenario if left unaddressed by policy steps.

Box 5.1: Balance Sheet Effects for Households

In the main text we have looked at balance sheets at the national level, focusing on external liabilities in the form of foreign law assets that would stay denominated in Euros in a limited break-up. How do households fit into the picture?

Household balance sheets in Europe are typically dominated by housing wealth and deposits on the asset side and mortgages on the liability side. Clearly a house itself is a physical asset (similar to gold) and there will be no redenomination issue. Other main items on household balance sheets should also be relatively easy to redenominate through a new currency law, as they are governed by local laws. This holds for deposits and for mortgages (as outlined in Chapter 3), except in situations where mortgages are explicitly in foreign currency (which is rare in the Eurozone, although some CHF-denominated mortgages have been issued).

In an exit scenario, households will see all main items on their balance sheet redenominated into the new national currency, and there would most likely be no direct currency effects. (In the extreme case, similar to Argentina, where different exchange rates were used for redenomination of assets and liabilities, there could be some currency effect, but we regard this possibility as remote.) Hence, balance sheet issues are generally much less important for households than for corporations and banks, which use foreign law instruments in funding operations.

There would be indirect effects on household wealth, however. First, currency depreciation would reduce the real values of incomes and assets. This unavoidable consequence of the need for macroeconomic rebalancing will involve a loss of purchasing power for the majority of citizens, although those involved in export industries are likely to benefit over time. Second, there could be losses for depositors in extreme cases of disorderly sovereign defaults, bank failure, and insufficient deposit insurance coverage.

Net relevant external liabilities

A final point pertains to whether there are any offsets on the asset side of external balance sheets. For example, a country such as the Netherlands, which has large relevant external liabilities, is likely to have more offset on the asset side of balance sheets than Greece and Portugal. However, it is unlikely to be useful to rely solely on a simple concept of net external liabilities. The current absence of a risk-transfer mechanism (see the component on hedging in Chapter 9) means that relevant assets at the country level will not provide full offset to relevant liabilities at the sector level.

One concrete example of this is the large majority of relevant external liabilities in the private sector sitting on corporate and bank balance sheets, while the relevant foreign assets are in the form of securities holdings of asset management companies (pension funds, etc.). These asset positions

will provide little direct offset for the borrowers in the corporate and banking sectors, except in the case where public pension fund money is used for macro political purposes. For this reason, the idea of net relevant external liabilities is not always an accurate concept, as it is mainly the gross exposures at sector and agent levels which will impact credit availability and output effects.

One can argue that we need a concept between gross relevant and net relevant liabilities. We have experimented with various approaches to produce the table below, which shows a measure of adjusted net relevant external liabilities with a 50% weight on positions on the asset side to capture the notion that external assets may not completely offset losses from external liabilities in a break-up scenario. There is potential for additional fine tuning of these measures, but at a minimum, the adjusted net relevant external position allows for cross-country comparison, even if the specific value may not be that meaningful in a country-specific sense.

Figure 5.4: Adjusted net relevant external position using a partial weighting of assets (% of GDP)

(% of GDP)	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
Net relevant external position	**-2%**	**34%**	**-34%**	**13%**	**42%**	**-92%**	**-73%**	**-20%**	**8%**	**-80%**	**-50%**
Private position	9%	49%	-48%	21%	33%	13%	20%	-8%	-4%	-22%	-31%
Assets	68%	118%	57%	68%	58%	34%	92%	25%	103%	51%	25%
Liabilities	59%	69%	105%	48%	25%	20%	72%	33%	108%	73%	56%
Public position	-10%	-15%	13%	-8%	9%	-106%	-93%	-12%	12%	-57%	-19%
Assets	10%	2%	24%	4%	17%	4%	6%	4%	15%	8%	4%
Liabilities	20%	17%	11%	11%	8%	109%	100%	16%	2%	66%	23%

Note: Negative figures denote an overall net external liability position, while positive figures denote a net external asset position.
Source: Authors' calculations, National central banks, World Bank, BIS

The overall impression from this final analysis is that Germany, Belgium, France and the Netherlands will be the most resilient in the aftermath of a break-up, while GIIPS will suffer the largest losses to their balance sheets. Italy, however, shows more moderate potential losses than the other periphery countries, in part because it does not rely on funding in the form of cross-border bank loans, and in part because the majority of public sector debt is under local law (93%). This is broadly in line with the conclusions drawn when examining balance sheet effects at the sector level: the program countries (Greece, Ireland, and Portugal) continue to see the greatest damage in the case of a break-up, while Germany proves to be the most protected in terms of its balance sheet exposure.

Conclusion and implications

Our analysis demonstrates that there are very large implicit foreign currency external liabilities looming for key exit candidates. For Greece and Ireland, the bulk of these exposures are parked on public sector balance sheets. It follows that it will be almost impossible to imagine exit and currency depreciation for these countries without restructuring of public sector liabilities (both government and central bank liabilities). For example, in a situation with a 50-60% depreciation of a new Greek currency (in line with our estimates in Appendix III), and foreign currency external liabilities of 92% of GDP currently, relevant external debt would explode to around 200% of GDP.

For Portugal and Spain, both the private and public latent foreign currency exposures are significant, and have potential to generate sizeable negative output effects in a depreciation scenario. This implies that exit and currency depreciation for these countries are unlikely to achieve significant positive output effects, unless combined with both private and public sector debt restructuring and special financing facilities.

On the other hand, the large Eurozone countries, such as France and Italy, have much smaller latent foreign currency exposure, due to their reliance on local law sovereign debt issuance and lower cross-border (foreign law) bank financing of their private sectors. Hence, in an exit scenario involving depreciation of their currencies, the negative balance sheet effect may be significantly smaller (although spill-overs to other countries, as discussed in the next section, consequently would be more material). This points to the controversial conclusion that exit and currency depreciation (not counting spill-over and transitions cost) could potentially have more positive output effects in those countries.

In Chapter 9, we highlight that risk management and hedging may allow for a reduction in relevant external exposures in the run-up to an exit. This is an ex ante type of solution[10]. In addition, there may be merit in setting up vehicles for trade finance and special corporate finance vehicles to reduce the output impact from balance sheet effects. Such vehicles may mimic elements of the Commercial Paper Funding Facility (CPFF), which was used to secure financing for major corporations in the US in 2008-2009, and it may have elements of agreed debt roll-overs by international banks (a technique used in the 1998 Korean crisis). Finally, the EIB could serve an important role in providing bridge financing in such situations.

While exit decisions may not take into account the cold calculus of cost-benefit analysis, policymakers in Eurozone countries have a democratic obligation to consider the macroeconomic damage from balance sheet effects when evaluating a potential exit, and this may even impact communication with voters.

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[10] We note that private hedging markets for intra-EMU currency risk are likely to start trading OTC in June/July 2012.

Chapter 6:
Spill-over effects to the rest of the Eurozone

In Chapter 5 and Appendix III, we discussed country specific macro effects associated with exit and depreciation. We now turn to spill-over effects from exits to remaining EMU countries. Importantly, a holistic cost-benefit analysis will focus on not only country specific effects, but also the broader effects through regional financial stability and sovereign debt stability. Given the strong financial linkages, these financial spill-over effects have potential to be large.

Against this background, it is useful to quantify possible spill-over effects from various break-up scenarios. We focus on *spill-over effects associated with financial losses related to defaults and FX losses, for banks and for the official sector*. Other losses for insurance companies[11], assets managers, and even central banks can also have important implications. They should matter more through longer-term wealth effects than through their impact on short-term financial stability, however. For this reason, we will focus on bank losses and losses in the official sector. In Chapter 9, we will go into some detail on another aspect of contagion, namely how to manage capital flight.

Calculating bank losses from Eurozone exits

There are two main types of cross-border losses that banks would be facing in relation to a Eurozone break-up:

- First, there are losses *linked to currency depreciation* of the potential new national currencies of exiting Eurozone member countries.

- Second, there are *losses linked to increased defaults on assets* in exiting Eurozone member countries, irrespective of whether assets stay in Euros, or get redenominated into new currency.

There have been many previous attempts to calculate possible losses for banks in various break-up scenarios (Dor 2012). Such macro level calculations of potential bank losses are typically based on BIS data, which provide aggregate figures for cross-border bank exposures at the country level. As we will show below, however, there are a number of problems germane to using this raw data, and we will highlight the key caveats below as we calculate more realistic loss estimates.

Bank losses from FX depreciation in exiting countries

The first caveat to keep in mind when calculating bank losses is that it is not correct to assume that all cross-border bank assets in a given country involve currency risk for parent banks in a break-up and currency redenomination scenario. For example, a cross-border loan from a German bank to a Spanish corporate would typically be done under English law, and the contract would not be easy to redenominate in a break-up scenario. That is, not all Eurozone bank assets relating to exiting countries would be subject to currency risk.

In fact, our guiding principles for redenomination imply that only the local law cross-border bank assets are subject to currency risk for the creditor banks. For this reason, any realistic calculation of potential currency losses would have to take into account the portion of cross-border bank assets which are under local jurisdiction.

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[11] Given tensions around the near-failure of AIG in the US in 2008, this could be a major concern. However, AIG was a special case in that AIG was involved in many markets playing different roles, such as a broker/dealer rather than an insurer. Hence, we do not focus on a similar possibility in the context of the Eurozone.

The diagram below illustrates which components of cross-border bank assets are relevant for this type of calculation.

Figure 6.1: Cross-border bank assets subject to redenomination risk

Financial Instruments	
Securities holdings · Government bonds (i.e. Eurobonds) · Other bonds (i.e. English law corp. bonds)	Securities holdings · Government bonds (i.e. Italian BTPs) · Other bonds (i.e. covered bonds)
Cross-border loans	Local loans through subsidiaries
Cross-border deposits	

(foreign law)	Assets noted as local law are subject to redenomination in the case of exit, whereas foreign law assets are likely to stay denominated in Euros. The local law assets have potential to create losses for lenders around exit.
(local law)	

To address the distinction, our calculation below takes into account that only local law assets will be directly impacted by FX losses. Our calculation relies on our own dataset for the breakdown of Euro-denominated assets by legal jurisdiction and on our estimate of the deposit share of cross-border bank assets (Appendix II and Appendix V).

Figure 6.2: FX-related bank losses in exit scenarios (EUR bn)

Banking system in:	Losses relating to exit in:								Total Losses
	Greece	Portugal	Ireland	Spain	Italy	**GIIPS**	Belgium	France	**Losses**
Austria	0.1	0.1	0.1	0.3	1.3	**1.9**	0.1	0.7	**2.6**
Belgium	0.0	0.5	0.2	1.2	2.1	**3.9**		8.1	**12.0**
Finland	0.0	0.0	0.0	0.1	0.0	**0.1**	0.0	0.2	**0.3**
France	0.4	1.5	1.5	7.0	18.4	**28.7**	15.2		**43.9**
Germany	1.3	2.6	1.0	9.1	15.4	**29.4**	3.5	7.4	**40.4**
Greece		0.0	0.0	0.0	0.0	**0.1**	0.0	0.1	**0.2**
Ireland	0.0	0.0		0.3	0.1	**0.5**	0.0	0.4	**0.9**
Italy	0.1	0.1	0.1	1.8		**2.2**	0.1	0.7	**2.9**
Netherlands	0.1	0.3	0.8	0.0	2.1	**3.3**	7.0	4.0	**14.3**
Portugal	0.0		0.1	1.3	0.3	**1.6**	0.0	0.4	**2.0**
Spain	0.0	1.8	0.1		1.9	**3.8**	0.6	1.9	**6.3**
Total	**2.1**	**6.9**	**3.9**	**21.0**	**41.6**	**75.5**	**26.6**	**23.7**	**125.8**

Note: Assumes a 30% depreciation of exiting country.
Source: BIS

The high level take-away is that losses linked to currency moves are smaller when one takes into account issues associated with legal jurisdiction than when one assumes that all cross-border assets are exposed to the currency risk associated with redenomination (see Figure 6.2). Note that we used a generic depreciation assumption for illustrative purposes, but that these figures could also be generated with country-specific depreciation estimates (as shown in Appendix III).

Bank losses from defaults in exiting countries

The *second* caveat to take into account in relation to calculating bank losses pertains to the fact that a significant portion of cross-border bank exposure in the Eurozone is accounted for by local subsidiaries or majority-owned foreign banking businesses. For example, French banks own some

of the largest Italian and Greek banks. Since the local banks operate as individual corporations, what is really at stake for parent banks in France, Germany, and elsewhere is the equity exposure involved (including the implicit equity in the form of intercompany loans).

In cooperation with Nomura bank equity analysts (Nordvig, 2012(a)), we have looked into the specific magnitude of loan exposure through local subsidiaries on a company by company basis for selected banks. Having done this analysis in detail, we realised that for a number of key institutions, the equity at stake in local subsidiaries will serve as an important upper bound on losses. The implication of this finding is that aggregate losses, taking into account this limit, will be substantially smaller than when losses are estimated from haircuts on total asset exposure as reported by the BIS.

Thus, we decided to gauge the aggregate size of *country specific equity exposure* relative to total asset exposure at the country level. This result from this exercise is that equity exposures relative to total ultimate risk assets typically range from 10-20%.

Since this creates an upper bound on losses (although reputational issues could trigger additional equity injections in some cases), this is an important consideration. In our preferred loss calculation, we apply a 15% loss of asset values to represent bank losses in the case of default in another Eurozone country (see Figure 6.3 below and detailed calculations in Appendix V).

Figure 6.3: Bank losses resulting from a loss of equity (EUR bn)

Banking system in:	Losses relating to exit in:								Total Losses
	Greece	Portugal	Ireland	Spain	Italy	**GIIPS**	Belgium	France	**Losses**
Austria	0.3	0.1	0.2	0.5	2.1	**3.3**	0.2	1.1	**4.6**
Belgium	0.1	0.3	2.5	1.5	1.4	**5.9**		6.8	**12.6**
Finland	0.0	0.0	0.1	0.1	0.1	**0.3**	0.0	0.4	**0.7**
France	5.1	2.5	3.2	13.3	38.4	**62.5**	25.9		**88.4**
Germany	1.5	3.5	11.0	16.9	15.5	**48.4**	3.2	20.2	**71.9**
Greece		0.0	0.1	0.0	0.1	**0.1**	0.0	0.2	**0.4**
Ireland	0.0	0.1		0.6	0.2	**0.8**	0.1	0.6	**1.5**
Italy	0.3	0.4	1.8	3.2		**5.6**	0.4	5.0	**11.0**
Netherlands	0.4	0.6	1.5	0.0	4.0	**6.5**	13.2	7.5	**27.2**
Portugal	0.9		0.5	2.7	0.3	**4.4**	0.0	0.8	**5.2**
Spain	0.1	8.8	0.9		3.6	**13.4**	0.6	3.2	**17.2**
Total	8.8	16.3	21.8	38.8	65.6	**151.2**	43.7	45.8	**240.7**

Note: Table shows approximate upper bound on losses from default derived from estimated equity to asset ratios.
Source: BIS

Comparing figure 6.3 with figure 6.2 previously, the bank losses related to default (through loss of equity) are more substantial than losses resulting from currency depreciation even after taking into account the effect from the upper bound. For example, we calculate that France and Germany could experience substantial losses from the exit of GIIPS countries of EUR63bn and EUR48bn.

Total losses for banks: Macro implications

At the macro level, the numbers look relatively manageable. The charts above and below illustrate the losses associated with a sequential exit process, starting with Greece and progressing to Portugal, Ireland, Spain, and Italy. They are based on the same assumptions, i.e. a 30% currency move, and losses which wipe out the entire cross-border equity position of banks. They shows that the losses associated with exit and loss of equity positions in Greece, Portugal and Ireland combined are not going to significantly exceed 1% of GDP in any country's banking system.

Figure 6.4: Total bank losses in a GIIPS exit scenario (% of GDP)

Banking system in:	Losses relating to exit in:								Total Losses
	Greece	Portugal	Ireland	Spain	Italy	**GIIPS**	Belgium	France	
Austria	0.1%	0.1%	0.1%	0.3%	1.1%	**1.7%**	0.1%	0.6%	**2.4%**
Belgium	0.0%	0.2%	0.7%	0.7%	0.9%	**2.7%**		4.0%	**6.7%**
Finland	0.0%	0.0%	0.0%	0.1%	0.0%	**0.2%**	0.0%	0.3%	**0.5%**
France	0.3%	0.2%	0.2%	1.0%	2.8%	**4.6%**	2.1%		**6.6%**
Germany	0.1%	0.2%	0.5%	1.0%	1.2%	**3.0%**	0.3%	1.1%	**4.4%**
Greece		0.0%	0.0%	0.0%	0.0%	**0.1%**	0.0%	0.2%	**0.3%**
Ireland	0.0%	0.1%		0.6%	0.2%	**0.8%**	0.1%	0.6%	**1.5%**
Italy	0.0%	0.0%	0.1%	0.3%		**0.5%**	0.0%	0.4%	**0.9%**
Netherlands	0.1%	0.1%	0.4%	0.0%	1.0%	**1.6%**	3.4%	1.9%	**6.9%**
Portugal	0.6%		0.4%	2.3%	0.3%	**3.5%**	0.0%	0.7%	**4.2%**
Spain	0.0%	1.0%	0.1%		0.5%	**1.6%**	0.1%	0.5%	**2.2%**

Note: Losses calculated as % of GDP. For example, losses for French banks are scaled in relation to French GDP.

Source: BIS

The losses are clearly more significant if we add currency losses and loss of equity associated with a Spanish exit, and even more significant if we add Italy into the sequence of exits. Nevertheless, even in that scenario, the largest hit, on the French banking system, is less than 5% of French GDP. This is clearly not an immaterial number, and it may indeed necessitate meaningful capital injections, including from the French government. A more detailed analysis would take into account the amount of capital currently available in the banking system, but since there is currently a strong focus on increasing capital ratios it may not be easy to use this type of buffer in a fashion that would preserve financial stability. In any case, we will look at the loss figures as a rough proxy for capitalisation needs. Even so, it is hard to argue that the size of this specific loss is the factor which is fundamentally going to alter French sovereign debt dynamics.

Figure 6.5: Total bank losses in a GIIPS exit scenario (% of GDP)
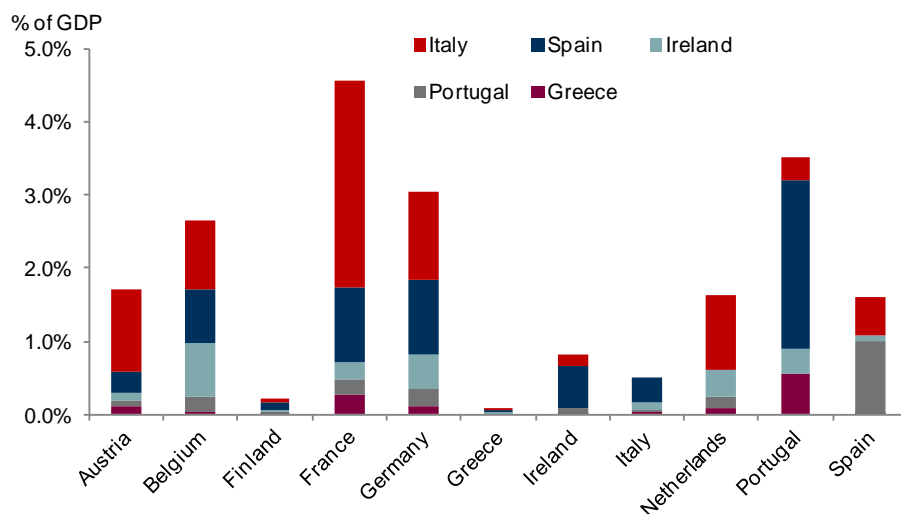
Note: Losses calculated as % of GDP. For example, losses for French banks are scaled in relation to French GDP.

Source: BIS

This result is a function of various factors. First, banks have already reduced intra-Eurozone exposure dramatically. Since 2006, aggregate intra-Eurozone cross-border exposures are down by 48% (see Appendix II for details). Second, banks have tried to avoid exposure to local law assets (such as local deposits) given the rising break-up risk (Tett 2012). Third, banks have tried to reduce equity exposure to local subsidiaries. For example, many banks have used the LTRO this year to obtain financing directly at the local subsidiary level, and reduce funding from parent entities, given the risk of outsized losses in specific countries in exit scenarios.

The flip side of the reduced bank exposure and the lower potential losses for banks, however, is that official exposures have grown significantly, as we detail below. In addition, this also creates a risk for depositors in peripheral countries if both the foreign parent company and the local deposit insurance fail to provide a backstop.

Calculating official sector losses from Eurozone exits

Official sector exposure within the Eurozone is generally subject to English law. For example, the documentation underlying EFSF loans is explicitly written with reference to English law. This means that there is no currency risk involved (at least not directly) for official sector creditors. This provides only limited protection for sovereign creditors, however, since the real issue is one of debt sustainability, as we have seen in Greece.

The starting point for any loss calculation is to quantify the relevant exposures. In relation to official sector exposure there are four main components:

1. Bilateral official sector loans (to Greece)

2. EFSF loans (to Greece, Ireland, and Portugal)

3. ECB holdings of peripheral bonds (Greek, Irish, Portuguese, Spanish, and Italian bonds)

4. Liabilities of national Eurozone central banks to the ECB[12] (mainly relevant for Greece, Ireland, Portugal, Spain and Italy)

Figure 6.6: Official sector exposures to GIIPS, Belgium, and France (EUR bn)

(EUR bn)	Greece	Portugal	Ireland	Spain	Italy	GIIPS	Belgium	France	Total
Bilateral loans	53	0	0	0	0	**53**	0	0	**53**
EFSF loans	108	10	12	0	0	**130**	0	0	**130**
SMP bond exposure	49	33	33	49	49	**212**	0	0	**212**
TARGET2	107	75	120	276	274	**853**	51	99	**1004**
Total	**317**	**117**	**165**	**325**	**323**	**1248**	**51**	**99**	**1399**

Note: Bilateral loans are based on Q4 data for Greece (Nordvig 2012(c)). TARGET2 balances are derived from international investment position data and are measured as net figures of central bank assets and liabilities in the form of "other" investments. EFSF loans data is taken directly from EFSF website (as of 21 May). SMP bond exposures are based on aggregate data provided by the ECB and our estimates of the country breakdown.

Source: Authors' calculations, EFSF, ECB, National central banks

In the appendix, we add up these exposures. We also conduct a simple loss calculation, where we distribute losses on EFSF loans in accordance with EFSF contribution weights. The more controversial part of the loss calculation is the part which pertains to central banks exposures, as it

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[12] Mainly TARGET2 balances, with a smaller component for those liabilities derived from 'overprinting' of physical notes.

can be argued that ECB losses can be absorbed in reserves and paid in capital as well as neutralised by future seigniorage[13].

For the purpose of our calculation, we look at official sector exposures in totality, including all four components. That is, we do not differentiate between government and central bank exposure. Detailed loss calculations can be found in Appendix V.

It is evident from this simple summation that the exposures have become very large. As a percent of Eurozone GDP, these exposures now stand at around 13-15%, depending on whether one includes France and Belgium. Importantly, as opposed to the banks, the losses associated with these assets are not limited to any equity proportion; hence, maximum loss is theoretically 100%.

If we add some proportion of these losses to public debt ratios on a country by country basis, it would lead to significant jumps in some countries, especially if added on top of bank recapitalisation needs. However, this is not entirely precise, first because EFSF and bilateral loans are already accounted for in standard gross debt statistics, and second because the ECB may be able to absorb some of the losses without translating into a fresh funding need for governments, at least not immediately, as mentioned earlier. Hence, it is difficult to do a calculation where one simply adds potential losses on these exposures to current debt to GDP ratios.

Projecting future official sector exposure

Even if the building exposure will not directly add to funding needs, the build-up is concerning from the perspective of the implicit transfer component. In this context, it is interesting to consider more than just a static calculation. It is worth looking at how these official sector exposures have grown over time, given how quickly the situation is evolving. The chart below illustrates developments over the last five years, focusing on GIIPS exposures (but full details are in Appendix V).

Figure 6.7: Breakdown of total official sector exposure to GIIPS (EUR bn)
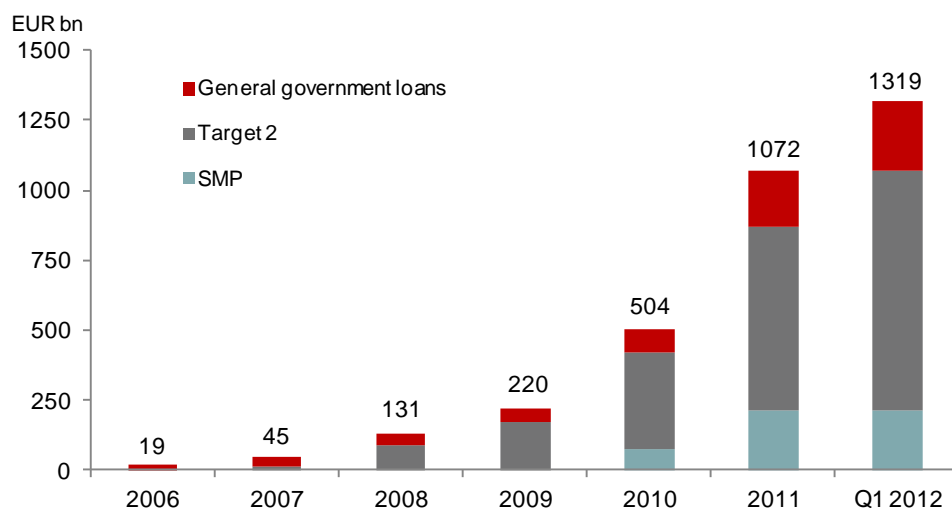
Note: 2012 data taken from March 2012. All other figures derived from end of year data.
Source: National central banks

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[13] One could reasonably argue that the ECB could operate with negative capital, much as the Bundesbank did after the break-up of Bretton Woods (Buiter 2008; Dalton 2005). We will not go into detail here on this topic. We merely recognise that losses at the central bank level have somewhat different solvency implications than losses on other balance sheets.

At the end of 2011, total official exposures (adding bilateral loans, EFSF loans, SMP holdings, and TARGET2 balances) amounted to EUR937bn or around 10% of total Eurozone GDP.

In this context, we also note how the official sector exposure is starting to grow at a rising rate. In Q1 alone, official sector exposure to GIIPS grew by EUR 247bn, or EUR 987bn annualised, compared to an increase of EUR 568bn in 2011, and EUR 284bn in 2010. At the current pace of increase, the exposure would be at EUR 2060bn by end-2012, or 21.9% of Eurozone GDP.

Given that we have observed dramatically increased tension in Q2, there is no reason to think that the accumulation of official exposure has decreased in the second quarter. In fact, it may well have accelerated further. Moreover, if we take into account that these exposures are ultimately backed by the core Eurozone countries, although technically backed by the Eurozone in its entirety, the numbers get even bigger. If we calculate exposure to GIIPS as a proportion on non-GIIPS Eurozone GDP, the exposure is set to jump to 33% of their GDP by the end of 2012.

Figure 6.8: Official sector exposure to GIIPS countries relative to Eurozone GDP
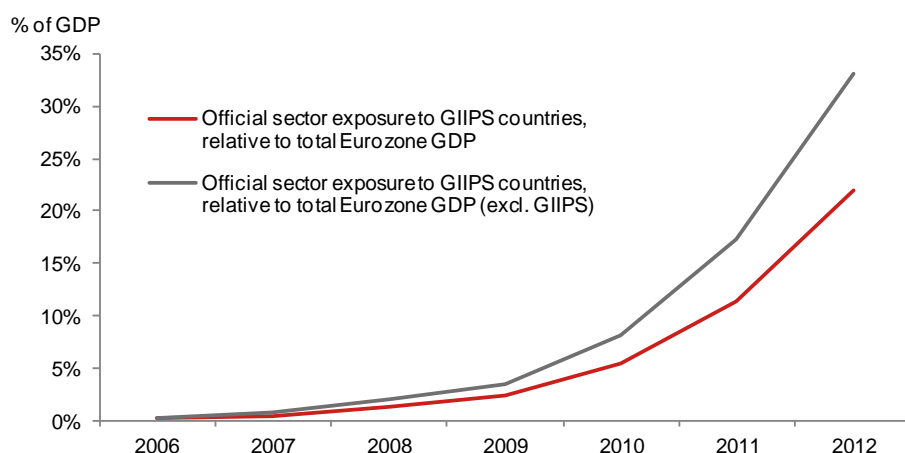
Note: 2012 figures extrapolated forward to end-2012 based on momentum in Q1 data.
Source: National central banks, IMF

Conclusion

Private sectors have already reduced their exposure to peripheral countries significantly. This is a key part of the reason why loss calculations for banks, in various exit scenarios, have been decreasing over time. This is a function of already-materialised financial disintegration within the Eurozone. From this perspective, an exit looks increasingly manageable, especially if banks are supported through various initiatives, as discussed in detail in Part III.

The flip side of the reduced private sector exposure is that the official sector has accumulated very large exposures. Moreover, the pace of accumulation is accelerating. Based on trends in Q1 2012, core Eurozone official exposure to GIIPS could increase to more than 30% of core Eurozone GDP by end-2012. Exposure is increasingly being accumulated through ECB TARGET2 balances. It is unclear how to think about this exposure in relation to government debt dynamics. It depends on the way the ECB decides to account for losses, and the degree to which losses are translated into recapitalisation demands and new funding needs for treasuries and debt management agencies.

The special accounting issues associated with losses on central bank balance sheets do not change the fact that central bank write-off losses amount to implicit permanent transfers. Ironically, the fact that these build-ups are happening mainly outside politically-approved channels may add to political risk over time. Such risks include fracturing within the ECB as well a revolt in countries such as Germany and the Netherlands against additional bailouts.

Chapter 7:
Ex post optimal reconfiguration scenarios

In the previous chapters in Part II and the accompanying appendices, we have discussed key aspects of optimal reconfiguration of the Eurozone, focusing on important aspects of this issue in the current crisis setting. Here, we draw conclusions about optimal configurations by pulling together the results from the previous chapters.

As mentioned in Chapter 4, we have not used a traditional optimal currency area framework in our analysis, but instead focused on specific effects important to securing economic recovery and avoiding crisis escalation.

At the individual country level, we have focused on two effects: the positive effect derived from eliminating currency overvaluation and the negative balance sheet effect associated with currency depreciation in the face of an overhang of sizeable external foreign currency liabilities.

At the Eurozone-wide level, we have discussed spill-over effects both in the form of bank losses and official sector (public) losses. In addition, we touched on potential costs associated with breakdown in European political processes (Appendix VI).

The table in Box 7.1 attempts to summarise the key effects captured in our various estimations. Since we cannot claim to have estimated the effects in a quantitatively definitive manner[14], we use a three-tier system to illustrate the rough magnitude of the effects involved: Very Large (+++), Large (++) and Moderate (+), with similar scaling applied for negative effects.

Summing up our cost-benefit analysis for individual exits

Using the overall table as guidance, there are no obvious break-up scenarios which stand out as uniformly beneficial at the country level, without creating significant negative spill-over effects to the rest of the Eurozone.

Before we turn explicitly to possible reconfigurations, it is useful to look at the key differences in terms of the estimated effects from individual country exits. We focus mainly on possible exits by the countries which could stand to benefit (looking at trade effects alone) from currency depreciation. The seven countries in this group are: Greece, Portugal, Ireland, Spain, Italy, Belgium and France (as detailed in Appendix III). For completeness, we also go through the effects associated with a German exit.

Greece, Portugal and Ireland: Exits would appear to be manageable at the regional level. But balance sheets effects could negate positive trade effects at the country level in the exiting countries.

The positive effect derived from elimination of FX overvaluation could be very large for Greece and Portugal (and large in Ireland, where FX overvaluation is already partially corrected through internal devaluation). In all three countries, however, there are very large negative balance sheet effects involved (although the composition between private and public sector external debt varies). The implication is that debt restructuring and/or special financing schemes, would have to feature in an

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[14] Some of our methods are entirely new, in that we explicitly incorporate legal constraints associated with redenomination in a quantification of important macro effects. This allows us to more precisely quantify the relevant exposures, which would create macro-level balance sheet effects in a break-up. At the same time, we realise that our method is new, and leaves scope for future refinement. In this regard, we are encouraged that leading academic economists (judging from the requests we have had for the underlying data) are starting to embrace our underlying approach. This means that we may soon have a larger set of independent estimates of the key balance sheet and spill-over effects.

exit scenario for those two countries in order to secure positive output dynamics following exit. Interestingly, the Eurozone-wide spill-over effects would generally be moderate (although official sector losses in Greece's case could be large, up to 3% of Eurozone GDP). Finally, political costs at the Eurozone level would likely be moderate. There would be potential issues with maintaining EU level cooperation, depending on whether withdrawal is multilaterally agreed. But relative to exits from larger countries, these would be at the moderate end of the spectrum.

Spain and Italy: Exits would be more difficult due to larger spill-over effects to other Eurozone countries, but would likely still be manageable. Balance sheet effects would tend to negate the positive effect from currency depreciation in Spain, but less so in Italy.

In relation to Spain and Italy, the impact on trade from currency adjustment would be positively large. Interestingly, there could be significant differences between Italy and Spain in terms of negative balance sheet effects. Spain would see large negative balance sheet effects, while balance sheet effects in Italy's case would be smaller. This suggests that from a country specific perspective, the exit option stands out as more attractive for Italy. Turning to the spill-over effects, the bank losses will be large in Italy's case, due to the large exposure of French banks to Italy (losses could be in the region 3% of French GDP). In Spain's case, bank losses will be more moderate, except for Portuguese banks. The wild-card is the political effect: can cooperation in the Eurozone and within the EU continue if Italy, a founding EU member country, such as Italy, leaves the currency union? Clearly the risks are elevated.

France and Belgium: While potentially beneficial at the country level, exits would induce large negative spill-over effects to the rest of the Eurozone and potentially ignite very negative political dynamics, undermining the benefits of exits.

France is one of the few countries which could benefit significantly from a less overvalued currency, but at the same time would not suffer meaningfully from negative balance sheet effects. The problem, however, is that it could see large spill-over effects through bank losses (particularly in Belgium and Germany), and through a breakdown in political cooperation. A unilateral French withdrawal and depreciation would potentially create risk of a breakdown in EU level cooperation, including trade tensions within Europe. Belgium is closely linked to France in various ways, and key EU institutions are based in Brussels, making exits extremely politically difficult. In fact, an attempt for France to exit could possibly trigger implosion of the Eurozone from the core, and involve a full-blown break-up, whereby the Euro would cease to exist.

Germany: A special case, with negative trade effects, and no standard balance sheet effects, but potentially significant losses on external assets for domestic banks. In addition, there could be special negative effects through destabilisation of the entire remaining Eurozone.

Germany would likely suffer through a large appreciation of its currency (the trade effect) but the standard balance sheet effect would not be an issue (by definition given currency appreciation). Meanwhile, the spill-over effect would work in reverse. German banks would face simultaneous FX losses on all relevant foreign assets (amounting to around 2% of German GDP). Additional losses would result from financial instability and increased defaults in the remaining Eurozone, as illustrated in the main text, and in Appendix VI. The benefit for Germany would come through avoiding participation in a further socialisation of losses (including the implicit socialisation through TARGET2 balance build-up) and from regaining full control over monetary policy.

Box 7.1: Cost-benefit metrics for individual country exits from the Eurozone

Exiting country:	Country-specific Effects		Eurozone-wide Effects		
	Reduced FX overvaluation	Balance sheet mechanism	Spillover		Political risk
			Bank losses	Public losses	
Austria	Indeterminate	Indeterminate	**Large** **- -**	Indeterminate	**Moderate** **-**
Belgium	**Large** **++**	Indeterminate	**Large** **- -**	**Moderate** **-**	**Large** **- -**
Finland	Indeterminate	**Large** **- -**	**Moderate** **-**	Indeterminate	**Moderate** **-**
France	**Large** **++**	Indeterminate	**Very large** **- - -**	**Moderate** **-**	**Very large** **- - -**
Germany	**Large** **- -**	Indeterminate	**Large*** **- -**	Indeterminate	**Very large** **- - -**
Greece	**Very large** **+++**	**Very large** **- - -**	**Moderate** **-**	**Large** **- -**	**Moderate** **-**
Ireland	**Large** **++**	**Very large** **- - -**	**Moderate** **-**	**Moderate** **-**	**Moderate** **-**
Italy	**Large** **++**	Indeterminate	**Large** **- -**	**Moderate** **-**	**Very large** **- - -**
Netherlands	Indeterminate	Indeterminate	**Large** **- -**	Indeterminate	**Large** **- -**
Portugal	**Very large** **+++**	**Very large** **- - -**	**Moderate** **-**	**Moderate** **-**	**Moderate** **-**
Spain	**Large** **++**	**Large** **- -**	**Moderate** **-**	**Moderate** **-**	**Large** **- -**

* In the case of Germany, spill-over effects would fall on the German banking system itself, and involve FX losses in relation to exposure to all other Eurozone countries. See Appendix V, p. 106 for detailed explanation of categorisation.

Each row in Figure 7.1 shows the effect of an individual country exit from the Eurozone. For example, the first row shows the various effects associated with Austria exiting the Eurozone. These effects should be interpreted as output effects. Since the metrics used should not be regarded as precise or final, we use a general three-tier classification into moderate (+), large (++) and very large effects (+++), or the equivalent tiering for negative effects. Cells are labelled as "Indeterminate" in cases where the effect is not significant.

Each column represents one of five effects resulting from a break-up. The two first columns represent country specific effects, while the three last columns represent spill-over effects to the remaining EMU countries.

Reduced FX overvaluation: This effect captures the output effect from currency depreciation in an exit scenario. A country with a strongly overvalued exchange rate currently stands to yield a *Very Large* positive output effect.

Balance sheet mechanism: This effect captures the output effect from balance sheet losses in an exit scenario. A country with large relevant external liabilities will face a *Very Large* negative output effect.

Spill-over effects from bank losses: This effect captures the negative implication for financial stability and output through spill-over effects to other EMU countries (or itself, in Germany's case) through bank losses.

Spill-over effects from public losses: This effect captures the negative implication for sovereign finance, financial stability, and output through official sector losses in other EMU countries.

Political risk: This effect captures the disruptive impact of a break-down in political cooperation within the Eurozone and the EU on output in other EMU countries, as well as the exiting country itself.

The measures in the first four columns are derived through an objective scoring system outlined in Appendix IV, based on the data analysis in Chapters 5 and 6 and Appendix IV. The quantification of the political risk effect is subjective, but based on the analysis in Appendix VI.

Ex post optimal reconfiguration

Many analysts and commentators have strong views on the feasibility and desirability of a break-up of the Eurozone. A common view, at least until recently, has been that any form of break-up would cause extreme and destabilising capital flight, and for this reason a break-up should be avoided at all costs. We agree with the notion that what constitutes an optimal currency area ex ante is not equivalent to the optimal reconfiguration ex post, given transition cost associated with breaking down the current structure. However, we do not agree that the possible risk of destabilising capital flight should preclude any proper analysis of whether a break-up may be desirable.

The problem with this argument is that we are already seeing destabilising capital flows well ahead of any actual break-up. As we explain in Chapter 8, it is not clear that the break-up itself will create an uncontrollable additional deterioration, although it could if mismanaged. There will be significant additional transition costs, but there is no strong basis to suggest that such a process would be significantly more unmanageable than the highly unstable path we are already on. Regardless of the final outcome, the longer it takes to find a solution—involving either break-up, integration, or a combination of the two—the more the costs will accumulate.

We think an exit of the smaller peripheral countries, such as Greece, Portugal and Ireland, would be manageable based on the size of spill-over effects. Further exits of Spain and Italy would also be possible, although spill-over effects to certain core banking systems would be large. Further exits involving France or Belgium, however, would involve very large spill-over effects, and incite risk of institutional breakdown and possible full-blown break-up, which would be prohibitively costly.

A possible configuration involving Germany, Austria, Netherlands, and Finland (i.e., without France and Belgium) would likely be one of the more stable configurations, from a political standpoint. However, many of the smaller nations are likely to be more comfortable with an arrangement where French and German interests counterbalance each other. We are thus faced with two possible configurations: the Northern region and one which also includes France and Belgium. But political considerations probably make it most likely that Belgium and France remain in the core[15].

This leaves the ex post optimal configuration as one which involves 3-5 exits from the group of GIIPS countries, with Greece almost certainly among the exiting countries. Which specific countries stay and which countries exit will ultimately be a political decision. The decision will be based on the views of the exiting countries (including willingness to give up sovereignty) and on the willingness of the core countries to provide transfers to keep current members inside the currency union. Since capital flight is already escalating, and since an initial exit is likely to lead to further escalation and instability, it would be a far superior outcome to execute needed exits all at once, rather than sequentially.

As it turns out, the optimal reconfiguration outlined here, involving essentially the simultaneous exit of the majority of GIIPS countries, is broadly consistent with findings within the empirical OCA literature (Bayoumi et al. 1992). That is, our analysis of which reconfigurations are feasible and potentially attractive from a cost-benefit approach (that take into account the importance of growth recovery in the current crisis setting), happens to yield similar conclusions to those from the literature on what would have constituted an optimal currency area ex ante in Europe.

Over the next 4-6 quarters, European policymakers are likely to face the decision of who should remain and who should exit the Eurozone. The decision will combine choosing the new configuration and cementing the currency union for the remaining countries, including potential socialisation of future losses (i.e. common deposit insurance, Eurobonds, etc). In the face of inaction, the path ahead will be one of increasing risk of full-blown break-up.

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[15] Having France as part of the core would counterbalance Northern European states desire not to fall under complete German hegemony. One relevant issue here is the core difference in attitudes towards government between the Germans (and other Northern Europeans) and the French. While these competing opinions have been of limited consequence in the Eurozone of the past decade, they will be a source of great potential tension going forward given the need for further integration in the core.

Part III:
Managing transition

Chapter 8:
Preparedness and contingency planning

Irrespective of whether the break-up is a limited break-up or a full-blown break-up, the transition process involves a large number of inter-related issues. Beyond the specific issues related to currency separation, there are important issues around controlling capital flight, stabilising banking systems and supporting government bond markets. The inter-connectedness of the key issues requires a holistic plan, and we outline key elements of such a plan below.

Only an all encompassing plan, as opposed to piecemeal fire-fighting, will effectively minimise transition costs associated with exits and redenomination, whether it is exit or full-blown break-up which is chosen. However, before we go into detail with the specific necessary steps in the transition process, it is helpful to outline our method. The break-up process will inevitably involve many steps, including those immediately pre- and post-exit stage (Scott 2012, Dor 2011). Figures 8.1 and 8.2 show pre-exit planning stages and responses to negative stakeholder reactions, and post-exit stabilisation, respectively. We also outline optimal configurations in Part II, giving motivation for the target union post exit.

The importance of preparedness and contingency planning

Policymakers are facing a dilemma. Going unprepared into an exit will lead to significant costs. Preparing for an exit, however, may be self-fulfilling and counterproductive, possibly leading to an inability to achieve any optimal reconfiguration due to ongoing market and economic pressures.

The solution to this dilemma is to design contingency plans using a risk management approach. The future of the Eurozone remains unknown, and will largely be dictated by political decisions, including future election outcomes. What is needed is a set of contingency plans which can prepare Eurozone members for various exit scenarios, without signalling the likelihood of specific scenarios. Contingency planning reduces the financial and legal uncertainty over investment and business in the Eurozone.

The big advantage of such planning is that it can be done openly. If designed carefully, and communicated properly, this preparatory work does not in itself signal that exit or break-up is a certainty. The risk management steps we outline are both prudent measures and means of reducing systemic risk and calming the ongoing crisis, regardless of whether break-up is a surety or merely a risk. We note that many of these measures we describe as necessary are already underway, partly at the behest of regulators, and partly due to market and economic forces.

A break-up of the Eurozone is hardly going to be a smooth process. Nevertheless, the quality of the preparation will be crucial to minimise the degree of disruption. Only after undertaking prudential controls and bolstering the means of handling systemic shocks from the sovereign and banking crisis can policymakers determine that the EU can withstand the shock. The final steps of exit or break-up are executed rapidly and under veil of secrecy. And subsequent to an exit or break-up, the preparatory elements will come into play to immediately stabilise the banking system(s) and the sovereign markets and reduce mass insolvencies of firms, while relying on new elements under the control of the NINCBs and the exiting governments.

Figure 8.1: Managing the process: Preparations and Exit
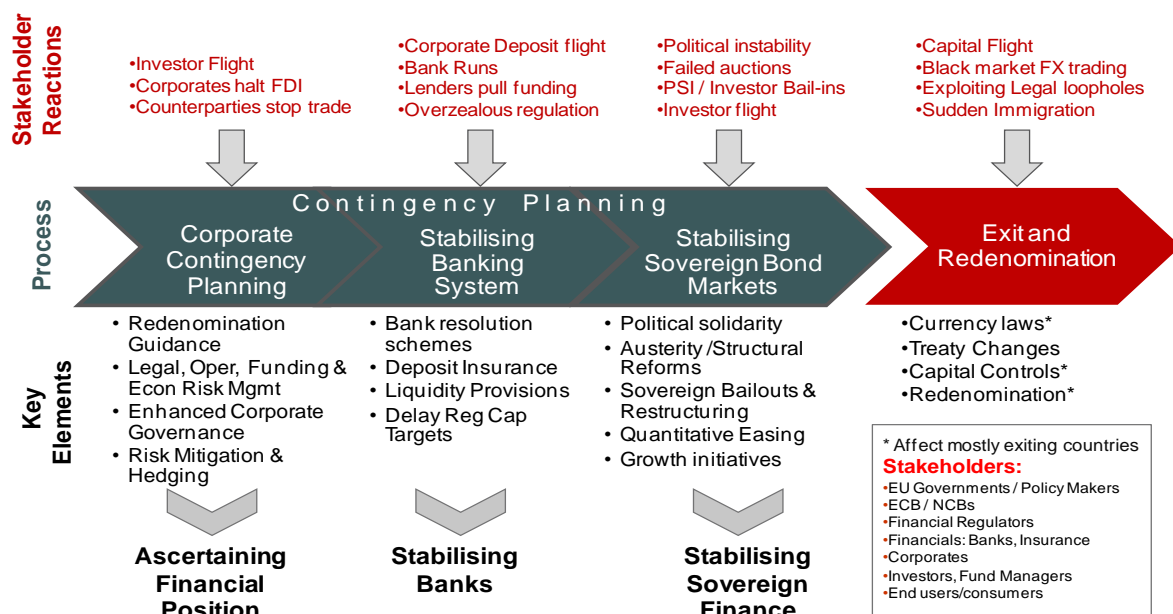
Source: FA Consulting in consultation with authors.

Avoiding unnecessary disruption and costs

Potential legal disruptions and associated costs

In a disorderly break-up scenario, with little forward looking guidance on the redenomination process, court decisions on redenomination are likely to be inconsistent, potentially arbitrary from an economic stand-point, and they are likely to be very slow. This would be a worst case outcome.

The fall-out from a disorderly redenomination process, for which market participants would have had little chance to prepare, would likely be to trigger a large number of technical defaults and bankruptcies. Importantly, a significant portion would be arbitrary and unnecessary, linked to specific court decisions and affecting otherwise viable companies.

This legal uncertainty is a form of Knightian uncertainty (Davis 2011), leaving investors expecting far higher risk premia and effectively pricing to worst (Al-Najjar 2011). Overall, this would raise the risk of more severe than necessary banking crises, creating a negative impact on actual and potential growth for a prolonged period of time.

Figure 8.2: Managing the process: Post-exit stabilisation and a new economic era

Stakeholder Reactions

- Lenders pull funding
- Corporates halt FDI
- Lawsuits stop resolution

- Deposit flight
- Bank Runs
- Safe haven inflows

- Political instability
- PSI / Investor Bail-ins
- Investor flight

- Hyperinflation
- FX Volatility
- Investor inaction

- Trade flow ceases
- Severe recession
- Ending FDI

Process

Post–Exit Stabilisation

Ascertaining Financial Position | Stabilising Banks | Stabilising Sovereign Finance

New Economic Era

New Monetary Regime | Stability & Growth

Key Elements

- Resolution of contracts*
- Default decisions*
- Settlement of Non-Deliverable Forwards

- Bank Recap & resolution
- Excess liquidity
- Deposit guarantee

- IMF/EU aid packages
- Infrastructure loans
- Quantitative Easing
- Plan for "Eurobond"

- Inflation Management*
- CB Credibility Building*
- Easing Capital Controls*
- International Aid

- Sustainable Debt Dynamic
- Reinstituting Free Trade
- Optimizing Currency Regime

* Affect mostly exiting countries

Stakeholders:
- EU Goverments / Policy Makers
- ECB / NCBs
- Financial Regulators
- Financials: Banks, Insurance
- Corporates
- Investors, Fund Managers
- End users/consumers

Source: FA Consulting in consultation with authors.

Potential costs associated with balance sheet effects and lack of hedging

The huge size of Euro-denominated assets and obligations (as illustrated in Chapter 3) would create new open currency exposures in a break-up scenario. We have quantified these exposures in detail in Chapter 6, and it is clear that they exceed, by a wide margin, the exposures in place in emerging market currency crises in the past. Combined with the current inability to hedge those exposures (as discussed in Chapter 9), this suggests that a wave of bankruptcies would be globally as a function of losses on new currency exposures, especially in those countries with the most relevant external (i.e., foreign law) liabilities.

In the extreme case of a full-blown break-up of the Eurozone, where the Euro would cease to exist, there would be an additional risk. In such a scenario, tens of trillions worth of obligations governed by English law and New York law would be stuck in redenomination-limbo. With no simple and remotely fair way to effect redenomination in that scenario, we would be faced with prolonged legal proceedings. During this time, financial market participants would have no way to value some of the biggest exposures on their balance sheets. Most likely, courts would be overwhelmed, resulting in failure to quickly resolve payments on millions of financial contracts. The most likely implication of such a disorderly redenomination process would be a complete freezing of the financial system, not only in the Eurozone, but also globally.

Corporate contingency planning

The first set of steps involves contingency planning, risk assessment, management and mitigation, enhanced corporate governance including stress testing, scenario building, task force creation (rapid response teams) and opening lines of communication with policymakers. These risk management and contingency planning exercises all follow from a set of established guiding principles for how redenomination of Euro-denominated assets and obligations will ensue under local and foreign law in various break-up scenarios. This is described in some detail in the guidelines on legal principles underlying redenomination. This first step is public and all regulated financial firms will be required to make such plans.

Financial macro-prudential oversight instructing regulated financial firms to take stock of each category of risk would affect efficient preparedness by market participants, helping to avoid triggering bankruptcies and other disruptions.

In particular, in order to ensure ease of redenomination in the event of break-up, we propose the following novel elements to contingency planning:

Communicate redenomination guidance

National regulators (and legal counsel) communicate guiding principles for redenomination of Euro-denominated assets and obligations, including a possible role of a new **European Currency Unit (ECU-2)** for settlement of Euro foreign law contracts only in a full-blown break-up scenario.

A new ECU-2 would play an important role in facilitating an orderly redenomination process for the myriad of contracts and obligations under foreign law without a clear country specific nexus in a full blown break-up scenario where the Euro ceases to exist. The ECU-2 would be mechanically linked to the performance of new national currencies of Eurozone countries in accordance with a pre-determined weighting scheme. The ECU-2 would play a crucially important role in facilitating efficient redenomination of foreign law contracts, and would thereby serve to minimise unnecessary insolvencies due to protracted legal battles about redenomination issues and due to losses on new currency exposure, some of which could be purely a function of unpredictable court decisions.

While it is probably not possible for EU policy-makers to communicate intent on an ECU-2 directly, national regulators (being independent) can broach this as a possible solution to redenomination of English law EUR contracts via working papers and discussion papers, (as we have seen with ECB communication around possible exits (Athanassiou 2009)), with more formal consultations by regulators about the likely impact, should break-up be more certain.

We note that the ECU-2 notion has no bearing on the discussion should a Euro continue to exist, irrespective of how small the region actually is. In particular English law instruments should continue to be settled in Euro if there is a Euro. The ECU-2 is merely a device for settling the conundrum of how to determine payment should there be no Euro.

Risk management and enhanced corporate governance

National regulators mandate that regulated firms must assess and monitor the legal and contractual, financial (i.e., funding and liquidity management), operational (e.g., IT issues and ability to make payment in variety of new currencies, via new payment systems, etc.) and economic risks and provide ongoing monitoring of these as well as counterparty credit risks. By assessing assets and liabilities, bucketing them into various currency buckets, and determining how each will behave under various break-up and exit scenarios, firms will have identified the key areas of focus immediately after such exit.

Regulated firms must **create rapid response task-forces** for dealing with every eventuality in a possibly messy break-up and these must be charged with taking responsibility over key decisions. Preparedness must be enhanced by scenario building and stress testing critical business and operational lines.

Moreover, **communication lines to policymakers** and regulators must be initiated so that, immediately after an event, policymakers can be informed as to ongoing operations, bottlenecks, challenges and difficulties, especially those overcome by policy intervention.

Preservation of shareholder value is incentive for non-regulated firms to undertake similar contingency planning. Public broadcasting of preparedness and reduction of uncertainty reduces risk premia both theoretically and empirically.

Combined, these steps will reduce both the corporate's own operational uncertainty and as well as systemic uncertainties associated with contagion.

Hedging and risk mitigation

Regulators should encourage regulated firms to take part in private hedging markets for hedging intra-Eurozone currency risk, through NDF contracts. Due to market incompleteness, certain risks (intra-Eurozone currency risk) cannot be hedged. This is crucially important for exit candidates, such as Spain, where the private sector has large implicit foreign currency exposures. In the absence of any ability to hedge and share risk with holders of foreign currency assets, the exit could create significant balance sheet effects, likely involving a wave of bankruptcies too (as detailed in Chapter 5).

On this basis, a hedging market for intra-Eurozone currency risk has potential to provide a new avenue for risk sharing, through creating a non-deliverable FX forward (NDF) market for potential new national currencies of current Eurozone member countries. As we outline in Appendix VIII, the creation of the NDF market will allow corporates to hedge their intra-Euro exposure and net or mitigate the financial risks associated with exit or break-up. Moreover, this will encourage firms to halt more rapid deleveraging, giving them the option to hedge their current FDI in possibly exiting countries.

We note that this product is already in final phases of development and is likely to start trading in OTC form during June. Hence, the creation will require no government involvement as such. However, it would be helpful if key countries encouraged risk sharing between sectors domestically. For example, local asset manager with (implicit) foreign currency assets should look to lock in some of the upside involved in appreciation on foreign currency assets, by selling the hedge to corporate sector entities with (implicit) foreign currency liabilities. The NDF market should ensure that firms that need to hedge and are willing to pay (as well as those which are overly hedged or have risks the other way round) can transact, thus lowering overall systemic risks. This could dramatically reduce the corporate exposure to balance sheet related devaluation concerns (as highlighted in Chapter 5). Those countries whose corporate sectors have the larger net foreign liabilities have the most to gain by corporates' hedging, and by doing so reduce the net balance sheet constraint on devaluation.

Stabilising the banking system

The second major area involved in ex ante efforts to enhance preparedness involves policies to stabilise the banking system. The banking and financial balance sheets are often cited as the means by which most financial contagion travels. And clearly large-scale liquidations and deleveraging will have more endemic effects. The European banking system is woefully underprepared for even the more minor issues of the sovereign crisis, with resolution plans merely drafted and only partly implemented into national law. This piecemeal approach has also allowed some countries to weather the crisis and ongoing rescue operations far more easily than others.

The steps involved in this stabilisation (many of which are underway) include:

Bank resolution schemes

In particular, EU policymakers must adopt a directive to ensure that bank resolution schemes are implemented into national law. These schemes must be modelled on the lines of those adopted by the UK, Germany, and Ireland, and allow for regulators to take ailing banks and divide them into:

- **Good banks** (with secured debt, deposits and 'good' assets), with an EU-wide deposit insurance and other backstops covering losses (e.g., with direct ESM support), effectively socialising rescue of depositors EU-wide, and

- **Bad banks** which can be (less capital intensive) investment companies which contain all subordinate liabilities (e.g., senior debt, sub debt and any remaining equity tranches) and questionable assets. Bad banks will then be run-down over time with shortfalls being covered by liability management exercises (e.g., buybacks of certain debt tranches) and bail-ins, and sovereign backstops with <u>indirect</u> ESM support, effectively socialising losses of bad banks to the sovereign rather than EU-wide.

Deposit insurance

EU wide deposit insurance (recently proposed by the EU) would be a first line of defence for bank insolvencies or bank runs. These must be backstopped (up to specific deposit limits) by the EU budget (much as is the case for EFSM or EEC bonds) or by a specifically dedicated fund of governmental guarantees.

ECB/NCB liquidity provisions

For banks with weak administration and failing the rapid approval of EU-wide bank resolution schemes, liquidity issues must be addressed as need be, with the ECB and other NCBs facing more questionable counterparties on less valuable collateral. Governments will have to indemnify the ECB to allow the ECB to protect its own balance sheet in facing unresolved banking situations. Finally, these credit easing policy measures must be in the context of further monetary loosening and liquidity provisions, aimed at stabilising the financial system and, in an emergency situation, stemming the possibility of bank runs.

Delay regulatory capital requirements

While future financial stability would require building up regulatory capital, the drive towards increasing capital requirements during a crisis and the induced deleveraging are merely the sources of yet further contagion. Regulators should delay requirements to full adherence to Basel III and other protocols to new regulatory capital requirements until sovereigns are fully able to fund themselves without the support of their national banks.

Stabilising the sovereign bond market

The third ex ante area of preparation is to stabilise sovereign bond markets. Due to the ongoing political dimensions of the ongoing crisis and the fact that the sovereign debt crisis has gone on for so very long, measures have been insufficient to shore up confidence. New steps needed to handle the extent of any post-exit moves include:

- **Political solidarity**: Unified decision making of core Eurozone sovereigns.

- **Sustainable debt dynamics:** Moves should include continued fiscal consolidation, with some room towards more growth enhancing measures, and structural reform measures (to boost potential GDP and ensure long-term convergence in productivity). PSI and OSI for those countries that should remain in the Euro. PSI should not be used to introduce foreign law bonds in any country which may be a possible exit candidate (as did happen in Greece in March 2012, further complicating an exit). Growth initiatives which could lessen the extent of the austerity measures, or delay full adherence to the SGP until the far distant future.

- **Sovereign Bailouts**: Increase capacity of sovereign bailouts and structuring them so that the bailout loans remain subordinate to private bondholders, should support be used to buy bonds for otherwise solvent nations (Firoozye 2011). Prepare for further market intervention by EFSF or ESM and ECB, should the need arise.

- **Quantitative easing**: Prepare for unsterilised ECB intervention through preannounced size and duration or at unlimited size at preannounced target yields or yield caps (thereby guaranteeing solvency of the stressed sovereign's budget and ensuring subordination issues are no longer a valid concern for the market). Continued concern over moral hazard can be addressed by providing excess liquidity to the ESM which can impose conditionality and buy the ECB political cover for its operations.

Each of these elements can be used to stabilise the market prior to any planned exit. While the moral hazard issue does arise, concerns over moral hazard are a luxury left to more stable times and concerns over contagion should prevail at this juncture. Finally, the issue of exit or break-up is not entirely economic, much in the same spirit as the actual entry into the union, which was arguably made for political rather than economic reasons.

As many of these elements outlined above can and should be undertaken in the context of the sovereign debt crisis alone, especially those elements involving corporate and systemic contingency planning to any and all extreme events, they do not signal exit or break-up. But ensuring that each of these items is in place is crucial to ensure that exit can be handled smoothly.

Post-exit actions

Contingency planning will allow the following post-exit actions to happen almost immediately, without operational and political delays causing significant economic costs.

Ascertaining financial position

Post exit, it is of crucial importance for firms, in a challenging and fast moving environment, to follow through on the prudential plans. Corporates will have to call together their specialised task forces to handle the immediacy of decisions needed to ensure that the firm continues to operate smoothly and efficiently. In terms of follow through, these actions comprise three major areas: resolution of contracts, default decisions and settling NDFs.

Resolution of contracts: Firms will largely be aware of which assets and liabilities will redenominate and will take the operational changes needed to ensure that they can continue to handle transactions in the new currencies. The hundreds of billions of Euros of back-to-backs and securitisations will be of particular challenge; back-to-backs have different governing laws which make them "economically equivalent" but not legally equivalent.

In the case of EU break-up, having legal certainty of settlement of the EUR denominated contracts which are in English or other (non-local) law will allow investors to unwind and take losses or consider the choices available to them, rather than to be weighted down by the legal uncertainty and unable to make crucial decisions. Our proposal is the issuance of an **EU directive to introduce a new ECU** under these circumstances (as described in Appendix VII).

There will be major types of securities and obligations where gains or losses are only subject to judicial decision. It is crucial that policymakers have already isolated key and **simple precedent setting transactions** well in advance so that, post exit, these can be decided rapidly and authoritatively by the appropriate court. It is only through rapid and equitable decisions that the EU can move forward rather than be weighted down by a morass of uncertainty post-exit. As we discuss in the appendix, political and legal uncertainty produces a large risk premium. It is this risk premium which is an indication of a slow-down of investment. Post exit, the longer this resolution process, the more likely adjustments will be more damaging.

Default decisions: After assessing foreign versus domestic liabilities and obligations, firms will decide whether national law (either via bankruptcy protection or if international judgments can no longer be readily enforced) affords them protection to default on overly expensive foreign obligations. Key decisions could include pulling credit lines on key customers, declaring institutions or counterparties to be in default, taking measures to prevent one's own default by technical or

operational reasons, or restructuring or defaulting on external law debt if need be, and closing out all non-economic transactions.

Settling NDFs: The non-deliverable forward contracts which we proposed for risk mitigation will be settled between firms and used to mitigate some of the exposure of redenomination risk with transfer payments between firms helping to lower systemic risk. This would effectively allow those who faced windfall gains on redenomination to give up some of these gains to those who faced losses.

Stabilising banking systems

Irrespective of the contingency planning which may take place, the banking system of both the exiting and the non-exiting countries will be in need of yet more bailouts. Our proposal of preparations comes into play post-exit with **bank resolutions**, **recapitalisations** (via ESM for non-exiting countries), ECB and NINCBs pumping in **excess liquidity** as need be, and the use of any **deposit insurance** scheme if it has been adequately capitalised (or further excess liquidity from the ECB and NINCBs if it has not).

Finally, should the sovereign have significant portions of non-local law debt held by its own banks, it will seek to switch the banks to more easily serviced local-law debt before possibly defaulting on the foreign obligations.

Stabilising the sovereign bond market

The elements used to prepare for sovereign rescue can now easily be unveiled or used. But in addition to the measures listed in contingency planning, the sovereign bond rescue will now be forced to take a much larger role in ensuring that sovereigns can fund at reasonable levels and remain solvent. The need for such stabilisation should be acute during the initial stages of the exit or break-up, and other than the elements mentioned in the pre-exit preparations and post-exit it should also entail:

1. **Quantitative Easing** (NINCB), ESM interventions (through ECB).

2. **Infrastructure loans** to circumvent national finances.

3. **IMF and EU aid packages** for exiting sovereigns, including the means of recapitalising foreign reserves.

4. **Announcement of "Eurobond"** or (possibly limited) fiscal union such as the European Redemption Pact (Bofinger et al 2011), allowing for limited temporary joint-and-several Eurobonds with strong conditionality and return to national bond markets and (coordinated but independent) fiscal policy thereafter[16].

5. **Default decision on foreign law bonds:** In order to avoid becoming unduly burdened by expensive foreign-denominated obligations, sovereigns may have CACs, allowing the issuer to call a bondholder committee and propose restructuring alternatives (i.e. redenominated debt) with implicit threat to default. If faced with sufficient holdouts, governments will need to take steps ensuring that they have limited value of assets abroad, and possibly default.

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[16] This appears to overcome both German constitutional constraints with the Bundestag deciding extent of commitment, while addressing EU sovereigns' concerns over permanent loss of sovereignty to an EU super state with permanent Eurobonds.

Applications to a Greek Exit

While we have kept the discussion of mechanics deliberately general, and are consequently able to address Greek, or say, Portuguese exit as well as the extremes of a full-blown break-up, we note briefly that Greek exit is considerably less complicated in some ways. In particular, if a Euro continues to exist, foreign law contracts will be paid in Euros for the most part (except in the rare cases where the contracts are clearly and explicitly tied to Greece).

Meanwhile, preparation is clearly underway, although it is clear that many of the optimal steps we mention are so far incomplete or entirely unaddressed. The lack of preparedness will require far greater involvement from the ECB in the near-exit and post-exit phases if a period of destabilising capital flow in the rest of the Eurozone, including risk of full-blown break-up, is to be avoided.

As outlined in our general framework, the preparatory steps come to play subsequent to exit and redenomination, thereby settling uncertainty in contracts and payments and stabilising the banking system of the remaining Eurozone with moves toward the introduction of Eurobonds of some limited form (for instance, the European Redemption Pact (Bofinger et al. 2011)). Finally, Greece itself will have to seek IMF and EU aid in the process of exit and redenomination to bolster its banking sector, ensure infrastructure development, and recapitalise its central bank reserves. Due to the complex nature of Greece's English-law PSI bonds and the relationship to the EFSF, it may be necessary to switch Greek banks' holdings from PSI bonds to some new local law bond before defaulting on the EFSF and PSI bonds, which may become prohibitively expensive to service. We address issues of currency laws, capital flight, and the actual mechanics of redenomination in the following chapter.

Chapter 9:
Managing exit and capital flight

Once the political decision to exit has been made, policymakers must prioritise achieving an orderly redenomination process and avoiding disruptive capital flight. At this point, the process will have clearly moved beyond contingency planning, and various crisis measures would need to be kept secret, until actual implementation. We first touch briefly on currency separation, and then we turn to the controversial topic of how to manage capital flight.

Currency separation

The issue of how to achieve an orderly currency separation process is dealt with in the literature in some detail. For example, the Czechoslovak currency separation in early 1993 has been regarded as a good example of an orderly redenomination process, and the template from Czechoslovakia has since been used by the IMF to advise Moldova on its split from Romania (Dedek 1996). Moreover, historical analysis can serve as a guide to addressing logistical issues around transition to a new physical currency (notes and coins). For this reason, we will not go into great detail on this subject[17].

However, there are some special considerations in connection with a Eurozone break-up. In relation to the legality of exit, there is a debate around whether Article 50 in the Lisbon Treaty can be used by a country to legally leave the EU and the Eurozone. There may as well be other methods for "opting out" using the Vienna convention on the Law of Treaties[18]. Given the need for expediency, it is likely that exit is either unilateral or is completed prior to formal approval by Eurozone partners. Later on, however, it could be formalised via treaty change, which could clear up a range of challenges during and immediately after exit (Scott 2012).

In relation to whether physical currency/stamps can be printed ahead of time, there is an issue of the feasibility of secrecy. This may entail some risk, but it has been done before. In the Czechoslovak case, for example, new Czech notes (specifically the stamps to be attached to old notes) were ordered more than six months before they were actually needed, and well before the political decision of currency separation had been made, as a part of the Czechoslovak State Bank's contingency planning (Dedek 1996).

Finally, there is an important caveat, which relates to Gresham's Law. Exiting countries, such as Greece or Portugal, would almost certainly see significant depreciation of their currencies relative to the remaining Euro in a limited break-up scenario (see Appendix III). This implies that there would be little economic incentive for citizens in exiting countries to convert Euros to the new currency, either by getting new notes or by getting stamps on existing notes. For this reason, the exiting country needs legislation forcing residents to exchange Euro cash for new national currency (bank deposits are harder to hide, and will be easier to redenominate for that reason). The alternative to stamping locally would be to stamp in the non-exiting Eurozone countries. This would conceptually get around the incentive issue (the disincentive to convert good currency for bad), but

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[17] Some of the key elements to exit would involve passing a currency law under a veil of secrecy, enacting bank holidays and exchange closures as the new currency becomes legal tender, during which time all locally domiciled residents are required to exchange their Euros for new notes and coins (or alternatively have them stamped), forcing all economic agents to convert under penalty of a fine, and sealing borders/monitoring border posts for fleeing currency.

[18] See Dor (2011). We note that France, Malta and Romania are not signatories to the Vienna Convention, and this may complicate the international acceptance of Vienna-based methods of exit. Scott (2012) states that there is no internationally acceptable legal means for exiting the Euro other than via the TFEU or through treaty amendment.

it would raise logistical issues, as it would require simultaneous stamping in the remaining 16 Eurozone countries (assuming just one country exits).

Managing capital flight

Large one-off currency moves have potential to generate large capital shifts. This was the experience during the ERM crisis, when pegs broke in Asia during the Asian crisis, and in many other departures from pegged exchange rate regimes in emerging market countries in the past. Linked to this, there is a fear that any hint of the possibility of a Eurozone break-up will similarly ignite large, and potentially destabilising, capital flows.

Before we turn to the specifics of what can be done to prevent capital flight (in the box), it is instructive to make a few observations about the behaviour of Eurozone capital flows and about some of the key concepts involved.

The dynamics of capital flight in the Eurozone

A key observation in relation to Eurozone capital flows is that *capital flight has already reached a mature phase* in some cases.

We can use Greece as an example, to illustrate the fundamental point:

- Foreign portfolio investors have largely exited Greece, as a function of active sales, redemptions, and haircuts on remaining exposures. We can use Japanese data to illustrate this point[19]. As of end-2009, Japanese investors held EUR5.7bn of exposure to Greece, while the latest data as of March shows that the exposure has been reduced to EUR0.1bn, **a decline of 98%.**

- Global banks have dramatically reduced their exposure to Greece by refusing to roll over loans and by selling securities. In Q1 2008, the exposure of global BIS reporting banks to Greece was $225bn. In the latest BIS data from end-2011, the exposure dropped to $87bn, **a decline of 61%**, and that was even before the PSI process imposed severe hair-cuts on bank holdings of Greek government bonds.

- Domestic residents have reduced their exposure to local bank deposits notably over the last three years. Household deposits were down 26% and corporate deposits showed **a decline of 42%** as of March 2012 (before reports of accelerated deposit withdrawals appeared in mid-May). The domestic recession is a part of the explanation, but the outsized drop in corporate deposits is likely to reflect a switch to banks outside Greece[20].

These numbers clearly document that private sector capital flight started long ago and well before the Greek election result in May 2012 further accentuated the risk an imminent exit. In fact, the process of private sector capital flight is now so mature in Greece that it will be hard to see a further acceleration on a flow basis, simply because the outstanding exposures (from a stock perspective) are so significantly reduced already. In this context, we note that the various backstop facilities in place, including in the form of ECB funding, have allowed private sector capital flight to continue, without causing a complete economic collapse. This is the story in Greece, but it is also the story more broadly in the Eurozone, as we discussed in Chapter 6, in the context of official sector exposures.

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[19] We use Japanese data to illustrate the general trend because it is more detailed and up-to-date than European statistics and because Japanese investors are among the biggest participants in global fixed income markets.

[20] In this context, it is worth making the general point that capital in the form of deposits tends to be stickier than other types of funding. This is well-known (it is the reason regulators prefer deposit funding to wholesale funding for banks), and it seems to be a feature in the Eurozone too, even if borders are open and capital movement remains unrestricted. The stickiness of deposits is one of the few features of the current setup which does not yet point to extreme capital flight when we look at the Eurozone as a whole.

Greece is obviously an extreme example; other countries have seen less severe capital outflows at this point. For example, foreign investors only started exiting their fixed income investments in Italy in the second half of 2011, and deposit outflows have only become meaningful in Spain in 2012. This means that there are still plenty of assets left for foreign investors to sell, and plenty of local deposits to move abroad in Eurozone countries other than Greece. This leaves significant scope for incremental deterioration in the capital flight dynamics.

Nevertheless, it is important to note that various degrees of capital flight have already happened in the Eurozone; it is too late to avoid capital flight altogether. The clear lesson from the capital flow picture in the Eurozone over the last few years is the following. Capital flight has gradually spread to more and more countries as well as to more and more assets. Moreover, while the initial capital flight was from the periphery to the core, the more recent evidence points to flight from the entire Eurozone[21].

Policy announcements and uncertainty as determinants of capital flight

We can put the above empirical observations in more conceptual terms:

- Capital flight is not a binary process, which jumps when a certain outcome (break-up) becomes pre-determined as a function of a policy announcement.

- Capital flight is a continuous variable; and increasing uncertainty will lead to – typically gradually – increased capital flight, regardless of whether policymakers acknowledge certain risks or not.

There is little empirical evidence backing the idea that contingency planning for a break-up (which will have only a minor impact on the perceived probability of a break-up) will cause major shifts in capital flows. This means that break-up preparation and contingency planning can be implemented as a risk management exercise (if clearly communicated as such) without in itself igniting additional capital flight.

In this regard, we note that expectations are already running well ahead of policymakers. For example, we have seen that spread-betting measures of the probability of some form of break-up of the Eurozone by 2013 has been in the 35-45% range for the majority of 2012 and spiking above 50% immediately after the first round of the Greek election[22]. Policymakers' recent admission that they are finally implementing contingency plans for a Greek exit had essentially no impact on the perceived probability of this event in the market. The genie was out of the bottle well before.

Uncertainty more generally, on the other hand, is bound to be a key driver of investor behaviour, especially since the uncertainties present today are of a type which investors did not contemplate. The uncertainties we are now facing were not incorporated into the original investment thesis behind foreign investor inflows in the Eurozone, and they certainly did not feature in a retail depositor's decision to put money in a savings account in a Eurozone bank. These are entirely new uncertainties, relating to risk of sovereign default, lack of credibility of deposit insurance, and possible currency devaluation. This uncertainty is bound to impact capital flight in a profound way, regardless of what policymakers say or pretend about the likelihood of break-up.

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[21] This is the evidence from global capital flow statistics, see (Nordvig 2012(a), Nordvig et al. 2012), and it is also the message from the trends in global bond yield, which have seen Treasury and Gilt yields drop dramatically in May 2012 as a function of the renewed tensions in the Eurozone.

[22] See, for example, odds that "Any country currently using the Euro to announce intention to drop it before midnight ET 31 December 2013," as available on www.intrade.com.

Box 9.1: What can be done to reduce capital flight?

In this box, we focus on more specific steps that can be taken to reduce capital flight. When exit is imminent, capital flight can only be addressed in the form of strict capital controls. In the pre-exit phase, some more modest steps may ease the concerns of institutional investors. We note, however, that all these measures are shorter-term treatments of a symptom, rather than a cure.

Reducing capital flight among institutional investors (ex ante)

- **Use of English Law Securities:** Due to increased awareness of redenomination risk, corporate investors would be somewhat comforted if they had legal certainty that their assets and securities were not able to be redenominated. While recent stresses have led the (English law) Greek PSI bonds to drop in value immediately after the PSI, the vast majority of investors are comforted by the fact that they are English law and are pro-rata with the EFSF loans. Similarly, deposit flight by corporates would probably subside if corporates had the option to convert to English law documented deposits or CDs. This re-documentation would not altogether halt capital flight (as default is always an option and exiting governments may declare payment in Euros to be illegal) and would have little effect on consumer-level capital flight. Moreover, conversion could exacerbate balance sheet effects for departing sovereigns. Still, we believe the option to convert will, on the margin, keep more deposits within a sovereign's banking system.

- **Non-Deliverable Forwards (NDFs)**: The ability to hedge currency risk (or potential currency risk) is known to reduce balance sheet volatility and increase optimal levels of FDI. Moreover, hedging is the means by which firms demonstrate the strength of their corporate governance (see Appendix VIII for further discussion). As a whole, the existence of a hedging market will help to prevent rapid and damaging deleveraging.

Ex post steps to reduce capital flight

The possible negative signalling effect from the introduction of capital controls means that they can only be introduced secretly at the very last moment, although there may be extreme circumstances where they may be warranted pre-exit to minimise the damage from excessive volatility in capital flows.

In general, we propose the following elements in a multi-pronged approach. The aim is to stem the poor enforcement problem within the exiting country[23]:

- **Capital Controls:** The exiting country eliminates or taxes all cross-border transfers except for "verifiable" and acceptable reasons in limited size (e.g., on humanitarian grounds, transfers for purchases of foreign goods and services, transfers for citizens relocating abroad). As we have mentioned above, the exiting country will have to introduce restrictions on transport of physical banknotes outside of the exiting country, entailing the establishment of border checks.

- **Taxes on cross-border deposits:** The tax should affect newly initiated deposits; it would essentially amount to a (discriminatory) tax on deposit inflow into non-exiting countries, enacted bilaterally to avoid conflict with EU law. For example, Germany and Greece would agree that Germany taxes any Greek resident inflows into deposits, a policy which benefits Germany as well as Greece, as a means of further preventing some capital flight. The rationale is that Greek Euros stored as deposits are not being used for acceptable reasons. Since this goes against most bilateral investment treaties, these treaties will have to be renegotiated in the context of an exit from the Euro[24].

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[23] Article 63 of TFEU (free movement of capital) is allowed to be circumvented temporarily under specific conditions. Moreover, Article 113 of TFEU empowers the commission to allow member states to take various more drastic (but temporary) measures to correct a balance of payments problem (Laver 2012). While these legal methods may exist, if treaty change is agreed as a means to allow exit, capital controls and other means of halting free movement of capital may be explicitly allowed by treaty (Scott 2012).

[24] If core countries wished to tax the inflows from exiting members on a multilateral basis, in theory this could be accomplished by simple agreement. Taxation is an area where the EU has minimal influence aside from discrimination (and taxes can distinguish between different taxpayers according to Article 65(1)), and therefore member states could agree to tax inflows from peripheral countries unilaterally without violating the treaty. Furthermore, with respect to tax discrimination provisions generally (not simply those applicable to capital movement), Article 112 allows for discrimination with regard to imports and exports if approved by the Council for a limited period. This provision should not be needed due to the aforementioned provisions regarding capital. It does, however, provide a back-up plan (Laver 2012), and it is likely to be more efficient in generating tax inflows, rather than outflows (as there will be a greater incentive to evade reporting the outflow level as opposed to the inflow level). This multi-pronged approach helps prevent leaky application of exiting countries' capital controls.

The real risk in relation to capital flight is the magnitude and duration of uncertainty. The worst case scenario is one of elevated and prolonged uncertainty about the future of the Eurozone, including the sustainability of sovereign finances in member countries. This most uncertain scenario would materialise in a process of sequential exits from the Eurozone. It would not be the individual exit itself, but the immense uncertainty in between the different exits in the sequence, which would drive capital away from vulnerable countries. This would lead to damaging instability more broadly. This is a scenario to fear and avoid, as we outlined already in Chapter 7.

Capital flight as well as the direct spill-over effects around a single exit, such as Greece, can be managed. It is the signalling effect from a Greek exit, which is the problem. It may be near-impossible to manage capital flight if a Greek exit opens the door to sequential exits (at least without giving up on free capital mobility). In fact, the instability of capital flows in that scenario, may lead to such severe economic damage that it would risk political disarray and a possible full-blown break-up.

Concluding remarks on the controversial topic of capital flight

In connection with the debate about a Eurozone break-up, it is common to argue that the costs associated with a break-up would be enormous, due to extreme capital flight (Eichengreen 2009). In fact, this is often used as an argument that break-up should be avoided at any cost. This argument, however, relies on a misunderstanding about the nature of capital flight.

In reality capital flight is a continuous process, and we have already seen extreme capital flight in some countries well ahead of a break-up. From this perspective, it is not clear that the break-up itself would necessarily generate a significant acceleration in capital flight, although a mismanaged break-up process surely could.

The real problem is sustained uncertainty, rather than the actual break-up as such. One could even argue that break-up will allow uncertainty to subside, as prices are allowed to adjust towards a form of equilibrium[25], but that goes beyond the main argument we are making here.

The ultimate solution lies in achieving optimal reconfiguration and a new equilibrium where private sector capital flows are in balance. The experience with Eurozone capital flows over the last year clearly documents that capital flight problems cannot be solved by pretending that a break-up is not possible.

From this perspective, a process of sequential exits, which would involve elevated and prolonged uncertainty, is the worst case outcome—and would likely result in devastating capital flight. We strongly recommend that such a path is avoided. For the benefit of the citizens of the Eurozone, a break-up should happen in one step, not sequentially, to shorten the duration of uncertainty and to minimise transition cost.

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[25] While a break-up may remove uncertainty about redenomination risk, it will potentially create new uncertainties, such as those relating to the future direction of macro policy, inflation risk, and more fundamentally, property rights. Hence, whether a break-up will help to reduce uncertainty will depend on perceived future policy uncertainty in the post-exit world. Most likely, a transition phase will be needed before uncertainty will truly subside.

Part IV:
Conclusion

Chapter 10:
Key policy insights and proposals

In this chapter, we briefly highlight the key insights and proposals embedded in the previous nine chapters. We highlight seven specific main points, listed here for summary purposes. Additional elements of our analysis can be found in the main text, and further detail is presented in the appendices.

(1) **A limited break-up can be managed.** We have analysed various types of fall-out from single country exits as well as from exits by limited groups of countries. Our quantitative estimates suggest that the fall-out, in terms of financial losses for banks and sovereigns, can be managed in a scenario where 3-5 GIIPS countries exit the Eurozone. In addition, such a limited break-up would leave hope that a certain degree of European cooperation can be preserved following break-up. Managing a limited break-up will require a) that it is done simultaneously, not sequentially, b) that comprehensive contingency plans are formed in advance, and c) that remaining core Eurozone countries move clearly toward fiscal union.

(2) **Preparedness is key to minimising transition costs.** A risk management approach to planning for a break-up can be adopted, as long as the outcome is not predetermined. Provided that this is the case, policy steps can be taken openly, and economic agents will be allowed to respond accordingly. Key steps involve reducing uncertainty around redenomination risk and introducing hedging tools for intra-EMU FX exposure, as well as proactive moves to stabilise banks and sovereign bond markets. Such preparedness will allow expedient resolution and stabilisation immediately following exit.

(3) **Negative balance sheet effects need to be countered.** Currency depreciation impacts the economy through various channels, mainly trade effects and balance sheets effects. Balance sheets effects, ex post break-up, are likely to be very large for exiting Eurozone countries. This is a function of significant external liabilities which would stay denominated in Euros following exit. To secure growth following exit, balance sheet effects need to be countered through a) ex ante risk reduction, including hedging, b) ex post debt restructuring and relief, and c) the availability of special financing vehicles, perhaps through the EIB.

(4) **Capital flight should be confronted with bold policy steps.** Regrettably, capital flight is already a major problem in the Eurozone, and there is no easy way to stop it without restraining the free movement of capital. Capital flight ultimately can only be controlled by attacking the root cause of the underlying imbalances and the credibility deficits in back-stop infrastructures. Capital flight cannot be prevented by pretending that a break-up is not possible. To avoid a period of prolonged and destabilising capital flight, it is crucial that no sequential break-up process takes place. The break-up has to be a one-off event, which is combined with additional integration in the core.

(5) **A breakdown in European cooperation should be avoided,** even in a Eurozone break-up. While there is widespread disagreement about the costs and benefits of the EMU, there is a more general consensus that integration of goods, labour and financial markets within the EU have seen significant benefits for EU member countries. An optimal reconfiguration of the Eurozone should seek to maintain the most advantageous components of European cooperation more broadly. A disorderly Eurozone break-up process would risk reversing decades of more fundamental (non-monetary) integration gains.

(6) **A full blown break-up would involve large yet unquantifiable cost.** The extreme form of break-up, involving all countries moving to new national currencies, will be associated with a number of unquantifiable costs. These costs include those associated with redenomination disputes, global financial instability due to losses on unknown latent currency exposures, political instability potentially risking a break-down in European cooperation, and extreme intra-European currency volatility in a new world of flexible European currencies.

(7) **An ECU-2 mechanism is needed to avoid redenomination anarchy in a full-blown break-up.** As a last resort, an ECU-2 currency basket concept would help resolve redenomination uncertainty. This solution would only apply in the undesirable scenario of full-blown break-up, where the Euro ceases to exist. The ECU-2 concept should be introduced by means of an EU directive, and would provide a bridge between tens of trillions worth of foreign-law contracts denominated in Euros, and the new national currencies of Eurozone countries. The ECU-2 currency basket would be an accounting tool used uniformly to efficiently settle millions of individual payments on foreign-law Euro-denominated instruments. It would serve to avoid arbitrary court decisions dictating the means of payment on myriads of international law contracts.

Chapter 11:
Rethinking the European monetary union

The current path of the Eurozone appears to be a dead end. The austerity based crisis strategy has led to depressed growth in an increasing number of member countries. Banking sector tensions and sovereign debt concerns also continue to increase, putting further downward pressure on growth.

Private sector funding markets are increasingly dysfunctional, and we can observe funding difficulties for a large proportion of Eurozone banks, for peripheral Eurozone sovereigns, and also, from a balance of payments perspective, for specific Eurozone countries. Meanwhile, the official sector is increasingly filling the gap. Banks are kept afloat by ECB funding, sovereigns are kept from default through the EFSF, and balance of payments funding is being supplied through a build-up in central bank liabilities, so-called TARGET2 balances.

Capital flight has become more pronounced; foreign institutional investors are reducing exposure to Eurozone markets, Eurozone investors are adopting a stronger (country specific) home bias, and depositors in the periphery are starting to move to safer banks in the Eurozone's core and to safe havens outside the region. Accelerating capital flight reinforces growth problems in the most vulnerable Eurozone member countries; meanwhile, ever larger official sector exposures are accumulating publicly through loan facilities, and "behind the scenes" through an astonishing build-up in exposure on the ECB balance sheet. Counting all official sector exposures, the core's exposure to the periphery is set to reach 30% of GDP this year.

At the same time, political risk is accumulating at various levels. At the individual country level, political risk is rising in the form of revolt against austerity, as we have seen lately in Greece. This is a risk which is also surging in other countries with failing austerity programs. Meanwhile, rising resentment at bailouts in Northern Europe has seen extremist parties taking larger shares of the vote in France and Netherlands. Political risk is also mounting at the institutional level in the form of protest against increasing moral hazard and the undemocratic socialisation of potential future losses. The growing political tension at the institutional level has been illustrated by prominent recent resignations from the ECB's governing council.

European policymakers will have to make a historical decision very soon. The choice is relatively well-defined at this point. It is a choice between further integration (involving fiscal integration and regional backstops for banks) or a form of break-up. An amalgamation of strategies is also possible and may indeed be the most likely outcome. This would involve the possible exit of one country (or a defined group of countries) occurring in tandem with significant additional integration among the remaining Eurozone member countries. In the absence of significant steps towards further integration, including absence of further cohesion between the core countries, a full-blown break-up would seem the likely outcome.

Risks are rising and the path ahead is unpredictable, driven by binary political decision by officials, as well as by voter choices in elections and referenda. The stakes are high, and it is time to start contingency planning in earnest. The first steps toward contingency planning have been taken, after the Greek election made it evident that a break-up is a real and imminent risk. But much more holistic planning efforts are required, given the multitude of uncertainties ahead.

It is time to rethink the European monetary union; it is time to stop pretending that adopting the Euro is an irrevocable process, and it is time to forget about loss of political capital involved in changing strategy for the Eurozone. The leaders who will be remembered positively are those who make visionary decisions for the benefit of their citizens, not those who stick to the script.

Rethinking the European monetary union involves a reconsideration of the optimal reconfiguration, fully incorporating the special circumstances associated with the current crisis. It also involves holistic contingency planning, openly where possible, and secretly when necessary. Finally, it involves minimising tail-risk associated with a political breakdown in the Eurozone and the EU. Such a breakdown would have large costs, not only in the form of costs associated with the break-up itself, but also due to potential loss of decades of integration gains at the EU level.

Our analysis suggests that a limited break-up of the Eurozone involving 3-5 exiting countries can be managed. It is not going to be pain-free, but it can be done, if it is combined with the steps outlined in this paper – rapid moves towards additional integration in the remaining core countries as well as coordinated efforts to manage the transition proactively.

A limited break-up process would allow exiting countries to see a benefit through increased competitiveness, especially if combined with sound new monetary institutional frameworks and measures to reduce balance sheet effects for borrowers in exiting countries.

A limited break-up process can be managed in terms of bank losses, official sector losses, and other stresses in the core, if combined with additional ECB liquidity provisions and other measures to stabilise bank funding and sovereign finance. This type of break-up process can preserve the EU and avoid a complete breakdown in European cooperation. This would also circumvent a full-blown break-up of the EMU, which would require ECB dissolution, involve the Euro ceasing to exist, and expose the entire region to immense political risk.

The worst case outcomes are a full-blown break-up and a prolonged sequential break-up process. The full-blown break-up would involve severe costs with respect to redenomination itself, even if an ECU-2 mechanism is used to settle Euro contracts. A sequential break-up process, starting with Greece and moving on to other vulnerable countries, would cause escalating and devastating capital flight, deposit instability, and a further deepening of recession dynamics. In addition, it would exacerbate a build-up in exposures in the core, and could entail a risk of splintering from the core, with countries such as Germany and the Netherlands essentially refusing a further socialisation of losses at some point. Both of these worst-case scenarios would entail large long-term costs associated with financial disintegration, a risk of competitive devaluations, and a broader break-down in European cooperation, including reversal of trade integration.

A break-up must be accomplished all at once to avoid a prolonged period of destabilising capital flight. Given that capital flight has already been accelerating since the summer of 2011, such a break-up would need to happen urgently, if it cannot be avoided altogether through serious advances toward integration.

The reconfiguration of the Eurozone will be a historical decision. Taking the final step to achieve sustainable monetary and fiscal integration will not be easy, and requires overcoming both legal hurdles and political and cultural differences. Political leaders must take brave steps to overcome nationalism as a driving force in EU level decision making. Who will participate, and who will exit, will be a political decision that will depend both on all individual countries' willingness to give up sovereignty and on core countries' willingness to mutualise liabilities. It is time to rethink the European monetary union.

The crisis in the Eurozone started in 2008 and has been escalating ever since. A break-up is likely to be painful for many agents and will likely result in a disruptive transition period. Nevertheless, a limited break-up, involving further integration of the remaining core, could put an end to the crisis and set the stage for future stability, continued cooperation and prosperity.

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Appendix

Appendix I:
Legal aspects of redenomination

Redenomination risk: Which Euros will stay Euros?

In the context of the Eurozone, the issue of redenomination is complex because there is no well-defined legal path for Eurozone or EU exit. While there was no means for exit in the initial stages of crafting the EU, the later Lisbon Treaty enabled EU exit through Article 50 of the Treaty on the Functioning of the European Union (TFEU). Most commentators see Article 50 as providing a framework for leaving the Eurozone together with the EU (Athanassiou 2009)[26], (given a Qualified Majority Voting among other EU members and failing that a delay of two years), but some have stated that this provides no such means to exit the Eurozone, and in fact, none exists[27].

However, the recent political reality has demonstrated that the lack of legal framework for break-up is unlikely to preclude this possibility. Moreover, there have so far been some more informal moves to make a unilateral Eurozone exit easier (e.g. without having to leave the EU)[28].

And yet others have suggested that the only feasible means of exiting the EU in a timely fashion would be to do so outside the context of the treaties, but with official sanctioning (i.e., through a new set of Treaties). And in fact this may be the only way to ensure the effective legality and international recognition to the host of measures that exiting countries must undertake in the course of the redenomination (Scott 2011).

As we have mentioned earlier, the type of break-up matters, in that internationally legitimate currency law can lead to acceptance of the new currency in various English and NY law contracts, depending on whether the nexus of the contract or obligation is tied to the exiting country. Moreover, with the prospect of leaving the Eurozone and the loss of a host of Treaties and applicable legislation, the prospects of an exit may be a far more unpleasant for a country than what would already be true of the immensely challenging redenomination exercise.

Financial risk premia and legal jurisdiction

As we have seen in Chapter 3 on legal risk, for the most part the distinction over which contracts will stay in Euros and which will be redenominate depends mostly on governing law. The risk of redenomination of EUR obligations into new local currency is higher for local law obligations than those issued under foreign law, and this type of differentiation based on redenomination risk already impacts investor behaviour. This distinction is especially relevant in scenarios where the break-up is limited, and where the EUR remains a functioning currency. In the alternative scenario of a full-blown break-up, redenomination into a new local currency or ECU-2 is possible even for foreign law bonds, and there is a less clear-cut case for differing risk premia based on different jurisdictions.

In any case, the immediate conclusion from an investor perspective should be that most peripheral assets issued under local law should trade at a discount to foreign law obligations, given the greater redenomination risk for local law instruments and the implicit assumption of devaluation of the new national currency (we see this detailed further in Appendix III). The caveat to this argument is that insolvency may alter the conclusion. In the case of insolvency (i.e., bankruptcy proceedings in a domestic court), foreign law obligations may remain denominated in Euros (in a limited break-

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[26] Although we note that the Commission has specifically said exit was not possible.
[27] "Neither exit nor expulsion from the Eurozone is possible according to the Lisbon Treaty" (Altafaj 2011)
[28] In November 2011, the German ruling party, CDU adopted a plank in its platform to seek treaty change to allow Eurozone exit without EU exit.

up scenario). But there could still be a material haircut on foreign law obligations. Hence, in the case of insolvency, whether local law obligations should trade at a discount to similar foreign law obligations will then depend on an evaluation of the higher redenomination risk relative to the size of likely haircuts on local law vs foreign bonds. If haircuts on foreign law bonds are higher than on local law bonds, that could negate the redenomination effect, and foreign law bonds should no longer trade at a premium in this scenario.

Box I.1: Lex Monetae

Lex Monetae or "the law of money" is a well determined principle with a great deal of case law. It is generally established that sovereign nations have the internationally recognised right to determine their legal currency. Reliance on this principal was actually key to the establishment of the EUR itself (Duisenberg 1999; Proctor 2010; Proctor 2011; Proctor 2005).

When thinking about the likely redenomination process, the following parameters are likely to be crucial in order to establish the legal territorial nexus of contract/obligation:

1. Explicit Nexus of contract can be established via a (re)denomination clause: The EUR or in any event the legal currency of <Exiting Country> from time to time.

2. Implicit Nexus of contract if

   a. Contract is governed by the Laws of <Exiting Country>

   b. Location of Obligor (debtor) is <Exiting Country>

   c. Location which action must be undertaken (e.g., place of payment) is <Exiting Country>

   d. Place of payment is <Exiting Country>

If no denomination clause exists, it is up to the courts to determine the Implicit Nexus of the contract. Was EUR meant to be EUR or the currency of the <Exiting Country>? If all of the factors mentioned tie the contract to the <Exiting country>, there is a rebuttable presumption that the parties to the contract had intended to contract on the currency of the <Exiting Country>. If one or more of the implicit tests fails, it is highly likely that there is insufficient evidence to determine the link to the <Exiting Country> and the contract or obligation is likely to be kept in EUR. We expect that under this principle, the vast majority of English Law contracts originally denominated in EUR will remain in EUR (if it exists).

More detail on legal jurisdiction for financial instruments

In making contingency plans for various break-up scenarios, policymakers would need to understand issues around the redenomination process in detail. This is an extremely complex issue to think about in totality, and it would require significant leg work by key European institutions to aggregate issues at the micro level to a full firm level perspective, and from that to a full macro perspective. In this regard, the data sets we have put together, as outlined in Appendix IV and Appendix V, should be a helpful starting point.

The table below highlights the legal jurisdiction of a number of key Eurozone asset types. While we cannot claim completeness, we have attempted to highlight the appropriate governing principals, whether Local, English or NY and the body of law (e.g. Banking Law for deposits, Covered Bond law for Pfandbrief, Company Law for Equities) which governs each security, contract or interest. In the case of English or NY law, the only relevant body of law likely will be contract law, as foreign law is only used as a means of contracting outside of a local jurisdiction, and no specific foreign statute could have an impact.

Figure I.1: Governing law and standard financial securities and contracts

Governing Law	Security Type	Body of Law	Examples
Local Law	Soverign Bonds, Bills	Local Statute/Contract	GGBs, Bunds, OATs
	International Bonds	Local Contract	Republic of Italy, Kingdom of Spain, etc.
	Corporate Bonds	Contract	
	Covered bonds	Covered Bond Law (Pfandbrief)	Pfandbrief, Obligacions Foncieres, Cedulas, Irish CBs
	Schuldschein (marketable loans)	Contract	Banking schuldschein
	Loans	Contract	
	Equities	Company	Any EU Equity
	Commercial Contracts	Contract	
	Deposits	Banking Law	CDs
English Law	Sovereign Bonds	Contract	Greek Euro-bonds, Republic of Italy Euro-bonds, Kingdom of Belgium USD-denominated bonds
	Corporate Bonds (Euro-bonds)	Contract	
	Loans (Euro-loans)	Contract	
	Commercial Contracts	Contract	
NY/ Other Law	Sovereign Bonds	Contract	Yankees, Samurai, Kangaroos, Maple, Dim Sum, etc.
	Corporate Bonds	Contract	
	Loans	Contract	
	Commercial Contracts	Contract	
Master Agreements	International Swap Dealers Association (ISDA)	English or NY Contract	IR Swap/Fwd, FX Swap/Fwd, CDS, Bond option
	Commodity Master Agreements	Varies for each commodity	Gold Swap/Fwd, Electricity Swap/Fwd, etc.
	Rahmenvertragfür Finanztermingeschäfte (DRV)	German Contract	Swaps and repos with German counterparties
	Fédération Bancaire Française (AFB/FBF)	French Contract	Swaps with French counterparties and all local authorities
	Contrato Marco de Operaciones Financieras (CMOF)	Spanish Contract	Swaps with Spanish counterparties
	ICMA Global Master Repurchase Agreement (GMRA)	English Contract	Repo agreements
	Master Repurchase Agreement (MRA)	NY Contract	Standard NY law repo agreement
	European Master Agreement (EMA)	English Contract	Repo with Euro-system NCB/ECB
	General Master Securities Loan Agreement (GMSLA)	English Contract	Sec lending
	Master Securities Loan Agreement (MSLA)	NY Contract	Sec lending
	(Euro) Medium-Term Note Programme (MTN/EMTN)	English or NY Contract	WB, Republic of Italy, EIB MTN Programmes
Other	Bond Futures (Eurex)	German Contract	Bund, Bobl, Schatz, BTP Futures on Exchange
	IR Futures (Liffe)	English Contract	EURIBOR Contracts on Exchange
	Equity Futures	Local Law/ English Law	SX5E, DAX, CAC40, MIB, IDX, IBEX, BEL20, PSI-20
	OTC Futures	English or NY Contract	Client back-to-back futures with member firm
	Clearing Houses (LCH, ICE, etc)	English Contract, etc.	Repo, CDS, etc. via clearing houses
	Cash Sales	Sales or Transaction	All cash sales prior to settlement (i.e. before T+3)

Source: Nomura

A large portion of obligations in the Eurozone remain in local law, whether they are consumer deposits, (most) consumer mortgages, covered bonds (which are based entirely on local covered bond statutes, unlike RMBS which may be foreign law), equities and foreign-direct investment, and large numbers of sovereign and corporate bonds, loans and commercial contracts. These are by far the easiest class of assets to redenominate.

What is obvious as well about this table is the vast number of master agreements which underpin most financial transactions. These include the various swap agreements from ISDA (under NY or English law) to those under French, German or Spanish law, as well as the various Repo and Securities Lending master agreements and Medium Term Note (MTN) platforms for issuing bonds. Each master agreement involves far more paperwork than a single standalone swap contract or bond. But the setup costs ensure that once the master agreement is finished, individual swap and bond transactions can be documented quickly and efficiently. Moreover some master agreements such as MTNs may be flexible enough as to allow the issuance of bonds to be under various different governing laws. In fact ISDAs represent the lion's share of all obligations in the Eurozone,

being the basis for most swap and derivative contracts. And most of these are under English and New York law, with a smaller portion under German, French and Spanish law in order of size.

Of note as well are the exchange traded contracts, which although governed by contract law (typically under the law where the exchange is based), are far more malleable arrangements. In practice, an exchange may ask members to accept new terms and conditions on contracts, (including existing contracts), and members will mostly accept these new terms in the hopes of some one-time windfall, given that membership entails larger advantages. Effectively, exchange traded contracts are likely to handle redenomination automatically and smoothly with no net benefit for being on one side of a trade or another, based on redenomination. For instance, a Bund futures contract currently margined and settled in Euro, will likely re-margin in the new German Mark, with settlement in DEM for delivery of the new (DEM-denominated) Bund, so neither the buyer nor the seller will have the opportunity to gain EUR/DEM exposure. Correspondingly, a German Bund will almost surely be converted into DEM[29].

How decisions will be made - the judicial process

In terms of the judgment, there will likely be some variance as to courts' decisions based on both the method for introduction of the new currency and any legislation directly binding on the courts. The general criteria for decision are as follows:

Local Courts:

- **Specific Legislation (a currency law):** for Redenomination of Local Contracts into new currencies can bind courts and overrule any contractual terms. It is particularly likely that contractual terms will be changed to redenominate all local law contracts.

English Courts:

- **Lawful and Consensual Process implies application of Lex Monetae principle:** if legal nexus is to the exiting country, then redenomination can happen in some cases. Otherwise, the Euro will remain the currency of payments.

- **Unlawful and Unilateral Withdrawal - No redenomination:** As the UK is signatory to the Treaties, unlawful withdrawal is manifestly contrary to UK public policy and no redenomination will likely be allowed.

- **EU Directive/UK Statute to redenominate and ensure continuity of contract:** English Court must uphold UK statute and/or interpret UK Statute so as to be in agreement with EU directive, and therefore must redenominate.

- **English law contracts with no nexus and no statute:** can be settled in GBP, and NY law contracts can be settled in USD[30].

NY/Other Courts:

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[29] While some have suggested a windfall for Germany if Bunds remain EUR denominated if Germany adopts the DEM, such a piecemeal and discriminatory approach to adopting a currency law, which would be legal tender for all but the sovereign runs the risk of international challenge (Proctor 2011, 2012).

The judgment of a court challenging the new currency law however, could only disregard the new currency law and reinstate any payment terms of the original security, which happen to be Euro. Consequently, challengers would have almost no recourse, leaving this a legal possibility. But Germany would most likely redenominate deposits for which Banks hold some portion of Bunds for regulatory reasons. The possibility of a shortfall due to banking liabilities redenominating but their assets not doing so runs further risk of disrupting the banking system.

Finally, given Germany's international stature, this one-off gain that could undermine the confidence of foreign investors (although arguably not disadvantage them since they would still receive EUR according to the Bunds' original documentation) is more the tactic of an emerging market rather than a country of Germany's geopolitical importance. Given the lack of legal penalty, other countries whose new currencies may appreciate (e.g., Finland, possibly Austria and Netherlands) are more likely to consider this stratagem.

We consequently presume all local law bonds will be redenominated according to the new currency law

30 According to C Proctor (Proctor 2011, 2012), if payment cannot be made in EUR, English law contracts must be settled in sterling [Libyan Arab Foreign Bank v Bankers Trust Co (1987)]. Similarly ART 3-107 of Uniform Commercial Code in the US contemplates payment of foreign currency amounts by tender of equivalent amounts of US Dollar. In both cases, should the EUR cease to exist, it is likely courts will use the last available exchange rate.

- **Lex Monetae principle:** If legal nexus is to the exiting country then redenominate. Otherwise, the obligation will remain in Euros.

- **NY (or other) Statute to redenominate and ensure continuity of contract:** NY Courts must uphold NY State Legislation and redenominate contracts if so directed.

We note that the difference between lawful and unlawful break-up is crucial for UK courts. This is, in particular, because the UK was signatory to the treaties, and unless otherwise directed, a Legal tender law from an exiting country in flagrant violation of the treaties will be considered to be manifestly contrary to UK public policy and the Lex Monetae of the exiting country will likely not be upheld in UK Courts. The legality of exit is of little consequence to NY and other non-EU courts and probably will not prejudice their judgments.

We thus expect that foreign law will insulate contracts from redenomination in the vast majority of cases (in the UK in particular) and in all cases when the method of exit is unilateral and illegal. The one overriding concern would be the introduction of legislation (NY or EU/English) which circumvents any court decision, although due to the politics of exit, it is unlikely that any such legislation would be passed unless there was a complete break-up.

In a scenario where the Eurozone breaks up in its entirety and the EUR ceases to exist, contracts cannot, for practical purposes, continue be settled in Euros. In this case, there are two basic solutions. Either obligations are redenominated into new national currencies by application of the Lex Monetae principle, or there is significant rationale of the legal basis for the argument of *Impracticability* or *Commercial Impossibility*[31]. Alternatively, existing EUR obligations are converted into a new European Currency Unit (ECU-2), reversing the process observed for ECU-denominated obligations when the Euro came into existence in January 1999 (see Appendix VII).

As courts themselves will be unable to apply a conversion to a new ECU-2 without some overriding legislation, it would be necessary for the EU Council to adopt a directive, essentially to the effect of:

> *Where the EUR was previously the currency of denomination of any contract that is not so determined to have a nexus to any one particular country whose currency was previously the EUR, it will henceforth be redenominated into the ECU.*

As Governing Law is one of several determinants of the nexus of a given contract, it is altogether likely that national courts would only apply this directive in the case where the governing law is that of an EU country, not in the Eurozone, i.e., England, Scotland, Northern Ireland, Wales, Sweden, Denmark and the CEE. Furthermore this directive could only apply where there was no means for the courts to infer a nexus of the contract under the other typically usual terms of Lex Monetae as highlighted in the grey box below. With specific mention of sovereign bonds, it is likely that local law sovereign bonds will immediately be redenominated, while the foreign-law bonds, with obvious international distribution, would likely remain in EUR.

Awards will be awarded through enforcement

The court of judgment is somewhat significant, but the court of enforcement is of paramount importance in determining payoffs. In particular, if the court is:

Local Court:

- Courts will enforce payoffs only in the local currency (as per the new currency law) and conversion will take place at the time of award or at some official rate, which may differ from the market rate.

- If the entity is undergoing an insolvency governed by local law, conversion is generally made at time of insolvency filing (irrespective of eventual award). This also carries considerable exchange risk given that the delay between losses having occurred and awards being made may be considerable (Bawlf et al. 2010) .

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[31] The more common *Frustration of Contract* is unlikely to apply (Proctor 2010).

- There probably will be uncertainty over the timing of payment and the conversion rate may not be at market rates, but exchange controls may further complicate repatriation of awards.

English NY/Other Court:

- Redenomination is unlikely to change the award and enforcement will likely be made in appropriate foreign currency.
- If countries remain in the EU, the Rome Convention and Rome Regulation make enforcement of other EU (i.e., English) court judgments locally, which is mostly a routine matter.
- If English or other court is determined to be the appropriate jurisdiction for insolvency, then delivery in appropriate foreign currency (Bawlf et al. 2010).

The combination of the award and the enforcement risk highlight a number of interesting credit concerns. If there is an exit, local law instruments will typically be redenominated and there will be little protection in them, but foreign law affords far greater protection. If, on the other hand, the exit also involves insolvency, foreign law instruments may similarly afford little protection. Investors have sought the protection of Eurobonds during the Greek PSI and prefer the legal protection of English law Portuguese and Spanish bonds to prevent losses from future restructurings. However, if we take break-up into account, it would make more sense for the exiting government to continue to service their local law debt using seigniorage revenue (most likely during the initial stages of the exit, to instruct the newly independent national central bank (NCB) to undertake QE and purchase local government debt) and default on the overly expensive English-law Eurobonds.

Risk premia, financial uncertainty and contingency planning

It is crucial to note that the steps we have outlined to determine with certainty the currency of financial obligations are prerequisite to any risk management exercise, and a detailed understanding of these conceptual issues is a prerequisite for adequate contingency planning in an orderly redenomination process for European policymakers. But legal analysis of financial contracts is the first step, after which contingency planning and risk management must take place. Recognising the exposures the corporations have and taking prudential steps to minimise any possible losses is a necessary element of any stabilisation exercise, both pre-exit or break-up.

The UK's FSA began a contingency planning exercise on 23 November 2012 with their "Dear CRO" letter to many London-based financial institutions, following the publication of the Nomura paper "Special Topic: Currency risk in a Eurozone break-up - Legal aspects" (Nordvig et al. 2011), by 5 days. The Federal Reserve had been reported to be undertaking a similar planning exercise. This specific contingency planning for regulated institutions is necessary to ensure financial stability through the exercise, with planning including both isolation of redenomination risks (as well as those instruments which are far less certain), exposure management and risk mitigation, as well as settling operational issues involving redenomination and possible currency controls to ensure no technical default can occur, thereby reducing systemic risks of any break-up.

We might add that the contingency planning, which is well underway at this time in a number of jurisdictions within the EU, does not at this very moment indicate that a break-up or even a Greek exit is a necessity. The exit process is ultimately political and contingency planning by regulators and corporates at the behest of regulators is merely macro-prudential risk management.

For non-regulated corporates, there is significant economic incentive associated with undertaking similar contingency planning. In particular, any publicly announced preparedness is likely to be

rewarded by equity markets[32] in the hope that it will reduce economic uncertainty. This is very much in line with prevailing academic literature that Knightian uncertainty leads to increases of risk premia (Epstein et al. 1994; Basili 2000), a matter that is now often modelled in a Bayesian context by investors having a set of probability measures over which there is no means of determining which is most appropriate (i.e., no meta-probability or weighting scheme), and consequently the market must price to worst (Al-Najjar et al. 2011). It is well known that uncertainty is empirically observed to impact market prices, for instance political uncertainty (Pastor et al. 2011) or legal uncertainty (Weiss 2005; Davis 2011). While this uncertainty cannot be eliminated until a limited or a full break-up is finalised or a far more stable union is achieved, contingency planning can reduce this legal uncertainty, leading to a lessening of risk premia and reduction of strains on financial markets (although not eliminated).

We describe contingency planning as a crucial step in planning for an orderly break-up in Chapter 8. But such prudential measures also enhance welfare if break-up is not imminent by demonstrating good governance procedures for investors, thus reducing corporate equity and bond risk premia and making the cost of capital for Eurozone banks and corporates more attractive.

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[32] The rewards for preparedness can be seen anecdotally by the proliferation of publications by legal firms and consultancies on the matter in Dec 2011-Jan 2012 (e.g. Slaughter and May LLP 2011, Rhodes et al. 2012, Clifford Chance LLP 2012, Accenture 2011), each advertising expertise and services to corporates in order to pave the way for currency change with the least disruption to business.

Appendix II:
Size of Eurozone assets by legal jurisdiction

In Part II, we briefly highlighted the importance of the concept of legal jurisdiction of assets and liabilities in relation to redenomination associated with various break-up scenarios. The key point was that the legal jurisdiction of an asset or liability will be an important determinant of whether given assets can be redenominated into new national currencies when a country exits the Eurozone.

In this appendix, we derive detailed estimates of the size of Euro denominated assets and liabilities, broken down by legal jurisdiction. We construct estimates for all major Eurozone countries, in order to be able to answer macro questions at the country level.

The breakdown of exposures by legal jurisdiction is crucial when quantifying balance sheet effects associated with currency depreciations, such as those impacting borrowers in exiting countries. This has potential to significantly impact output dynamics following large currency depreciations. In addition, the proportions of local and foreign law exposures on bank balance sheets will have important implications in relation to the magnitude of spill-over effects to remaining EMU countries in a limited break-up, which again will impact financial stability nationally, regionally and globally. Finally, the very large size of Euro-denominated foreign law derivatives exposures means that in the absence of an efficient mechanism to settle such contracts in a full-blown break-up, there is a significant risk of a complete freezing of the global financial system, as described in Chapter 7.

Our method for quantifying assets and liabilities by legal jurisdiction

Over the last 12 months, we have been working on quantifying the size of various exposures within the Eurozone by legal jurisdiction. Our initial attempt to provide guidance on the size of Eurozone exposures by legal jurisdiction was published in November 2011 (Nordvig et al. 2011), and more elaborate data was presented Nordvig (2012(a)). Updated data on the break-down of assets by legal jurisdiction was also part of our original submission to the Wolfson Prize.

In this appendix, we take the analysis a step further by building a database of Eurozone assets and liabilities, including derivatives by legal jurisdiction. The compilation of the database is based on combining the logical application of the legal framework, as outlined in Chapter 3 and Appendix I, with a comprehensive data analysis of securities market data, loans and deposit data, and derivatives exposure, including evidence of a breakdown from OTC level sources.

Before we turn to the specifics of the data, it is helpful to apply the framework of classification by jurisdiction outlined in Chapter 3 and Appendix I. Based on that framework, the following general observations can be made:

- Portfolio equity and foreign direct investment asset and liabilities are largely governed by local law.

- Fixed income securities can be governed both by local and foreign law.

- Cross border loans (lending or borrowing) are generally governed by foreign law, typically English law.

- Cross border deposits are governed by the local law of the receiving bank

- Euro-denominated derivatives are predominantly governed by international law, typically English or New York law, although there are some rare exceptions where derivatives are governed by local law.

From this perspective, the greatest difficulty in quantifying the legal jurisdiction of certain assets and liabilities is associated with fixed income securities, which entail a mix of local and foreign law jurisdictions. The other asset classes are generally easier to handle, as the overall size of exposures can be logically grouped into either local or foreign law jurisdiction. Hence, we generally do not need any supplemental information to qualify assets as local or foreign law.

In the following analysis, we focus on:

- The size of foreign and local law components of Eurozone fixed income securities, broken down by Eurozone country.

- The size of foreign and local law components of Euro-denominated cross-border bank exposures, utilising the split between loans and deposits as a guide.

- The size of derivatives exposures, in the form of Euro-denominated currency and interest rate derivatives (generally foreign law).

Information about the legal jurisdiction of these instruments has generally not been a major focus of market participants, except in situations involving insolvencies. But information about legal jurisdiction is becoming highly relevant and investors are increasingly paying more attention.

This has also been illustrated by the focus on legal jurisdiction issues surrounding the recent Greek restructuring process. But the importance of quantifying these exposures goes far beyond Greece, and should be a crucial element in any break-up analysis, including from a macro perspective, as a parameter to evaluate systemic risks.

We do not go into the size of portfolio equity, FDI, or loan/deposit exposures in great detail in this appendix. We have used such data extensively, however, in the calculations in Chapter 5, in combination with the logical groupings of these assets into foreign and local law, as detailed in Chapter 3.

Eurozone fixed income securities by legal jurisdiction

Generally, bond markets offer more transparency than loan, forward, and swap markets, which are dominated by over-the-counter (OTC) transactions and are therefore harder to monitor from an outsider's perspective.

But even for bonds, detailed information about the legal jurisdiction of assets is generally not available. There are ways, however, to extract this information bond by bond. After comprehensive cross-checking of data sources, including the BIS, our preferred method for generating the break-down of fixed income securities by legal jurisdiction involves a mix of three main data sources. First, we have scanned a sample of more than four hundred thousand individual bonds from Bloomberg to find their legal jurisdiction. Second, we have used data from Nomura Credit Syndicate to accrue additional information on the jurisdiction of bonds, especially within the financial and non-financial issuer categories. Finally, we have used data on covered bonds from the ECBC to further improve the coverage of the overall sample.

The data based on this methodology is presented below. We break the data into Euro-denominated bonds and non-Euro-denominated bonds, and we also display a separate table for the total bond amounts.

The overall sample covers around EUR15trillion of bonds issued by Eurozone issuers, of which EUR13.4 trillion were Euro-denominated. To be specific, the sample of Euro-denominated bonds includes 26,770 bonds, from the 11 larger Eurozone countries (excluding Malta, Cyprus, Slovenia, Slovakia, Estonia and Luxemburg), which we analysed in detail. The number of bonds is smaller than the full sample number available from Bloomberg. However, the larger number of bonds listed on the Bloomberg system is accounted for by a large number of very small bond issues, for which the data on legal jurisdiction appears to be unreliable. Hence, we focus on the screened sample of bonds with somewhat larger amounts outstanding.

We note that our database does not cover Euro-denominated bonds issued by non-Eurozone issuers. Such an exercise would be relatively straightforward to run, but from a macro standpoint, we regard it as less important than the other exposures we focus on.

The tables on the following page show a general breakdown of bonds issues by Eurozone issuers broken down by legal jurisdiction.

Figure II.1: Euro-denominated bonds issued in the Eurozone (EUR bn)

	Sovereign			Financial			Nonfinancial			Total
	Local Law	Foreign Law	Unknown	Local Law	Foreign Law	Unknown	Local Law	Foreign Law	Unknown	
Austria	176	2	1	61	37	3	7	7	0	295
Belgium	309	16	5	5	115	4	40	25	3	522
Finland	69	1	0	13	15	0	3	7	1.4	110
France	1421	19	12	689	179	22	206	145	22	2716
Germany	1530	1	23	1199	58	6	297	42	17	3172
Greece	73	127	2	38	49	2	6	37	2	335
Ireland	114	0	0	93	32	3	4	45	16	307
Italy	1517	74	14	168	261	15	272	113	12	2446
Netherlands	282	15	0	192	25	19	324	47	21	925
Portugal	107	13	2	56	29	2	22	49	1	281
Spain	638	74	16	758	80	9	594	143	11	2323
Total	6237	342	76	3270	881	87	1773	660	106	**13433**

Figure II.2: Non-Euro denominated bonds issued in the Eurozone (EUR bn)

	Sovereign			Financial			Nonfinancial			Total
	Local Law	Foreign Law	Unknown	Local Law	Foreign Law	Unknown	Local Law	Foreign Law	Unknown	
Austria	1	11	6	3	15	0	0	0	0	37
Belgium	6	0	1	0	40	2	1	22	7	79
Finland	0	14	11	0	2	0	0	3	0.8	32
France	27	31	33	21	67	29	9	103	14	334
Germany	19	0	5	54	45	22	47	60	38	290
Greece	0	3	2	0	2	0	1	2	1	11
Ireland	0	0	0	2	14	2	6	23	7	55
Italy	8	27	6	6	13	3	1	65	18	145
Netherlands	0	3	2	75	53	17	7	37	13	206
Portugal	1	1	0	0	3	2	0	2	1	10
Spain	3	18	7	3	90	20	5	90	23	260
Total	66	109	73	167	342	97	77	407	122	**1460**

Figure II.3: All bonds issued in the Eurozone, irrespective of currency (EUR bn)

	Sovereign			Financial			Nonfinancial			Total
	Local Law	Foreign Law	Unknown	Local Law	Foreign Law	Unknown	Local Law	Foreign Law	Unknown	
Austria	177	13	7	65	52	3	7	7	0	332
Belgium	315	16	5	5	155	5	41	47	11	601
Finland	69	15	12	13	17	0	3	11	2.2	142
France	1448	50	45	710	246	51	215	248	36	3050
Germany	1549	2	27	1253	104	29	343	102	54	3462
Greece	73	130	4	38	52	3	6	38	3	346
Ireland	114	0	0	95	46	6	10	68	23	362
Italy	1525	101	20	174	274	18	273	179	29	2592
Netherlands	282	18	2	267	78	36	331	83	33	1131
Portugal	109	14	3	56	32	4	22	51	2	291
Spain	640	92	23	762	170	29	599	233	35	2583
Total	6303	451	149	3437	1224	184	1849	1068	228	**14893**

Note: Figure II.3 is simply the sum of the figures in Figure II.1 and Figure II.2.
Source: Nomura Credit Syndicate, Bloomberg, and ECBC

Key figures to note for Euro-denominated bonds include:

- EUR342bn of foreign law bonds in the sovereign category.

- EUR881bn of foreign law bonds in the financial issuer category.

- EUR660bn of foreign law bonds in the non-financial (corporate) category.

We note that the available data do not have information about jurisdiction for every single issue. But the methodology presented here minimises this problem by using multiple data sources, whereas we only used one source in previous research.

In the time between our first bond analysis and our most recent bond analysis, the Greek debt restructuring has caused an interesting shift in the jurisdiction of Greek sovereign bonds. This change can best be seen in Figure II.4 below, which shows that domestic sovereign bonds as a whole fell from EUR 263.4bn to EUR 71.7bn while outstanding amounts of international sovereign bonds increased from EUR 6.2bn to EUR 129.6bn.

Figure II.4: Legal jurisdiction of Greek sovereign bonds, before and after PSI (EUR bn)

(EUR bn)	As of 1/23/2012:	% of total	As of 4/30/2012:	% of total
Sovereign bonds	**269.6**	**100.0%**	**201.3**	**100.0%**
Domestic	263.4	97.7%	71.7	35.6%
Local law	255.2	96.9%	71.7	100.0%
Foreign law	8.2	3.1%	0.0	0.0%
International	6.2	2.3%	129.6	64.4%
Local law	0.4	6.5%	1.3	1.0%
Foreign law	0.7	11.2%	126.8	97.8%
Unknown	5.1	82.3%	1.6	1.2%

Note: Table only displays Euro-denominated bonds.
Source: Nomura, Bloomberg

Figure II.5 below shows the breakdown by legal jurisdiction in percentage terms. Note that amounts listed under the sovereign header include sub-sovereigns, i.e., regions, municipalities and agencies:

Figure II.5: Bond jurisdiction breakdown for all bonds issued in the Eurozone

	Sovereign		Financial		Nonfinancial		Total	
	Local Law	Foreign Law	Local Law	Foreign Law	Local Law	Foreign Law	Local Law	Foreign Law
Austria	93%	7%	56%	44%	47%	53%	77%	23%
Belgium	95%	5%	3%	97%	47%	53%	62%	38%
Finland	83%	17%	43%	57%	21%	79%	67%	33%
France	97%	3%	74%	26%	46%	54%	81%	19%
Germany	100%	0%	92%	8%	77%	23%	94%	6%
Greece	36%	64%	43%	57%	14%	86%	35%	65%
Ireland	100%	0%	67%	33%	13%	87%	66%	34%
Italy	94%	6%	39%	61%	60%	40%	78%	22%
Netherlands	94%	6%	77%	23%	80%	20%	83%	17%
Portugal	89%	11%	64%	36%	30%	70%	66%	34%
Spain	87%	13%	82%	18%	72%	28%	80%	20%
Total	**93%**	**7%**	**74%**	**26%**	**63%**	**37%**	**81%**	**19%**

Source: Nomura Credit Syndicate, Bloomberg, and ECBC

The table below, Figure II.6, offers additional detail on the specific foreign jurisdiction of the bonds included in the table above. As it turns out, the most relevant foreign jurisdictions are the English, German, and New York jurisdictions. For simplicity, the data

is reported in aggregate figures, rather than broken down into the individual Eurozone countries. The main message here is that English law accounts for the majority of all foreign law issues. Also, financial issuers seem to use German law rather than their own domestic jurisdiction. Meanwhile, New York law applies to just below 10% of non-financial (corporate) issuance under foreign law, and even less than that for sovereign and financial issues.

In terms of summary figures, there are EUR1883bn worth of total allocated foreign law bonds in our sample. Scaling this amount up to the size of the total sample (including both allocated and unallocated bonds) suggests that foreign law bonds amount to EUR1.9 trillion when all legal jurisdiction information is available.

Figure II.6: Legal jurisdiction of EUR-denominated bond amounts outstanding (EUR bn)

	Sovereign		Financial		Nonfinancial		Total
	Amount Outstanding (EUR bn)	%	Amount Outstanding (EUR bn)	%	Amount Outstanding (EUR bn)	%	
Total	**6655**	**100%**	**4239**	**100%**	**2539**	**100%**	**13433**
Unallocated	19	0%	87	2%	106	4%	212
Allocated	6636	100%	4152	98%	2433	96%	13221
Local law	6294	95%	3270	79%	1773	73%	11338
Foreign law	342	5%	881	21%	660	27%	1883
English	251	73%	688	78%	499	76%	1438
New York	18	5%	7	1%	53	8%	78
German	17	5%	69	8%	25	4%	111
Other	56	16%	118	13%	83	13%	257

Source: Nomura Credit Syndicate, Bloomberg, and ECBC

Euro denominated bank assets by legal jurisdiction

As with derivatives contracts, there is a general lack of information about the legal jurisdiction under which loans are extended. BIS data for the fourth quarter of 2011, which was released in April 2012, shows that total cross-border loan exposures in Euros reported by global banks add up to USD14trillion.

It is our understanding that the large majority of cross-border loans are governed by foreign laws, particularly English law. However, the aggregate exposures are comprised of a mix of cross-border loans and cross-border deposits, and the deposits are almost certainly governed by local law.

Since the BIS provides no additional breakdown of exposures at the currency specific level, we have to rely on an estimate of how much of the aggregate cross-border Euro exposure is in deposit form, versus other assets. There is no accurate way to do this for Euro-denominated assets specifically. But looking simply at the aggregate breakdown for Eurozone countries, total bank assets of BIS reporting banks consisted of $3.8 trillion worth of loans, and $3.9 trillion worth of deposits, or a deposit ratio of 51%.

Euro-denominated derivatives by legal jurisdiction

Turning to derivatives markets, the importance of foreign law jurisdiction grows, including for basic markets such as FX forwards, FX swaps, and interest rate swaps. These contracts are generally traded within ISDA agreements, written with reference to English and New York law, which would add significant complexity to any redenomination process. Moreover, these markets are very large in size.

The data on the outstanding notionals in Euro-denominated currency derivatives from the BIS is probably the best source. The latest survey is from 2010, but current exposures are likely to be comparable in size. The survey shows a total $22.7trillion in FX derivatives outstanding, of which $18.5trillion is in the form of FX forwards and swaps, and of which $4.2trillion is FX options.

For Euro-denominated interest rate derivatives, the notionals involved are even larger, according to TriOptima's Interest Rate Trade Repository Report: total notionals for interest rate derivatives outstanding amount to $219.6trillion, of which $20.2trillion is forward rate agreements, $172.7trillion is interest rate swaps, and $26.7trillion is interest rate options.

Summary of exposures

The bottom line from the examples presented here is that Euro-denominated exposure in foreign law contracts is very large. In addition to the relatively well-defined exposure in bond markets (in the region EUR1.9 trillion), there may be around EUR 3.8 trillion of exposure in the form of cross-border EUR-denominated loans. In addition, FX related derivatives may involve outstanding notional amounts in the region EUR15-25 trillion (depending on the foreign exchange rate used). Finally, there are extremely large indirect exposures through interest rate derivatives, in the region of at least EUR150 trillion. Since these instruments are governed by foreign law, they would create major redenomination issues in a break-up scenario.

Remaining information gaps

While we have made significant progress in understanding Eurozone exposures by legal jurisdiction over the last 12 months, there are still significant information gaps. Regulators would need to investigate the breakdown of assets by legal jurisdiction more carefully to close these gaps. The analysis of bond market information above is based on samples of varying size, the largest covering more than four hundred thousand bonds. But this sample does not cover the entire spectrum of bonds outstanding. More importantly, there is virtually no aggregate data available on the legal jurisdiction of derivatives and loan contracts.

Regulators, in preparation for a possible break-up, should seek to quantify the exposures to instruments of different jurisdictions at the institutional level in order to determine implicit open currency exposures and the need for planning across various jurisdictions, including English, New York and other jurisdictions. In particular, there are derivative transactions and back-to-backs where several legs could potentially be redenominated differently, which will be the cause for far greater scrutiny by regulators and courts seeking resolutions that are least disruptive to the majority of the counterparties involved.

One added complexity is the fact that many of these transactions involve laws of several countries. For instance, it would be possible to have issued an ABS securitisation of Spanish assets under English law. There are similar complexities involving so-called back-to-backs, where banks generally execute intermediate trades which are meant to be economically hedged, but the underlying contracts fall under several jurisdictions. A common example is members facing Eurex under German law, but facing non-member investors in a back-to-back contract under English law.

Appendix III:
Currency valuation within the Eurozone

In this appendix, we first discuss methods for estimating current misalignment of Eurozone real exchange rates. We then turn to a framework for projecting nominal currency moves following exit. Our estimates could be relevant both in a limited break-up scenario (for the departing countries) and in a full-blown break-up scenario (for all Eurozone countries)[33].

I. Estimating Current Misalignment

We start out by briefly highlighting which national (real) exchange rates appear to be significantly overvalued, and where currency depreciation (and monetary independence) may serve a function in terms of boosting growth.

Our measure of misalignment combines two basic approaches to currency valuation:

- *A time series based component*. This component captures the degree to which the current level of the real exchange rate is stronger than the historical norm. We do our own calculations of current real exchange rate levels relative to the real exchange rate levels prevailing the period prior to EMU entry, when real exchange rates were arguably closer to equilibrium.
- *External balance based component*. This component captures the degree to which flow and stock based metrics of the external balance points to un-sustainability, at the current level of the exchange rate. We use metrics derived by the European Commission (European Commission 2011) to quantify this component[34].

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[33] Note that in this analysis, we base our calculations on an assumed EUR/USD rate of 1.34. However, the Euro has weakened substantially since the beginning of May, and measures should be adjusted for this depreciation going forward.

[34] We use the average of the estimated overvaluation from the flow-based approach (current account) and the stock-based approach (net foreign liabilities position) to calculate this component.

Figure III.1: Estimates of current misalignment of country-specific real exchange rates
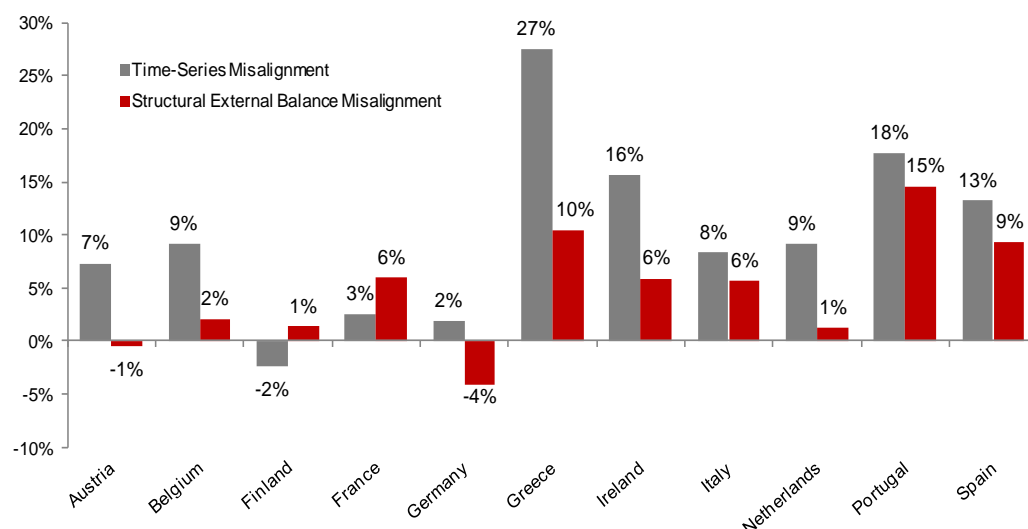
Note: Positive figures indicate overvaluation.
Source: Nomura

Our overall metric, which is an average of these two estimates of misalignment, points to significant over-valuation for Greece (18.9%), Portugal (16.1%), Spain (11.2%), and Ireland (10.8%). Meanwhile, the results for Italy and Belgium point to more moderate overvaluation (6-7%).   At the other end of the spectrum, Germany and Finland stand out as the two countries with potentially undervalued real exchange rates (-1.1% and -0.5%, respectively). The overvaluation indicated by these aggregate measures is a function of the deteriorating cost of competitiveness, as suggested by the time series based information on real exchange rates, as well evidence of large external imbalances, on both flow and stock based metrics, for a number of countries.

Figure III.2: Summary measure of FX misalignment in Eurozone countries
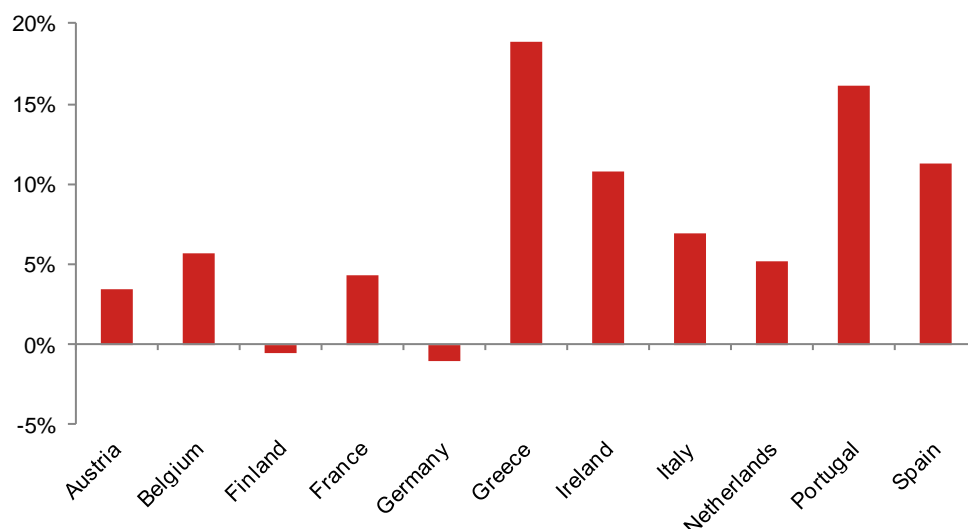
Note: Positive figures represent overvaluation. Figures are simple averages of the two measures in Figure III.1.
Source: Nomura

There are many different ways to measure currency over- or under-valuation in the Eurozone (Bayoumi et al. 2011), and thus it is hard to have confidence in one measure, even if its robustness is enhanced by the use of various subcomponents derived from different methodologies.

We can use market share analysis as an alternative measure of competitiveness to cross-check our results above. It is fairly uncontroversial that some Eurozone countries are facing significant competitiveness issues associated with overvalued real exchange rates. One simple indication of this is the extremely high peaks in average trade and current account deficits observed in Greece, Portugal and Spain in the post-EMU period (see Figure 3 below).

Figure III.3: Current account deficits of Eurozone countries: recent vs. historical (% of GDP)

	Post-EMU (%)		Pre-EMU (%)	
	Peak	Average	Peak	Average
Greece	-14.6	-9.1	-3.8	-2.4
Portugal	-11.6	-9.0	-6.8	-2.0
Spain	-10.0	-5.8	-3.6	-1.8
Ireland	-5.3	-2.1	-1.5	1.6
Italy	-3.4	-1.6	-2.7	0.3
Belgium	-2.9	2.6	1.8	4.1
France	-1.9	0.1	-0.8	0.7
Germany	-1.7	3.5	-1.4	0.0
Austria	-1.6	1.7	-2.9	-1.2
Finland	1.3	4.9	-5.4	-0.1
Netherlands	1.9	5.4	2.1	4.1

Note: Post-EMU period is defined as 1999-current day for all countries, including Greece. Pre-EMU period is defined as 1989-1999.
Source: Nomura, Eurostat

Additionally, we can consider competitiveness in terms of trade dynamics within Eurozone countries themselves. This type of analysis similarly indicates growing weakness in competitiveness within the individual nations, as demonstrated in Figure 4 below.

As expected, Figure III.4 points to large market share losses for all the peripheral countries since the introduction of the Euro. But in addition to this finding, the market share based metrics also point to large losses in competitiveness for France and Belgium. Meanwhile, the figures point to somewhat lower market share losses in Spain and Ireland. One explanation of why this is not translating into overvaluation on the summary metric displayed above for Italy and France is that they still have relatively moderate net external liabilities, in part because they came from a favourable starting point on this metric around ten years ago.

Figure III.4: Change in share of world exports from 2000-2010
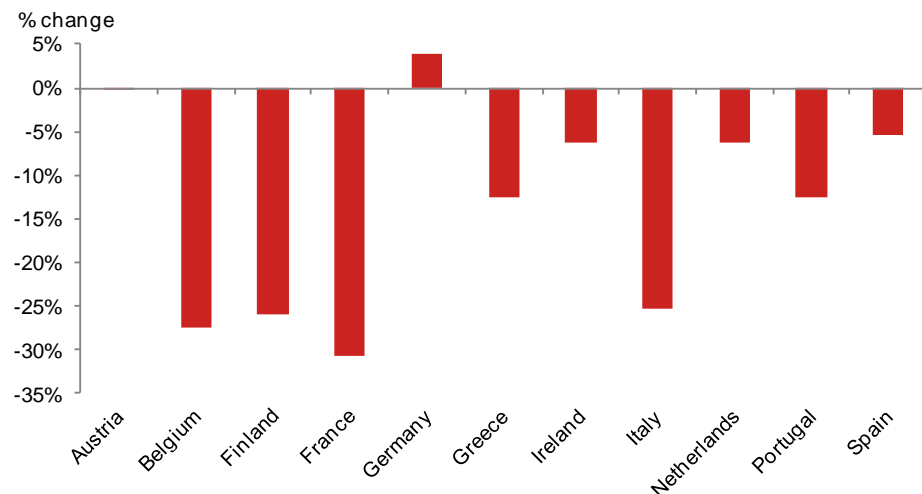
Note: The share of world exports ('export market share') captures the value of exports of goods and services of a country compared to the value of total world exports, both at current prices. The data are based on the Balance of Payments information (European Commission 2011).
Source: Nomura, Eurostat, IMF

One drawback of these types of indicators is that they can be quite lagging. For example, the market share data is not up-to-date beyond 2010. Moreover, recent evidence on price competitiveness suggests that material changes on some cost competitiveness metrics are under way in some countries, Ireland and Spain in particular (Darvas 2012).

This means that the real exchange rate misalignment is in the process of correction through internal devaluation in Ireland, and to some degree in Spain. However, sluggish productivity growth and sticky wages seem to be hampering this process in Greece and Portugal.

A fuller analysis of these issues would require a separate stand-alone paper. But we note that the likely path of cost competitiveness going forward should be taken into account when doing policy analysis, including the effects that recently implemented structural measures will have in facilitating greater labour market and wage flexibility going forward, and allowing internal devaluation to take place.

What seems clear is that the exchange rates of Greece and Portugal are significantly overvalued, both in the sense that price competitiveness has suffered over a sustained period of time, and in the sense that large external liabilities have been built up, probably to a level where they are not sustainable without a combination of currency depreciation and/or debt restructuring. Moreover, there is little evidence that significant improvement is under way. Specifically, unit labour cost indicators have hardly improved at this point in these two economies. Finally, since these are small economies, the exchange rate should be an

important variable for overall growth (even if Greek exports are so depressed that the economy does not look particularly open based on the export to GDP share)[35].

For a group of countries, including Spain and Ireland, the evidence is more mixed. Market share indicators do not point to any acute degree of currency overvaluation, and there is evidence that price competitiveness is starting to improve (especially in Ireland's case). But the size of external liabilities is a concern, making adjustment through FX depreciation alone hard to achieve (as we discuss in Chapter 5).

Finally, the evidence for France, Italy and Belgium is also mixed. These three economies have all lost significant market share in global export markets over the last ten years. But they still have moderate net external liability positions, in part due to favourable starting points, which have supported income balance flows even as trade flows have deteriorated. Moreover, in the case of France and Italy, both economies are large and less open than most other Eurozone economies (the average of imports and exports is less than 30% of GDP). This implies that export dynamics may be less dominant as a factor in overall output than in other Eurozone economies, where trade accounts for a larger share of output. In these economies, domestic demand is the more important determinant of output, and this may matter in weighing the benefits of increased currency flexibility, especially when taking into account transition costs associated with an exit process.

II. Valuing new national currencies

In estimating values for new national currencies of the current Eurozone countries, we view our estimates as an initial benchmark for where currencies may trade in a "new equilibrium" following a potentially lengthy and extremely volatile transition period. Such estimates will be "moving targets, influenced by country specific policies, the global environment, and regional political developments in the European Union.

For full disclosure, we are not regarding the break-up scenario as our central case. But it has become a real risk over the last few months, and a possibility which investors and policymakers should now plan for.

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[35] There is some ongoing debate about recent improvement in Portugal's exports. The IMF has argued in recent reviews that export performance is improving. But this has hardly been sufficient to alter growth dynamics, as exports are coming from relatively low base, following loss of market share over 10 years (IMF 2012).

Figure III.5: Fair value estimates for new national currencies in a Eurozone break-up scenario
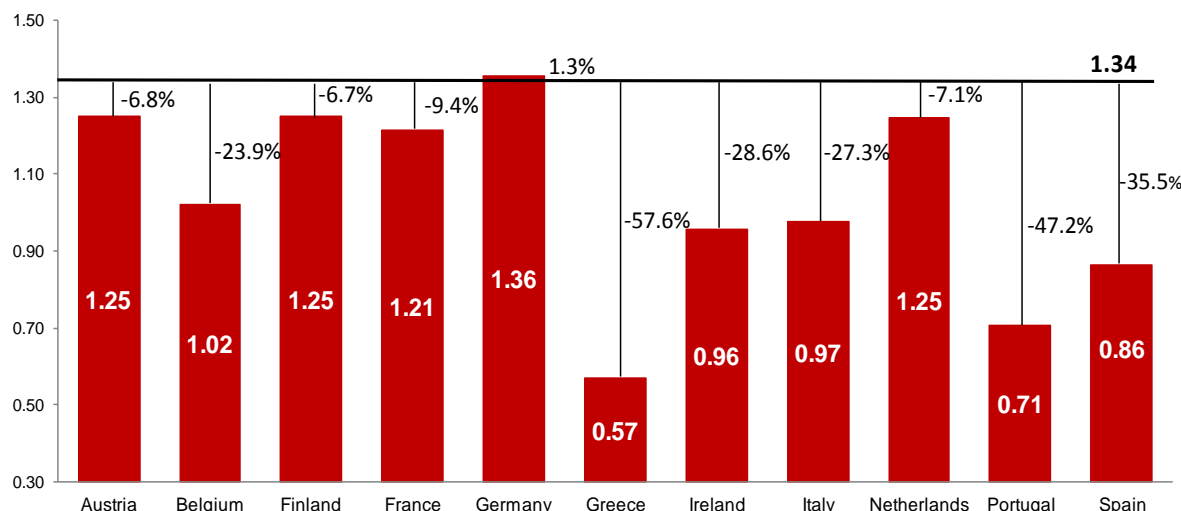
Note: These fair value estimates are calculated for the national currencies of each of the 11 original Eurozone members and are based on a 5-year horizon following a potential Eurozone break-up. The percentages included in the chart represent the degree of appreciation/depreciation from the EUR/USD value, which stood at roughly 1.34 as of early December.

Source: Nomura

A framework for valuing new national Eurozone currencies

Currency valuation is a complex exercise, and the uncertainties associated with a Eurozone break-up further complicate the analysis.

There are many possible permutations for a break-up. To simplify the analysis, we will focus on currency valuation at the national level, country by country, rather than for possible new groups of countries. We think this exercise is instructive, as even if some Eurozone countries manage to maintain a currency union, the value of a new composite currency is likely to be linked to the value of the individual component currencies. Similarly, currency projections at the national level can be used in a bottom-up valuation exercise for a new European Currency Unit (ECU-2).

Since the uncertainties in the valuation exercise are large, we want to focus on a relatively simple and transparent framework. And we want to stress up-front that these estimates are unlikely to be particularly precise. They are intended to give a sense of potential magnitudes involved over a 5-year forward time frame, after which we believe temporary transition effects should be smaller. In addition to currency misalignments, our approach also considers projected future inflation risk. A break-up of the Eurozone would mean that individual Eurozone countries would return to independent monetary policies. The national central banks would have differing inflation fighting credibility and face varying degrees of pressure to provide liquidity for banks and public institutions. Those differences would leave potential for significant divergence in inflation trends.

A Eurozone break-up will create additional short-term risks and require new risk premia for investors. These extraordinary risk premia will vary by country depending on factors such as market volatility and liquidity conditions, as well as issues relating to capital controls, including possible taxes on capital flows. Since our analysis is focused on equilibrium considerations over a 5-year period, we will not focus directly on these more temporary effects, although we recognise that they could be crucial in the short-term.

Quantifying future inflation differentials

In a break-up scenario where individual Eurozone countries return to independent monetary policy, there is potential for significant divergence in inflation rates. Projecting future inflation is challenging

under normal circumstances, but it is doubly difficult in an environment of severe instability and structural changes associated with establishing new frameworks for monetary policy at the national level.

Nevertheless, there are a number of parameters which help gauge the country specific inflation risk in a Eurozone break-up scenario. Here, we will focus on four main parameters that we think are important. We do not view this as a complete analysis, but rather as an initial attempt to quantify some of the key parameters involved.

We focus on four parameters which measure future inflation risk:

1. Sovereign default risk: Financial stability and conduct of sound monetary policy is closely linked to fiscal stability. From this perspective, sovereign default risk will be a key parameter influencing future inflation risk. This is especially the case since sovereign default is likely to trigger a domestic banking crisis, in which case central bank action may be partially dictated by the liquidity needs of banks. We look at the implied default probability in 5yr CDS to quantify sovereign default risk per country.

2. Inflation pass through: The degree to which the inflation process is vulnerable to shocks depends on openness, indexation, unionisation, terms of trade volatility and other factors. The exchange rate pass-through is a summary measure, which captures a number of these effects. Past inflation volatility is another proxy for susceptibility to shocks, such as energy price shocks. We use estimates from academic studies of the exchange rate pass-through coefficient per country and we combine this with the observed volatility of CPI inflation in the past at the country level.

3. Capital flow vulnerability: Combination of large current account deficits combined and a weak structure of capital flows can leave a vulnerable capital flow picture. A vulnerable balance of payment situation may imply a higher risk of capital flight, with implications for money demand and inflation dynamics. We look at the basic balance, defined as the current account balance plus net foreign direct investment flows, as a simple metric of capital flow vulnerability by country

4. Past inflation track record: Inflation expectations can have long memory, and past experiences may matter when new monetary policy frameworks are put in operation. The inflation track-record before Euro entry may therefore be important. We look at inflation performance in the pre-Euro period (1980s and 1990s) by country.

In order to translate these different metrics of future inflation risk into a common indicator, we use a simple scoring method.

The *first step* is to define the range of possible outcomes for future inflation. There is no obvious upper limit to how much inflation could result in a worst-case scenario. But we think a look at countries affected by currency crises in the past may provide some clues.

Figure III.6: Inflation dynamics in times of currency crisis (y-o-y CPI inflation)

	2 years prior to currency crisis (A)	5 years following currency crisis (from date of de-peg)					Average post-currency crisis inflation (B)	Inflation shock (B)-(A)
		1st year	2nd year	3rd year	4th year	5th year		
Russia	14	97	32	22	17	14	36	**22.0**
Mexico	8	35	35	21	16	17	25	**16.3**
Indonesia	7	34	50	2	10	13	22	**14.6**
Argentina	-1	26	15	4	10	11	13	**14.1**
Brazil	8	15	7	7	4	4	7	**-0.4**
Thailand	6	9	2	1	2	1	3	**-2.8**
Turkey	59	57	43	25	10	8	29	**-30.8**

Source: Nomura, Bloomberg, Eurostat, OECD

Figure III.6 looks at inflation dynamics around a number of prominent currency crises in the past (Argentina 2001, Thailand 1997, Indonesia 1997, Russia 1998 and Mexico 1994). We define the "inflation shock" as the increase in average annual inflation in the five years following the beginning of the currency crisis, as compared to the inflation level in the two years prior to the crisis. The table shows that Russia is an outlier, with a very large inflation shock of 22%. A number of the other examples (Indonesia, Mexico and Argentina) show a cluster around 15%, while Turkey was an outlier in the other direction, with a negative inflation shock, due to successful macroeconomic stabilisation.

We use this analysis to define an extreme upper limit of 15% on the potential inflation shock Eurozone countries could experience on an annual basis over a 5-year period, following a Eurozone break-up. To define a lower limit, we look at the lowest CPI readings observed in the Eurozone over the last 20 years. There have been many episodes of moderate deflation, but peak deflation has generally not seen CPI inflation drop below minus 2%. We use this as the lower limit of the inflation shock.

The second step is to map the four inflation risk parameters into this scale (from -2% to +15%). We do this by mapping sovereign default risk, inflation pass-through, past inflation measures into a -2%-15% scale using the cross-sectional distribution of the parameter values. Similarly, we map the external balance measures into a 0% to 15% scale, assigning a value of 0 to all countries with a positive external balance. These calculations are summarised in Figure III.7 (for a more detailed view of future inflation risk calculations, see *Box III.1: Complete calculation of future inflation risk* below).

Figure III.7: Inflation risk parameters and potential future inflation shock in a break-up scenario

	Sovereign Default Risk (%)	Inflation Pass-Through		Capital Flow Vulnerability (%)	Past Inflation (%)	Total Future Inflation Shock (%)
		FX Pass-Through	CPI Volatility			
Austria	14.2	0.77	0.9%	3.0	3.1	**1.1**
Belgium	22.7	0.83	1.2%	-7.6	3.5	**4.1**
Finland	5.8	0.77	1.3%	3.1	4.7	**1.5**
France	15.2	0.79	0.7%	0.4	4.6	**1.6**
Germany	7.9	0.75	0.7%	7.0	2.7	**0.5**
Greece	99.6	0.78	1.0%	-11.2	15.3	**11.1**
Ireland	45.2	0.56	2.8%	-4.8	5.8	**5.3**
Italy	32.8	0.94	0.7%	-2.7	7.7	**4.9**
Netherlands	8.9	0.79	0.9%	9.0	2.7	**0.9**
Portugal	59.7	0.82	1.3%	-12.6	11.9	**9.3**
Spain	28.4	1.04	1.2%	-5.5	7.2	**6.1**

Source: Nomura, Bloomberg, Eurostat, FRB

In order to keep the real exchange rate constant, and maintain competitiveness, equivalent annual depreciations of nominal exchange rates would be needed. For example, assuming no inflation shock in trading partner countries, this analysis suggests that the new Greek currency would need to depreciate by 47.7% in nominal terms over a 5-year period in order to compensate for the cumulative inflation differential associated with an annual inflation shock of 11.1% over the period. At the other end of the spectrum, Germany and the Netherlands stand out, and our estimates suggest that Germany may experience only very moderate inflationary pressure in a Eurozone break-up scenario (less than 1%). In addition, both countries also have a better inflation track-record than the US, which is our benchmark country.

Valuation of new national currencies: A two-factor approach

Having quantified the two components of our valuation framework, we can derive fair value estimates of new national currencies as the product of the two effects: i) the current real exchange rate misalignment, and ii) the future inflation risk. Our model has an explicit medium-term focus, and in order to make the investment implications clear, the results are expressed in nominal terms, relative to the dollar. We note again that the framework is not incorporating extraordinary risk premia, which could be very significant in the transition period toward a new equilibrium.

The key results are summarised in the table below, and they are based on the nominal exchange rate value versus the dollar from early December (1.34).

Figure III.8: National currency fair value projections in a Eurozone break-up scenario

	Fair Value Estimate		Estimated change due to:	
	Estimate	Total Change (%)	Current FX Misalignment (%)	Future Inflation Risk (%)
Austria	1.25	-6.8	-3.4	-3.5
Belgium	1.02	-23.9	-5.6	-19.3
Finland	1.25	-6.7	0.5	-7.2
France	1.21	-9.4	-4.3	-5.4
Germany	1.36	1.3	1.1	0.2
Greece	0.57	-57.6	-18.9	-47.7
Ireland	0.96	-28.6	-10.8	-19.9
Italy	0.97	-27.3	-7.0	-21.8
Netherlands	1.25	-7.1	-5.2	-2.0
Portugal	0.71	-47.2	-16.1	-37.1
Spain	0.86	-35.5	-11.2	-27.3

Note: Estimates should be viewed as 5-year ahead fair value projections.
Source: Nomura

The fair value calculations show potential for significant (58%) depreciation of the new Greek drachma relative to the US dollar, followed by a 47% depreciation of the new Portuguese escudo. Perhaps not surprisingly, our estimates also suggest that Ireland, Spain and Italy are likely to see significant depreciation of new national currencies in a break-up scenario. We estimate depreciation of about 25-35% for this group, driven by a combination of the two factors in our framework.

At the other end of the spectrum, Germany stands out as facing no material depreciation risk within the equilibrium framework considered. In fact, our estimates suggest a marginal appreciation potential, although the effect is too small to be economically meaningful.

The countries not in our story…

Our study has focused on the first 11 Eurozone member countries, although the analysis excludes Luxembourg, which is likely to re-peg its currency to another "stable" European country, given its very small size. We have also excluded the five newcomers to the Eurozone: Slovenia, Slovakia, Cyprus, Malta, and Estonia from this initial study.

The reason is two-fold. First, these countries are all relatively small in terms of the size of their economies and their financial markets. Second, the methodology we have been using is not directly suitable for the countries which joined the Eurozone later on. We may do a customised analysis for those countries at a later date.

How to interpret the results

Our estimates provide an initial attempt to quantify potential medium-term depreciation risk of individual national Eurozone currencies in a break-up scenario.

Our estimates are based on the notion that the real exchange rate in most developed markets tends to have a mean-reverting component, meaning that it settles at a new equilibrium level after the effect of temporary shocks have abated. This again implies that the nominal exchange rate in the medium-term (which we define as a 5-year period) can be viewed as a function of i) the current real exchange rate misalignment, and ii) cumulative inflation differentials.

The framework does not explicitly incorporate effects, which could permanently affect the level of the real exchange rate. Such effects include permanent terms of trade shocks and diverging productivity trends. Since, we are dealing with Eurozone countries, which generally have limited commodity resources, we do not think the exclusion of terms of trade dimension is likely to be crucial, and we do incorporate an effect from varying inflation pass-through when accounting for inflation risk in our framework. We recognise that structural reform initiatives could have a significant impact on productivity growth, and may need more consideration over time. At this stage, however, it seems almost impossible to quantify such effects, and we have not yet made the attempt.

Figure III.9: Depreciations of currencies in the 2 years surrounding breaks from pegs
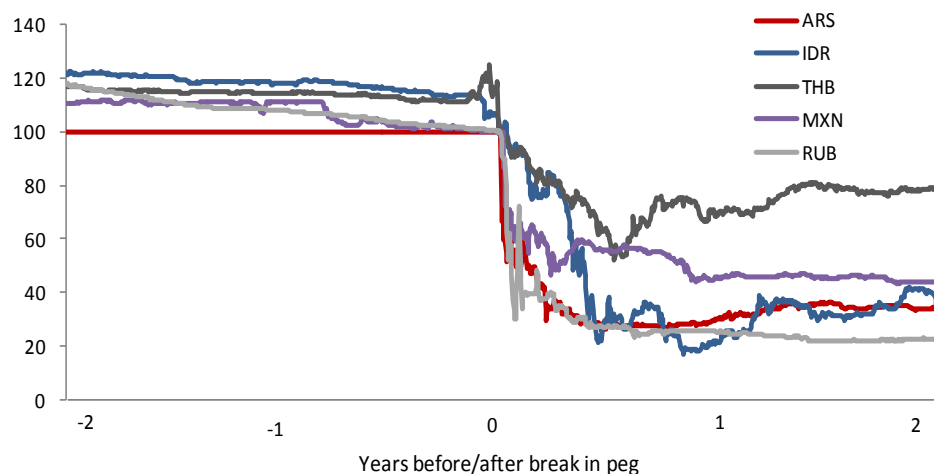
Note: Indexed to year of break in peg.
Source: Nomura, Bloomberg

The framework also does not incorporate cyclical effects, which could be material. A break-up scenario would likely involve important growth underperformance in Europe overall, relative to the Americas and Asia, for example, with implications for real interest rate dynamics. But this effect would come in addition to the effects analysed here.

Our estimates deal with a medium-term concept of currency fair value. In the shorter-term, however, other influences on the exchange rate could be significant. This is the experience from previous currency crises. In the Argentine crisis, for example, the Argentine Peso staged a dramatic drop of 72% in nominal terms in the five months following its break off the peak, and this move arguably exceeded what turned out to be justified from a real exchange rate analysis perspective.

In general, the short-run path is likely to be influenced by the interaction between a number of forces. Certain extraordinary risk premia are likely to be required by investors and other market participants to compensate for risk associated with excess volatility and illiquidity. In addition, there may be additional risks associated with capital controls, including taxes on capital flows. High local interest rates may provide partial compensation for such risk, limiting the need for a depressed currency value, although this may again depend on the condition of the banking system, which could well be in a very fragile state.

Box III.1: Complete calculation of future inflation risk

	Sovereign Default Risk		Inflation Pass-Through			Capital Flow Vulnerability		Past Inflation (%)		Future Inflation Risk (%)
	Implied Default Probability	Inflation risk #1	FX Pass-through	CPI Volatility	Inflation risk #2	Basic Balance	Inflation risk #3	Past Inflation	Inflation risk #4	
Austria	14.2	0.4	0.77	0.9%	2.6	3.0	0.0	3.1	1.5	**1.1**
Belgium	22.7	1.9	0.83	1.2%	5.1	-7.6	7.6	3.5	1.9	**4.1**
Finland	5.8	-1.0	0.77	1.3%	3.7	3.1	0.0	4.7	3.2	**1.5**
France	15.2	0.6	0.79	0.7%	2.7	0.4	0.0	4.6	3.1	**1.6**
Germany	7.9	-0.7	0.75	0.7%	1.5	7.0	0.0	2.7	1.0	**0.5**
Greece	99.6	14.9	0.78	1.0%	3.1	-11.2	11.2	15.3	15.0	**11.1**
Ireland	45.2	5.7	0.56	2.8%	6.1	-4.8	4.8	5.8	4.5	**5.3**
Italy	32.8	3.6	0.94	0.7%	6.8	-2.7	2.7	7.7	6.5	**4.9**
Netherlands	8.9	-0.5	0.79	0.9%	3.1	9.0	0.0	2.7	1.0	**0.9**
Portugal	59.7	8.1	0.82	1.3%	5.1	-12.6	12.6	11.9	11.2	**9.3**
Spain	28.4	2.8	1.04	1.2%	10.0	-5.5	5.5	7.2	6.0	**6.1**

Source: Nomura, Bloomberg, Eurostat, FRB

This table is an extension of Figure III.8, showing the raw inputs contributing to each of the four intermediate measures (labelled Inflation risk #1-4) used to calculate the final future inflation risk percentage. Each subcomponent is indexed from -2 to 15, with values less than zero representing future deflation and values greater than zero representing future inflation. The exception to this indexation method is the basic balance, which was indexed from 0 to 15 because a surplus in a country's balance would not imply negative inflation risk. In the case of inflation pass-through, indexed FX pass-through and indexed CPI volatility were averaged together to find a final indexed value of inflation pass-through (Inflation risk #2). Following this process, Inflation risks #1-4 were averaged together to find an overall future inflation risk value for each Eurozone country.

Appendix IV:
Balance sheet effects in a Eurozone break-up

The relevance of balance sheet effects for growth

The basic relationship between exchange rates and growth has been investigated for decades within the economics profession. The older economic literature typically focuses on the effect the exchange rate has on trade performance. Specifically, the literature has focused on the so-called Marshall-Lerner condition, which states the conditions under which currency depreciation is supportive of the trade position as well as growth. But the more recent research has been focused on financial sector effects, in addition to the real effects through net exports. See, for example, Frankel (2004) for an overview of the literature on balance sheet effects.

The key message of the literature overall is that there are two opposing effects at play:

- *First*, the positive effects from currency depreciation, through increased competitiveness on trade performance, and into output.
- *Second*, the negative effect from currency depreciation, through balance sheets, on the net worth of domestic agents, access to credit, ability to invest, and into output.

The strength of the first effect will be linked to factors such as inflation pass-through, the price elasticities of imports and exports, and the size of the export sector. The strength of the second effect will be linked to the size of external liabilities in foreign currencies and to the level of financial development.

The problem is that there is very little empirical work that has been done on possible balance sheet effects in the context of a Eurozone break-up. In fact, to our knowledge, there is essentially no applied research on the size of these effects that incorporates the legal aspects of redenomination.

Outside of the specific issue of a Eurozone break-up, however, there is sizeable literature, which investigates balance sheet effects in emerging market countries, typically in the context of explaining output behaviour following large currency depreciations. We will draw on this literature in designing our methodology. Key papers include Goldstein (2004), Eichengreen (2007), and Towbin (2011).

Methodology

In order to analyse balance sheet effects in the context of a Eurozone break-up, we construct data on external liabilities in foreign currencies from an ex-post perspective, following a break-up and redenomination into new national currency. We do this for our sample of the 11 largest Eurozone countries.

Importantly, the size of external liabilities in foreign currency ex-ante (when the exiting country still has the Euro as its currency) is not the same as the size of external liabilities in foreign currency ex-post (when the exiting country has shifted to its own currency, and remaining Euro liabilities are now foreign currency).

This issue is crucial in that agents up until now have had little ability to hedge their (implicit) intra-EMU currency exposures (more on this in Chapter 9). This means that the balance sheet effects associated with ex post foreign currency external liabilities may be more pronounced than in other examples from history, when agents had better instruments to hedge out those exposures.

The key takeaway from our analysis of legal aspects of redenomination is that the extent to which EMU exit creates new foreign currency external liabilities will depend on the composition of liabilities by legal jurisdiction:

- Local law liabilities, such as local law government bonds, are likely to be redenominated into the new local currency in a break-up scenario (as outlined in Chapter 3 and Appendix I), and such liabilities will not create a negative balance sheet effect as a function of depreciation.

-   Foreign law liabilities, such as government bonds issued under English law, cannot easily be redenominated into local currency even in a break-up scenario, and are likely to remain in Euros even after exit from the Eurozone, assuming a limited break-up scenario.

As such, foreign law liabilities in Euro will create new foreign currency liabilities for domestic agents in a break-up. Liabilities which were in foreign currency ex-ante, such as US Dollar liabilities, should also be taken into account, but they are generally much smaller in magnitude than the foreign law Euro liabilities, and the size of foreign law Euro liabilities will be the most important determinant of negative balance sheet effects associated with currency depreciation.

In this context, we note that the proportion of foreign law instruments in overall external liabilities is similar to the concept of 'original sin' in the literature of balance sheet effects in relation to emerging market currency crises. In that literature, the 'original sin' parameter measures the degree of foreign currency borrowing in total borrowing for a given country (Goldstein 2004). But for Eurozone countries, which have predominantly borrowed in Euros, the more relevant concept now becomes the proportion of foreign law instruments in the overall liability structure.

The diagram below shows a stylised break-down of external liabilities at the country level, consistent with how statistics for the international investment position is constructed. To be precise, the diagram captures how previously Euro-denominated assets and liabilities can be grouped according to whether they are governed by foreign law or by the local law of the exiting country.

Figure IV.1: International investment position of exiting country

External Assets	External Liabilities	
FDI	FDI	
Portfolio equity securities	Portfolio equity securities	
Portfolio debt securities	Portfolio debt securities	Portfolio debt securities
Mortgage instruments/ covered bonds	Mortgage instruments/ covered bonds	
Other assets, cross-border bank loans	Other liabilities, cross-border bank loans	
Other assets, cross-border deposits	Other liabilities, cross-border deposits	
Derivatives	Derivatives	
Central bank assets	Central bank liabilities	

(foreign law)
(local law)

Liabilities noted as local law are subject to redenomination in the case of exit, whereas foreign law assets and liabilities are likely to stay denominated in Euros. The foreign law liabilities have potential to create negative balance sheet effects for borrowers after exit.

Our calculation then essentially comes down to combining traditional international investment position data with proportions of foreign law exposure in each line item. The foreign law proportions are derived for bonds, using detailed micro level data, as described in Appendix II. The foreign law proportion of cross-border bank exposures are calculated using our framework of classification of financial instruments by legal jurisdiction, and by using various BIS data breakdowns.

Estimates of relevant external liabilities in the Eurozone

Figure 2 below shows our calculation of the relevant external liabilities, which takes into account the legal jurisdiction of specific line items in the external balance sheet. To describe how the table works, we use Spain as an example:

Spain has EUR708bn in bond-related external liabilities, according to international investment position data, of which EUR248bn are external liabilities of the Spanish government and EUR460bn are external liabilities of the private sector. The share of foreign law bonds within government bonds is 13%, and the share of foreign law bonds within private sector bonds is 23% (according to our own compilations, as derived in Appendix II). Applying these foreign law

percentages to the overall exposures allows us to calculate the relevant bonded liabilities, which in this case add up to EUR140bn, or 13% of GDP.

In terms of cross-border loan-related liabilities for the private sector, Spain has EUR670bn in total liabilities. Of this total amount, EUR492bn are bank liabilities, of which 64% are loans (see Figure 12), and EUR178bn are non-bank liabilities, mostly belonging to corporates. By applying the loan share to the total bank liabilities and aggregating with total non-bank liabilities (all of which would be under foreign law), we find that relevant loan-related liabilities for the private sector amount to EUR491bn (46% of GDP).

For the public sector of Spain, loan-related external liabilities account for EUR210bn. Both the general government loans (EUR35bn) and the central bank, or TARGET2, loans (EUR175bn) will be subject to redenomination in the case of a break-up. As such, the total EUR210bn of loan-related liabilities are considered relevant for the public sector, bringing relevant loan-related public sector liabilities to 20% of GDP.

Figure IV.2: Relevant external liabilities

(EUR bn)	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
Bond related external liabilities	340.6	254.5	161.6	1967.2	2038.7	75.9	136.2	954.8	834.6	111.2	708.0
General government	162.5	183.2	81.8	1037.3	1137.8	73.3	68.0	666.5	224.9	54.2	247.6
Share of foreign law	8%	7%	18%	5%	1%	64%	0%	7%	6%	13%	13%
Private sector	178.0	71.3	79.8	929.9	900.9	2.5	68.1	288.3	609.7	56.9	460.4
Share of foreign law	48%	82%	64%	37%	17%	67%	56%	51%	32%	52%	23%
Relevant bonded liabilities	*97.5*	*70.4*	*66.2*	*397.5*	*168.2*	*48.6*	*38.1*	*191.9*	*209.1*	*36.2*	*139.5*
% of GDP	*32%*	*19%*	*35%*	*20%*	*7%*	*23%*	*24%*	*12%*	*35%*	*21%*	*13%*
Loan related external liabilities (private sector)	168.8	459.2	205.3	1217.6	1024.5	98.1	103.9	512.3	732.2	133.6	670.2
Local banks	138.7	429.2	177.1	1131.5	887.8	91.0	304.6	397.3	656.3	105.5	492.2
Share of loans	46%	39%	68%	46%	40%	38%	53%	65%	58%	64%	64%
Non-banks	30.1	30.0	28.3	86.1	136.7	7.2	43.0	115.1	75.9	28.0	178.0
Relevant loan-related private sector liabilities	*94.0*	*196.3*	*149.3*	*610.7*	*487.4*	*42.1*	*204.6*	*374.4*	*453.5*	*95.9*	*491.2*
% of GDP	*31%*	*53%*	*78%*	*31%*	*19%*	*20%*	*131%*	*24%*	*75%*	*56%*	*46%*
Loan related external liabilities (public sector)	48.5	51.5	6.3	171.8	187.2	188.4	155.8	201.0	0.0	105.4	210.1
Government loans	13.9	0.0	5.3	20.5	140.6	83.7	35.3	6.9	0.0	44.5	34.7
Central bank (Target 2)	34.6	51.5	1.0	151.3	46.6	104.8	120.4	194.1	0.0	61.0	175.4
Relevant loan-related public sector liabilities	*48.5*	*51.5*	*6.3*	*171.8*	*187.2*	*188.4*	*155.8*	*201.0*	*0.0*	*105.4*	*210.1*
% of GDP	*16%*	*14%*	*3%*	*9%*	*7%*	*88%*	*100%*	*13%*	*0%*	*62%*	*20%*

Source: Authors' calculations, National central banks, World Bank, BIS, IMF

Net relevant external positions

Since the asset side of external balance sheet may provide at least a partial offset to liability position (depending on distribution between sectors and individual entities), we next examined the external assets of each country in order to create a measure of net relevant external positions. On the asset side, both loans and deposits will be subject to redenomination in the case of a break-up, and hence both will be considered relevant external asset exposures. Considering these asset positions alongside the liability positions calculated above, we derived a measures of net relevant positions in both the private and public sectors (see Figure IV.3).

It is important, however, to note the role that asset depreciation plays into this net relevant external position. Interpreting output effects of net positions is theoretically relatively straightforward for countries facing currency depreciation in a break-up scenario. However, for countries, such as Germany, whose currencies may appreciate in a break-up, the concept of net relevant external position is less useful because positive net positions could lead to losses on assets. Still, this loss would have a much more moderate effect on growth

and credit constraints than losses on the liability side. Figure IV.3 below shows the net relevant external positions of the 11 Eurozone countries[36].

Figure IV.3: Net relevant external liabilities (EUR bn)

(EUR bn)	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
Net relevant external position	**230.6**	**571.8**	**90.5**	**1697.7**	**2976.9**	**-118.5**	**39.4**	**134.9**	**759.1**	**-35.5**	**-225.0**
Private position	232.1	616.9	18.5	1777.6	2327.0	101.7	175.6	254.2	595.8	48.4	-67.2
Assets	411.2	871.6	219.2	2732.3	2967.5	145.5	289.0	776.0	1244.6	173.7	531.3
Liabilities	179.1	254.7	200.8	954.7	640.5	43.9	113.4	521.8	648.8	125.3	598.6
Public position	-1.4	-45.1	72.0	-79.9	650.0	-220.1	-136.2	-119.4	163.4	-83.9	-157.7
Assets	59.4	18.4	93.1	145.4	852.3	15.2	19.6	126.2	177.2	28.4	84.5
Liabilities	60.8	63.5	21.1	225.3	202.3	235.3	155.8	245.5	13.8	112.3	242.2

Figure IV.4: Net relevant external position (% of GDP)

(% of GDP)	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
Net relevant external position	**77%**	**155%**	**47%**	**85%**	**116%**	**-55%**	**25%**	**9%**	**126%**	**-21%**	**-21%**
Private position	77%	167%	10%	89%	91%	47%	112%	16%	99%	28%	-6%
Assets	137%	236%	115%	137%	116%	68%	185%	49%	207%	102%	50%
Liabilities	59%	69%	105%	48%	25%	20%	72%	33%	108%	73%	56%
Public position	0%	-12%	38%	-4%	25%	-102%	-87%	-8%	27%	-49%	-15%
Assets	20%	5%	49%	7%	33%	7%	13%	8%	29%	17%	8%
Liabilities	20%	17%	11%	11%	8%	109%	100%	16%	2%	66%	23%

Note: Negative figures denote an overall net external liability position, while positive figures denote a net external asset position.

Source: Authors' calculations, National central banks, World Bank, BIS, IMF

Importantly, Greece, Portugal, and Spain are the only countries with negative relevant net external positions, indicating that they are the most vulnerable to losses in the case of a Eurozone break-up. It is also interesting to note that Spain is the only country with a negative, albeit small, private external position, while GIIPS (led by Greece) and France all negative public sector external positions. These overall exposures drive our analysis of the economic impact of a currency redenomination on the 11 main Eurozone countries in the case of a Eurozone break-up.

However, this initial calculation of net relevant external positions may not be the most practical approach. Since a country's assets would probably fail to fully offset its liabilities in the case of a currency union break-up, we create an alternative scenario for illustrative purposes in which we assign a partial weighting of 50% to each country's assets. This scenario is represented in the tables below, the idea being to create a simple concept that bridges the gross and net concepts.

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[36] We find that Finland's private net external position is composed of a larger share of cross-border bank loans on the liabilities side relative to the asset side when compared with other countries, which pulls Finland's private sector external position significantly lower.

Figure IV.5: Net relevant external liabilities with partially weighted asset component (EUR bn)

(EUR bn)	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
Net relevant external position	**-4.7**	**126.8**	**-65.7**	**258.8**	**1067.0**	**-198.8**	**-114.9**	**-316.2**	**48.2**	**-136.5**	**-532.9**
Private position	26.5	181.1	-91.2	411.5	843.2	28.9	31.1	-133.8	-26.5	-38.4	-332.9
Assets	205.6	435.8	109.6	1366.2	1483.8	72.8	144.5	388.0	622.3	86.9	265.7
Liabilities	179.1	254.7	200.8	954.7	640.5	43.9	113.4	521.8	648.8	125.3	598.6
Public position	-31.1	-54.3	25.5	-152.6	223.8	-227.7	-146.0	-182.4	74.8	-98.1	-200.0
Assets	29.7	9.2	46.5	72.7	426.2	7.6	9.8	63.1	88.6	14.2	42.2
Liabilities	60.8	63.5	21.1	225.3	202.3	235.3	155.8	245.5	13.8	112.3	242.2

Figure IV.6: Net relevant external liabilities with partially weighted asset component (% of GDP)

(% of GDP)	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
Net relevant external position	**-2%**	**34%**	**-34%**	**13%**	**42%**	**-92%**	**-73%**	**-20%**	**8%**	**-80%**	**-50%**
Private position	9%	49%	-48%	21%	33%	13%	20%	-8%	-4%	-22%	-31%
Assets	68%	118%	57%	68%	58%	34%	92%	25%	103%	51%	25%
Liabilities	59%	69%	105%	48%	25%	20%	72%	33%	108%	73%	56%
Public position	-10%	-15%	13%	-8%	9%	-106%	-93%	-12%	12%	-57%	-19%
Assets	10%	2%	24%	4%	17%	4%	6%	4%	15%	8%	4%
Liabilities	20%	17%	11%	11%	8%	109%	100%	16%	2%	66%	23%

Note: Negative figures denote an overall net external liability position, while positive figures denote a net external asset position.

Source: Authors' calculations, National central banks, World Bank, BIS, IMF

From this table, we can draw the following conclusions:

Public Sector

1. Greek public sector liabilities are especially large, as Greece is the only country with a negative public sector position exceeding 100% of GDP. This is mostly due to the large proportion of English law bonds in Greek public bonded liabilities, which is a result of the debt restructuring in March 2012, and due to TARGET2 liabilities.

2. Besides Greece, Ireland is the only country with public sector liabilities of over 50% of GDP.

3. Meanwhile, core countries such as Germany, the Netherlands and Finland have positive adjusted net relevant positions in their public sectors.

Private Sector

1. Portugal and Spain stand out here with sizeable private sector adjusted net relevant liability positions, amounting to over 20% of GDP in each country.

2. Although private sector liabilities in Finland appear to be quite large, Finland may have a relatively strong currency in an exit, so this will not be as significant a problem as it would be in other Eurozone countries with weaker currencies.

The difference between adjusted and unadjusted net relevant external positions can best be seen in Figure IV.7 below. In the second scenario of partially-weighted assets, it is clear that the GIIPS nations (and Finland, due to its large level of bank loans as compared to bank assets) have the largest balance sheet exposure out of all the Eurozone countries.

Figure IV.7: Net relevant external position: full vs. partially weighted asset component
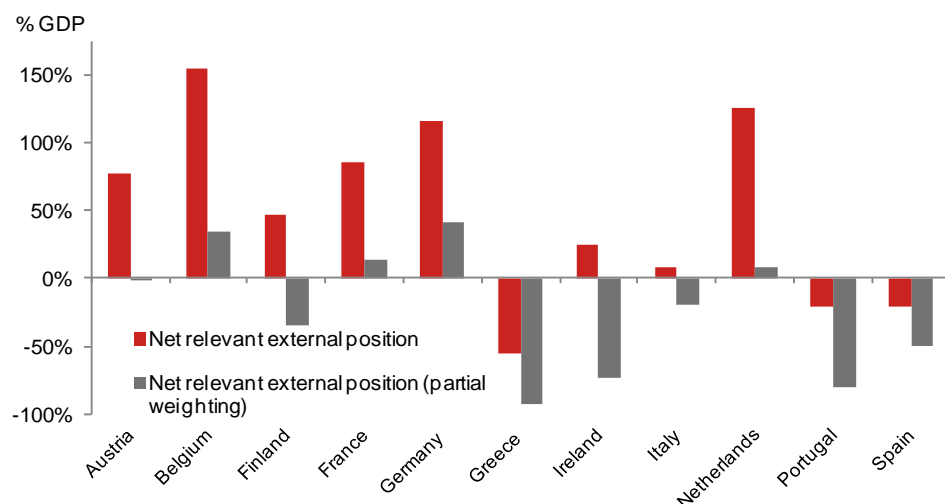
Underlying data and necessary adjustments

For completeness, we provide below the full details of our data construction (this section is not critical to understanding any of the main concepts).

In order to obtain a full set of comparable international investment position (IIP) datasets for all 11 countries in our sample, we constructed a database of foreign assets and foreign liabilities for each of the 11 main Eurozone nations, shown in Figures IV.8 and IV.9 below, using various adjustments and estimates to fill data gaps.

Figure IV.8: Foreign asset position (EUR bn)

(EUR bn)	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
Direct Investment	232.4	686.0	107.3	1139.8	1085.7	33.2	250.6	380.4	728.9	52.6	496.4
Portfolio investment	244.8	554.0	208.0	2099.7	1872.0	72.3	583.2	796.2	1028.0	115.6	309.9
Debt securities	188.1	373.0	122.3	1589.2	1373.1	54.5	146.6	480.1	578.0	93.5	232.7
Central bank	18.6	18.4	13.8	60.2	87.7	14.0	17.1	66.7	22.1	18.0	52.4
General government	0.9	0.0	0.4	0.0	129.5	0.0	0.2	3.9	0.0	2.2	7.7
MFIs	71.8	144.0	48.1	620.7	498.4	26.0	46.1	76.3	225.7	29.7	61.6
Other	96.8	210.6	60.0	908.3	657.5	14.5	83.3	333.3	330.2	43.7	111.0
Equity securities	56.7	181.0	85.7	510.5	498.9	17.9	436.6	316.1	450.1	22.1	77.2
Other investment	282.5	517.0	190.0	1288.5	2446.7	106.3	161.9	422.0	843.8	108.6	383.1
Central bank	34.3	0.0	68.1	51.8	530.1	1.2	0.7	9.5	155.1	1.5	4.8
General government	5.6	0.0	10.8	33.4	105.0	0.0	46.1	46.1	0.0	6.7	19.6
MFIs	208.2	371.2	100.4	1123.2	1327.3	72.3	75.9	223.0	494.5	62.1	230.7
Other	34.4	145.8	10.8	80.1	484.3	32.7	83.7	143.4	194.3	38.3	128.1
Total Assets	**759.7**	**1757.0**	**505.3**	**4528.1**	**5404.4**	**211.8**	**995.7**	**1598.6**	**2600.7**	**276.8**	**1189.4**

Figure IV.9: Foreign liability position (EUR bn)

(EUR bn)	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
Direct Investment	209.7	674.0	64.1	754.7	695.2	21.2	188.2	261.6	455.3	84.3	480.1
Portfolio investment	377.8	301.5	218.1	2558.5	2419.7	81.6	1281.6	1071.0	1156.0	145.2	873.6
Debt securities	340.6	254.5	161.6	1967.2	2038.7	75.9	136.2	954.8	834.6	111.2	708.0
Central bank	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
General government	162.5	183.2	81.8	1037.3	1137.8	73.3	68.0	666.5	224.9	54.2	247.6
MFIs	140.8	23.2	60.8	548.7	817.4	0.0	8.6	152.3	454.3	29.0	223.0
Other	37.2	48.1	19.0	381.3	83.5	2.5	59.5	136.0	155.4	27.9	237.5
Equity securities	37.2	47.0	56.4	591.3	381.0	5.8	1145.4	116.2	321.5	34.1	165.5
Other investment	217.3	510.7	211.7	1389.4	1211.7	286.5	259.7	713.3	732.2	239.0	880.3
Central bank	34.6	51.5	1.0	151.3	46.6	104.8	120.4	194.1	0.0	61.0	175.4
General government	13.9	0.0	5.3	20.5	140.6	83.7	35.3	6.9	0.0	44.5	34.7
MFIs	138.7	429.2	177.1	1131.5	887.8	91.0	60.9	397.3	656.3	105.5	492.2
Loans	63.9	166.3	121.1	524.6	350.7	35.0	32.3	259.3	377.6	67.9	313.2
Deposits	74.9	262.9	56.0	606.9	537.1	56.0	28.6	138.0	278.7	37.6	179.0
Other	30.1	30.0	28.3	86.1	136.7	7.2	43.0	115.1	75.9	28.0	178.0
Total Liabilities	**804.8**	**1486.2**	**493.8**	**4702.6**	**4326.7**	**389.4**	**1729.4**	**2045.9**	**2343.5**	**468.5**	**2233.9**

Note: Highlighted inputs represent insufficient data corrected using Nomura estimates (see explanation below).
Source: Authors' calculations, National central banks, World Bank, BIS, IMF

We used international investment position data from each national central bank as our primary source, but we recognise that this data may have some inherent issues and inconsistencies. For example, the Irish and the Dutch data tend to be biased by the use of foreign jurisdictions (due to tax considerations) as a base for multinational issuers to raise capital through issuing debt instruments via finance vehicles on-lending to the parent company. As such, we made several adjustments to this fundamental data to correct for inconsistencies and gaps between country reports:

1. In the case of Ireland, we had to adjust overall external assets and liabilities downward because a large part of that exposure is due to multinational entities issuing through local subsidiaries. This added exposure makes Ireland appear to have a significantly higher exposure in the form of bonds and loans than any other Eurozone nation. For bonds, we collected data from Bloomberg (which included bonds issued by foreign branches of Irish entities) and our Nomura Credit Syndicate (which did not include these multinational issuances) and used the ratio of the total amounts outstanding of NCS bonds over Bloomberg bonds to adjust our measure of bonded debt in both the assets and liabilities categories for Ireland by a factor of 0.132.

Figure IV.10: Ireland bonded debt inflated by multinational exposure

For loans in both the assets and liabilities categories, we used an assumed adjustment factor of 0.5 to make a similar adjustment for multinational loans.

2. To further break down other investments of MFIs into loans and deposits, we used BIS data to determine the ratios of loans and deposits to total other investment bank liabilities.

Figure IV.11: Breakdown of cross-border liabilities

(EUR bn)	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
Other investments	138.7	429.2	177.1	1131.5	887.8	91.0	304.6	397.3	656.3	105.5	492.2
Loans	63.9	166.3	121.1	524.6	350.7	35.0	161.6	259.3	377.6	67.9	313.2
Deposits	74.9	262.9	56.0	606.9	537.1	56.0	143.0	138.0	278.7	37.6	179.0
Loans share	46%	39%	68%	46%	40%	38%	53%	65%	58%	64%	64%
Deposits share	54%	61%	32%	54%	60%	62%	47%	35%	42%	36%	36%

   a. By taking outstanding amounts of loans (or deposits) in all sectors less outstanding amounts of loans (or deposits) of non-banks, we calculated outstanding amounts of bank loans (or deposits). Next, we found the proportion of bank loans (or deposits) relative to the sum of bank loans and deposits to determine the share of loans (or deposits) in total other investments. We then applied these ratios to the headline figure of other investments for each country to determine the gross amounts of bank loans and deposits as sub-divisions of all other investment.

3. For central bank debt assets in Germany, we used a measure including securities and deposits, since this figure is mainly composed of securities and is therefore a good proxy for foreign asset debt securities. Due to a lack of sectoral breakdown in Belgium, the Netherlands, and France data:

   a. To calculate central bank assets in debt securities, we used data for the rest of the Eurozone countries in our sample to calculate a simple ratio between FX reserves and reported central bank assets in other investments. Using this average ratio of 3.0, we scaled up the FX reserves for Belgium, the Netherlands, and France and used this final figure as a measure of other investments. (Note:

We used this approach for Germany as well). We assume that general government assets held in debt securities and other investments for Belgium, the Netherlands, and France are equal to 0, since this type of exposure is generally small.

  b. Combining the calculated measures in part a., we have public sector debt security assets for all 3 countries listed above and public sector other investment assets for the Netherlands and Belgium. We then subtracted these from total debt security assets and total other investment assets, respectively, to find equivalent measures for the private sector.

4. Using data from the other Eurozone countries included in our analysis, we calculated the average proportion of private sector debt securities and other investments that are attributed to MFIs and "other" sectors. For debt securities, MFIs accounted for 41% of private sector assets while other sectors accounted for 59%. For other investments, MFIs accounted for 72% of private sector assets while other sectors accounted for 28%. We then applied these proportions to total private sector debt security assets in all 3 countries and to total private sector other investment assets in Belgium and the Netherlands to break each type of investment down into MFIs and "other" sectors.

5. On the liabilities side, we use data from the World Bank Quarterly External Debt Statistics database to provide the sectoral breakdown for debt securities in Belgium, the Netherlands, and France and other investments in Belgium and the Netherlands.

6. Due to a lack of data for other investments made by the central banks in Belgium and the Netherlands, we supplemented these figures on both the assets and liabilities side by applying the formula used to calculate TARGET2 balances from Hans-Werner Sinn and Timo Wollmershaeuser's paper (Sinn et al. 2011) using IMF data for Q4 2011. We then included this figure on the liabilities side for Belgium and the assets side for the Netherlands and assumed a value of 0 for central bank other investments on the opposite side of the balance sheet. Since we are interested in the final net figures anyway, this will not affect our final calculation.

Appendix V:
Spill-over effects to the rest of the Eurozone

In this appendix, we provide additional detail on the spill-over effects discussed in Chapter 6. We first provide detail on bank losses. We then turn to official sector losses.

Banking sector losses

Bank losses resulting from FX depreciation

As outlined in the main text, we consider potential losses stemming from two effects: currency moves and defaults. Starting with the banking sector, we gathered the latest (Q4 2011) consolidated bank data from the BIS on an ultimate risk basis for each of the 11 Eurozone nations, broken down by sector when possible. This raw data can be found in Figure V.2 on the next page. Unfortunately, six of the countries do not provide a sector break-down of international claims, so we calculated the average share of each sector in total foreign claims for the countries that did report claims by sector and applied these percentages to the total foreign claims of the six countries.

For bank exposures to the public sector (which is almost entirely in the form of government bonds), we focus on bonds under local law by applying the share of local law bonds from our analysis in Appendix II. With regard to corporate bonds, we believe there is very little corporate bond exposure on bank balance sheets, and thus we ignore this component in our calculations.

For exposures in the form of banking assets, we similarly only considered the deposits portion (since that is governed by local laws) by applying the share of deposits calculated in Appendix IV. We adjusted exposures to the Greece sovereign down, to account for the 75% haircut in March 2012, which happened after the latest data point in our data set.

The local law share of government bond holdings, as well as the deposit share of cross-border loans assets, are summarised in the table below. We will impose these shares on the raw BIS figures to derive the relevant exposures, and conduct loss calculations:

Figure V.1: Share of local law liabilities in bank assets

Share of:	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
Deposits	54%	61%	32%	54%	60%	62%	47%	35%	42%	36%	36%
Local law government bonds	92%	93%	82%	95%	99%	36%	100%	93%	94%	87%	87%

Source: BIS

Figure V.2: International bank claims, consolidated on an ultimate risk basis (EUR bn)

Q4 2011 (EUR bn)	Sector	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain	Total exposure
Austria	**Total foreign claims**		**1.3**	**0.8**	**7.6**	**35.3**	**1.8**	**1.5**	**14.2**	**10.1**	**0.8**	**3.4**	**76.8**
	Banks	0.5		0.2	39.1	5.7	0.0	0.6	2.8	1.6	0.5	3.0	54.1
	Public sector	0.6		0.2	3.2	2.0	0.5	0.3	5.5	0.3	1.4	2.2	16.2
Belgium	Non-bank private sector	0.1		0.0	2.6	3.0	0.0	15.8	1.2	15.1	0.2	4.9	43.1
	Unallocated by sector	0.0		0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3
	Total foreign claims	**1.2**		**0.5**	**45.0**	**10.7**	**0.6**	**16.9**	**9.5**	**17.1**	**2.1**	**10.1**	**113.6**
Finland	**Total foreign claims**	**0.3**	**0.2**		**2.6**	**1.9**	**0.0**	**0.4**	**0.4**	**1.7**	**0.2**	**0.9**	**8.6**
	Banks	3.6	17.9	0.9		45.9	0.2	6.1	24.2	17.7	3.4	18.0	137.9
	Public sector	5.5	43.3	2.0		31.4	5.0	1.7	51.0	12.9	3.2	14.4	170.4
France	Non-bank private sector	3.1	111.4	2.7		84.5	29.0	13.4	181.0	58.9	10.1	56.0	550.1
	Unallocated by sector	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0
	Total foreign claims	**12.2**	**172.6**	**5.6**		**161.9**	**34.2**	**21.2**	**256.2**	**89.5**	**16.8**	**88.4**	**858.5**
	Banks	33.7	4.6	6.0	67.7		0.6	13.8	24.5	39.2	8.1	41.0	239.2
	Public sector	13.1	7.3	2.1	15.6		5.2	2.0	32.3	8.0	5.5	19.1	110.2
Germany	Non-bank private sector	9.7	9.6	4.0	51.5		4.5	57.7	46.5	72.0	9.7	52.6	317.7
	Unallocated by sector	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total foreign claims	**56.5**	**21.5**	**12.2**	**134.8**		**10.3**	**73.5**	**103.3**	**119.2**	**23.3**	**112.6**	**667.2**
Greece	**Total foreign claims**	**0.1**	**0.2**	**0.0**	**1.6**	**2.3**		**0.4**	**0.3**	**2.6**	**0.0**	**0.2**	**7.9**
Ireland	**Total foreign claims**	**0.3**	**0.4**	**N/A**	**4.2**	**2.4**	**0.1**		**1.0**	**1.9**	**0.4**	**3.8**	**14.8**
	Banks	9.3	1.0	0.4	19.9	39.1	0.1	3.2		4.0	1.1	4.3	82.3
	Public sector	11.0	0.3	0.1	1.7	37.4	0.6	0.4		0.1	0.3	4.7	56.5
Italy	Non-bank private sector	57.5	1.5	0.3	11.5	104.2	1.0	8.4		11.7	1.0	12.4	209.6
	Unallocated by sector	0.0	0.0	N/A	0.0	0.0	N/A	N/A		0.0	N/A	0.0	0.0
	Total foreign claims	**77.7**	**2.9**	**0.8**	**33.2**	**180.7**	**1.7**	**11.9**		**15.8**	**2.5**	**21.4**	**348.5**
Netherlands	**Total foreign claims**	**7.0**	**88.1**	**3.7**	**50.2**	**134.4**	**2.7**	**10.1**	**26.5**		**3.7**	**0.0**	**326.5**
Portugal	**Total foreign claims**	**0.2**	**0.2**	**0.1**	**5.1**	**2.0**	**6.3**	**3.3**	**1.7**	**6.9**		**17.8**	**43.5**
	Banks	1.3	0.6	0.0	7.0	4.6	0.0	0.5	2.0	1.4	3.3		20.6
	Public sector	0.3	2.0	0.1	4.3	3.0	0.2	0.1	6.6	0.7	5.4		22.8
Spain	Non-bank private sector	1.8	1.5	1.4	10.0	34.4	0.5	5.4	15.3	12.2	49.8		132.3
	Unallocated by sector	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
	Total foreign claims	**3.4**	**4.1**	**1.5**	**21.2**	**42.0**	**0.7**	**6.0**	**23.9**	**14.2**	**58.5**		**175.7**

Note: Due to unavailable data, Netherlands exposure to Spain is assumed to be zero.
Source: BIS

Applying these modifications, we calculated the following losses in the case of 30% currency depreciation. We could have easily run these calculations based on our estimates of the potential value of new national currencies, as outlined in Appendix III, but in order to avoid the loss estimates being driven by specific currency depreciation projection, we opted for a simple uniform 30% depreciation assumption, for illustrative purposes.

Figure V.3: Bank losses in a 30% currency depreciation scenario (EUR bn)

Banking system in:	Sector losses (EUR bn)	Losses relating to exit in:								Total Losses
		Greece	Portugal	Ireland	Spain	Italy	GIIPS	Belgium	France	
Austria	Government bonds	0.0	0.0	-0.1	-0.2	-0.6	-0.9	-0.1	-0.3	-1.3
	Bank deposits	-0.1	0.0	-0.1	-0.2	-0.6	-0.9	-0.1	-0.3	-1.3
	Total losses	**-0.1**	**-0.1**	**-0.1**	**-0.3**	**-1.3**	**-1.9**	**-0.1**	**-0.7**	**-2.6**
Belgium	Government bonds	0.0	-0.4	-0.1	-0.6	-1.5	-2.7		-0.9	-3.5
	Bank deposits	0.0	-0.1	-0.1	-0.6	-0.5	-1.3		-7.2	-8.5
	Total losses	**0.0**	**-0.5**	**-0.2**	**-1.2**	**-2.1**	**-3.9**	**0.0**	**-8.1**	**-12.0**
Finland	Government bonds	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	-0.2
	Bank deposits	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1
	Total losses	**0.0**	**0.0**	**0.0**	**-0.1**	**0.0**	**-0.1**	**0.0**	**-0.2**	**-0.3**
France	Government bonds	-0.4	-0.9	-0.5	-4.1	-14.5	-20.3	-12.3		-32.7
	Bank deposits	0.0	-0.6	-1.0	-2.9	-3.9	-8.4	-2.9		-11.2
	Total losses	**-0.4**	**-1.5**	**-1.5**	**-7.0**	**-18.4**	**-28.7**	**-15.2**		**-43.9**
Germany	Government bonds	-0.4	-1.6	-0.6	-5.6	-9.6	-17.8	-2.2	-4.6	-24.6
	Bank deposits	-0.9	-1.0	-0.4	-3.5	-5.9	-11.6	-1.3	-2.8	-15.8
	Total losses	**-1.3**	**-2.6**	**-1.0**	**-9.1**	**-15.4**	**-29.4**	**-3.5**	**-7.4**	**-40.4**
Greece	Government bonds		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Bank deposits		0.0	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1
	Total losses		**0.0**	**0.0**	**0.0**	**0.0**	**-0.1**	**0.0**	**-0.1**	**-0.2**
Ireland	Government bonds	0.0	0.0		-0.2	0.0	-0.3	0.0	-0.2	-0.5
	Bank deposits	0.0	0.0		-0.1	0.0	-0.2	0.0	-0.2	-0.4
	Total losses	**0.0**	**0.0**		**-0.3**	**-0.1**	**-0.5**	**0.0**	**-0.4**	**-0.9**
Italy	Government bonds	0.0	-0.1	-0.1	-1.3		-1.5	-0.1	-0.5	-2.1
	Bank deposits	-0.1	0.0	0.0	-0.5		-0.6	0.0	-0.2	-0.8
	Total losses	**-0.1**	**-0.1**	**-0.1**	**-1.8**		**-2.2**	**-0.1**	**-0.7**	**-2.9**
Netherlands	Government bonds	0.0	-0.2	-0.5	0.0	-1.2	-1.8	-4.0	-2.3	-8.1
	Bank deposits	-0.1	-0.1	-0.3	0.0	-0.9	-1.5	-3.0	-1.7	-6.2
	Total losses	**-0.1**	**-0.3**	**-0.8**	**0.0**	**-2.1**	**-3.3**	**-7.0**	**-4.0**	**-14.3**
Portugal	Government bonds	0.0		0.0	-0.7	-0.1	-0.8	0.0	-0.2	-1.0
	Bank deposits	0.0		-0.1	-0.5	-0.2	-0.8	0.0	-0.1	-1.0
	Total losses	**0.0**		**-0.1**	**-1.3**	**-0.3**	**-1.6**	**0.0**	**-0.4**	**-2.0**
Spain	Government bonds	0.0	-1.4	0.0		-1.7	-3.2	-0.5	-1.1	-4.8
	Bank deposits	0.0	-0.4	-0.1		-0.2	-0.6	-0.1	-0.8	-1.5
	Total losses	**0.0**	**-1.8**	**-0.1**		**-1.9**	**-3.8**	**-0.6**	**-1.9**	**-6.3**
Total		**-2.1**	**-6.9**	**-3.9**	**-21.0**	**-41.6**	**-75.5**	**-26.6**	**-23.7**	**-125.8**

The largest losses relate to French and German exposure in Italy, which is simply a function of the large exposures in place there. It is worth noting however, that when calculated accurately (accounting for the fact that only a proportion of cross-border exposure to those countries is in local law form), the FX losses that would arise in Greece, Ireland and Portugal in exit scenarios for France and Germany are relatively limited. The grand total of GIIPS related FX losses in a scenario of sequential exits of the five countries add up to around EUR75bn.

Bank losses resulting from defaults

Next, we calculated losses due to default in the counterparty country, assuming 80% losses for the banking sector, 60% losses for the public sector, and 40% losses for the private sector. As we will explain below, this calculation is for illustrative purposes only, and will not actually feed into our final computations.

Figure V.4: Bank losses in a counterparty default scenario

Banking system in:	Sector losses (EUR bn)	Losses relating to exit in:								Total Losses
		Greece	Portugal	Ireland	Spain	Italy	GIIPS	Belgium	France	
Austria	Bank	-0.4	-0.2	-0.3	-0.7	-3.1	-4.7	-0.3	-1.6	-6.6
	Public sector	0.0	-0.1	-0.1	-0.3	-1.4	-2.0	-0.1	-0.7	-2.8
	Corporates	-0.4	-0.2	-0.3	-0.8	-3.2	-5.0	-0.3	-1.7	-7.0
	Total	**-0.8**	**-0.4**	**-0.8**	**-1.9**	**-7.7**	**-11.6**	**-0.7**	**-4.1**	**-16.4**
Belgium	Bank	0.0	-0.4	-0.5	-2.4	-2.2	-5.6	0.0	-31.3	-36.9
	Public sector	-0.1	-0.8	-0.2	-1.3	-3.3	-5.7	0.0	-1.9	-7.6
	Corporates	0.0	-0.1	-6.3	-2.0	-0.5	-8.9	0.0	-1.0	-9.9
	Total	**-0.1**	**-1.3**	**-7.0**	**-5.7**	**-6.0**	**-20.1**	**0.0**	**-34.3**	**-54.4**
Finland	Bank	0.0	0.0	-0.1	-0.2	-0.1	-0.4	0.0	-0.6	-1.0
	Public sector	0.0	0.0	0.0	-0.1	0.0	-0.2	0.0	-0.2	-0.5
	Corporates	0.0	0.0	-0.1	-0.2	-0.1	-0.4	0.0	-0.6	-1.1
	Total	**0.0**	**-0.1**	**-0.2**	**-0.5**	**-0.2**	**-1.0**	**-0.1**	**-1.4**	**-2.6**
France	Bank	-0.1	-2.8	-4.9	-14.4	-19.3	-41.6	-14.3		-55.9
	Public sector	-0.8	-1.9	-1.0	-8.6	-30.6	-42.9	-26.0		-68.9
	Corporates	-11.6	-4.0	-5.3	-22.4	-72.4	-115.8	-44.6		-160.4
	Total	**-12.5**	**-8.7**	**-11.3**	**-45.4**	**-122.3**	**-200.3**	**-84.9**		**-285.1**
Germany	Bank	-0.5	-6.5	-11.0	-32.8	-19.6	-70.3	-3.7	-54.2	-128.2
	Public sector	-0.8	-3.3	-1.2	-11.4	-19.4	-36.1	-4.4	-9.3	-49.8
	Corporates	-1.8	-3.9	-23.1	-21.0	-18.6	-68.4	-3.8	-20.6	-92.8
	Total	**-3.1**	**-13.7**	**-35.3**	**-65.2**	**-57.6**	**-174.8**	**-11.9**	**-84.1**	**-270.8**
Greece	Bank		0.0	-0.1	0.0	-0.1	-0.2	-0.1	-0.3	-0.6
	Public sector		0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	-0.3
	Corporates		0.0	-0.1	-0.1	-0.1	-0.2	-0.1	-0.4	-0.6
	Total		**0.0**	**-0.2**	**-0.1**	**-0.2**	**-0.5**	**-0.1**	**-0.8**	**-1.5**
Ireland	Bank	0.0	-0.1		-0.8	-0.2	-1.2	-0.1	-0.9	-2.2
	Public sector	0.0	0.0		-0.4	-0.1	-0.5	0.0	-0.4	-1.0
	Corporates	0.0	-0.1		-0.9	-0.2	-1.2	-0.1	-1.0	-2.3
	Total	**-0.1**	**-0.2**		**-2.1**	**-0.5**	**-2.9**	**-0.2**	**-2.3**	**-5.4**
Italy	Bank	-0.1	-0.9	-2.5	-3.4		-6.9	-0.8	-15.9	-23.6
	Public sector	-0.1	-0.2	-0.2	-2.8		-3.3	-0.2	-1.0	-4.5
	Corporates	-0.4	-0.4	-3.4	-5.0		-9.1	-0.6	-4.6	-14.4
	Total	**-0.6**	**-1.5**	**-6.1**	**-11.2**		**-19.3**	**-1.6**	**-21.5**	**-42.5**
Netherlands	Bank	-0.6	-0.8	-2.2	0.0	-5.7	-9.3	-19.0	-10.8	-39.1
	Public sector	-0.1	-0.4	-1.0	0.0	-2.5	-3.9	-8.4	-4.8	-17.2
	Corporates	-0.6	-0.9	-2.3	0.0	-6.0	-9.8	-20.1	-11.4	-41.4
	Total	**-1.3**	**-2.0**	**-5.4**	**0.0**	**-14.3**	**-23.0**	**-47.6**	**-27.1**	**-97.7**
Portugal	Bank	-1.4		-0.7	-3.8	-0.4	-6.3	0.0	-1.1	-7.4
	Public sector	-0.1		-0.3	-1.7	-0.2	-2.3	0.0	-0.5	-2.8
	Corporates	-1.4		-0.8	-4.1	-0.4	-6.6	0.0	-1.2	-7.9
	Total	**-2.9**		**-1.8**	**-9.6**	**-0.9**	**-15.3**	**-0.1**	**-2.8**	**-18.1**
Spain	Bank	0.0	-2.6	-0.4		-1.6	-4.6	-0.5	-5.6	-10.7
	Public sector	0.0	-3.3	-0.1		-3.9	-7.3	-1.2	-2.6	-11.1
	Corporates	-0.2	-19.9	-2.2		-6.1	-28.4	-0.6	-4.0	-33.0
	Total	**-0.3**	**-25.8**	**-2.6**		**-11.7**	**-40.4**	**-2.3**	**-12.1**	**-54.8**
Total		**-21.6**	**-53.8**	**-70.8**	**-141.7**	**-221.4**	**-509.3**	**-149.5**	**-190.5**	**-849.4**

Source: Authors' calculations, BIS

The aggregate default losses for GIIPS amounted to EUR 509.3bn for Eurozone countries' banking systems in total, or almost 7 times the FX losses calculated earlier. This type of calculation does not take into account that ultimate risk exposures are often largely a function of exposures from local subsidiaries. Since the subsidiaries are stand-alone companies, with separate equity positions from the parent companies, the equity position defines an upper bound on the magnitude of losses which can feed back into the income statement of parent companies (as discussed in Chapter 6).

In accordance with recent work by Nomura bank analysts, we take this effect into account and simply derive the equity which is at risk in GIIPS countries, among the 11 Eurozone nations. In this approach, we assume a 15% write-down on total claims in the case of a GIIPS exit, which generates the following losses:

Figure V.5: Bank losses in a 15% asset write-down scenario (EUR bn)

Banking system in:	Greece	Portugal	Ireland	Spain	Italy	GIIPS	Belgium	France	Total Losses
Austria	0.3	0.1	0.2	0.5	2.1	**3.3**	0.2	1.1	**4.6**
Belgium	0.1	0.3	2.5	1.5	1.4	**5.9**		6.8	**12.6**
Finland	0.0	0.0	0.1	0.1	0.1	**0.3**	0.0	0.4	**0.7**
France	5.1	2.5	3.2	13.3	38.4	**62.5**	25.9		**88.4**
Germany	1.5	3.5	11.0	16.9	15.5	**48.4**	3.2	20.2	**71.9**
Greece		0.0	0.1	0.0	0.1	**0.1**	0.0	0.2	**0.4**
Ireland	0.0	0.1		0.6	0.2	**0.8**	0.1	0.6	**1.5**
Italy	0.3	0.4	1.8	3.2		**5.6**	0.4	5.0	**11.0**
Netherlands	0.4	0.6	1.5	0.0	4.0	**6.5**	13.2	7.5	**27.2**
Portugal	0.9		0.5	2.7	0.3	**4.4**	0.0	0.8	**5.2**
Spain	0.1	8.8	0.9		3.6	**13.4**	0.6	3.2	**17.2**
Total	8.8	16.3	21.8	38.8	65.6	**151.2**	43.7	45.8	**240.7**

Source: Authors' calculations, BIS

This creates more moderate total losses of EUR 151bn, much lower than the EUR507bn in the previous loss calculation, which does not take the upper bound on losses into account. However, this is still bigger than the EUR75bn we derived in total FX losses.

In Figures V.6 and V.7, we combine FX losses and losses from a 15% write-down related to a wipe-out of equity positions to get an idea of aggregate bank losses in the case of a GIIPS exit. Ideally we would examine these losses in relation to total bank capital, but since capital can be replenished by the official sector as needed, we will focus on losses as a share of GDP instead.

Figure V.6: Total bank losses: FX and default related (EUR bn)

Banking system in:	Greece	Portugal	Ireland	Spain	Italy	GIIPS	Belgium	France	Total Losses
Austria	0.4	0.2	0.3	0.8	3.4	**5.1**	0.3	1.8	**7.2**
Belgium	0.1	0.8	2.7	2.7	3.5	**9.8**		14.8	**24.6**
Finland	0.0	0.0	0.1	0.2	0.1	**0.4**	0.0	0.6	**1.0**
France	5.5	4.0	4.6	20.2	56.8	**91.2**	41.1		**132.3**
Germany	2.9	6.1	12.0	26.0	30.9	**77.9**	6.7	27.6	**112.2**
Greece		0.0	0.1	0.0	0.1	**0.2**	0.1	0.3	**0.6**
Ireland	0.0	0.1		0.9	0.2	**1.3**	0.1	1.0	**2.4**
Italy	0.4	0.5	1.9	5.0		**7.8**	0.5	5.6	**14.0**
Netherlands	0.5	0.9	2.3	0.0	6.1	**9.8**	20.2	11.5	**41.5**
Portugal	0.9		0.6	3.9	0.5	**6.0**	0.0	1.1	**7.2**
Spain	0.1	10.6	1.0		5.5	**17.2**	1.2	5.1	**23.5**
Total	10.9	23.2	25.7	59.8	107.1	**226.7**	70.3	69.5	**366.5**

Note: FX losses derived from 30% FX depreciation scenario and taking into account that FX depreciation will only impact local law assets redenominated into new local currency. Default losses are derived from the equity at risk, rather than ultimate risk exposure.
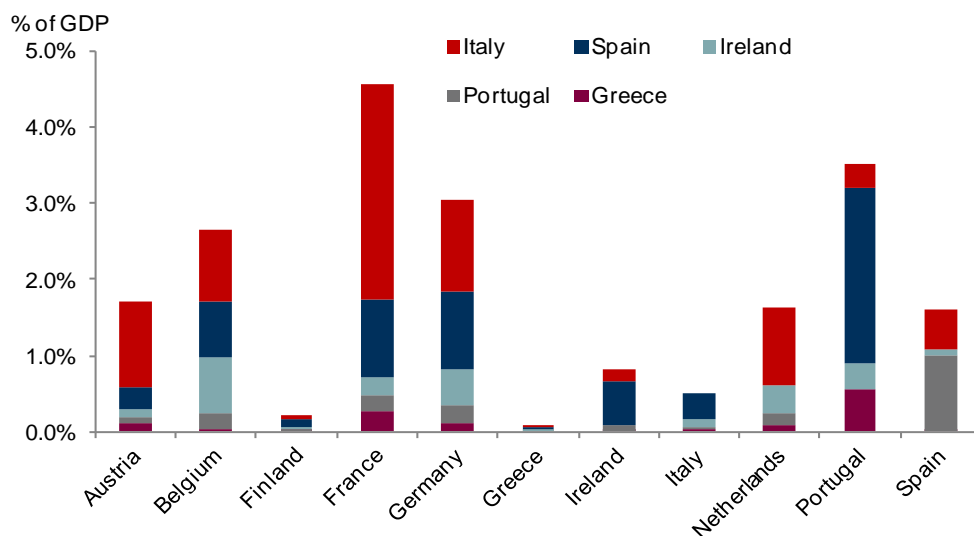Source: Authors' calculations, BIS

Figure V.7: Total bank losses (% of GDP)

Banking system in:	Losses relating to exit in:								Total Losses
	Greece	Portugal	Ireland	Spain	Italy	**GIIPS**	Belgium	France	
Austria	0.1%	0.1%	0.1%	0.3%	1.1%	**1.7%**	0.1%	0.6%	**2.4%**
Belgium	0.0%	0.2%	0.7%	0.7%	0.9%	**2.7%**		4.0%	**6.7%**
Finland	0.0%	0.0%	0.0%	0.1%	0.0%	**0.2%**	0.0%	0.3%	**0.5%**
France	0.3%	0.2%	0.2%	1.0%	2.8%	**4.6%**	2.1%		**6.6%**
Germany	0.1%	0.2%	0.5%	1.0%	1.2%	**3.0%**	0.3%	1.1%	**4.4%**
Greece		0.0%	0.0%	0.0%	0.0%	**0.1%**	0.0%	0.2%	**0.3%**
Ireland	0.0%	0.1%		0.6%	0.2%	**0.8%**	0.1%	0.6%	**1.5%**
Italy	0.0%	0.0%	0.1%	0.3%		**0.5%**	0.0%	0.4%	**0.9%**
Netherlands	0.1%	0.1%	0.4%	0.0%	1.0%	**1.6%**	3.4%	1.9%	**6.9%**
Portugal	0.6%		0.4%	2.3%	0.3%	**3.5%**	0.0%	0.7%	**4.2%**
Spain	0.0%	1.0%	0.1%		0.5%	**1.6%**	0.1%	0.5%	**2.2%**

These losses are summarised in Figure V.8, which clearly shows that French banks will suffer the greatest losses in the case of a GIIPS exit from the Euro. Portugal, Germany, and Belgium are next in line, also looking at significant losses relative to their country GDP. While it is clear that most countries have scaled down their exposure to Greece in recent months, it is clear that Eurozone countries still have significant exposures to GIIPS.

Figure V.8: Total bank losses in a GIIPS exit scenario (% of GDP)

These exposures remain despite the fact that Eurozone countries have significantly reduced their cross-border lending to GIIPS by 48% since 2007. Country by country detail of these changes in loan amounts can be seen in Figure V.9 below, which essentially provides a measure of financial disintegration.

Figure V.9: Changes in cross-border loans (% change since 2007)

Banking system in:	Loans to:				
	Greece	Portugal	Ireland	Spain	Italy
Austria	-63%	-60%	-79%	-46%	-29%
Belgium	-95%	-75%	-67%	-70%	-78%
Finland	0%	0%	0%	0%	0%
France	-31%	-33%	-71%	-39%	-31%
Germany	-68%	-36%	-53%	-50%	-46%
Greece		24%	-14%	129%	67%
Ireland	-98%	-93%		-87%	-97%
Italy	-81%	-60%	-43%	3%	
Netherlands	-83%	-72%	-71%	0%	-77%
Portugal	24%		39%	-17%	-58%
Spain	0%	0%	-67%		-14%

Source: BIS

Official sector losses

Moving on to official sector exposures, we aggregated central bank (TARGET2) liabilities, general government loans, and SMP holdings for each of the GIIPS countries using the latest data available (from Q4 2011) and our assumptions for the composition of SMP holdings. By applying the contribution key percentages from the ECB for each of the 11 Eurozone countries to the GIIPS sovereign liabilities measures, we found each country's exposures in the case of a GIIPS, Belgium, and French exit and possible debt restructuring, shown in Figure V.10.

Figure V.10: Official sector exposures to GIIPS (EUR bn)

Sovereign	Exposures to:					GIIPS	Belgium	France	Total
	Greece	Portugal	Ireland	Spain	Italy				
Austria	6.6	3.8	5.2	5.8	5.6	**27.1**	1.4	3.3	**31.9**
Belgium	8.2	4.8	6.5	7.3	7.0	**33.8**		4.2	**38.0**
Finland	4.2	2.5	3.4	3.8	3.6	**17.5**	0.9	2.1	**20.5**
France	48.2	28.0	38.3	42.7	40.8	**198.0**	10.5		**208.5**
Germany	64.2	37.4	51.0	56.8	54.4	**263.8**	13.9	32.5	**310.2**
Greece		3.9	5.3	5.9	5.6	**20.7**	1.4	3.4	**25.5**
Ireland	3.8	2.2		3.3	3.2	**12.5**	0.8	1.9	**15.2**
Italy	42.4	24.7	33.6	37.5		**138.2**	9.2	21.4	**168.8**
Netherlands	13.5	7.9	10.7	12.0	11.5	**55.6**	2.9	6.8	**65.3**
Portugal	5.9		4.7	5.3	5.0	**20.9**	1.3	3.0	**25.2**
Spain	28.2	16.4	22.4		23.9	**90.8**	6.1	14.2	**111.1**
Total	225.4	131.5	181.1	180.4	160.5	**878.9**	48.5	92.9	**1020.3**

Source: Authors' calculations, ECB, National central banks

For illustrative purposes only, we assume the same 60% loss rate in a sovereign default scenario for each counterparty country to calculate overall losses for the sovereigns (shown in Figures V.11 and V.12 on the following page).

**Figure V.11: Illustrative official sector losses (EUR bn)**

Sovereign	Losses relating to:					GIIPS	Belgium	France	Total
	Greece	Portugal	Ireland	Spain	Italy				
Austria	4.0	2.3	3.1	3.5	3.4	**16.3**	0.9	2.0	**19.1**
Belgium	4.9	2.9	3.9	4.4	4.2	**20.3**		2.5	**22.8**
Finland	2.5	1.5	2.0	2.3	2.2	**10.5**	0.6	1.3	**12.3**
France	28.9	16.8	23.0	25.6	24.5	**118.8**	6.3		**125.1**
Germany	38.5	22.4	30.6	34.1	32.6	**158.3**	8.4	19.5	**186.1**
Greece		2.3	3.2	3.5	3.4	**12.4**	0.9	2.0	**15.3**
Ireland	2.3	1.3		2.0	1.9	**7.5**	0.5	1.1	**9.1**
Italy	25.4	14.8	20.2	22.5		**82.9**	5.5	12.9	**101.3**
Netherlands	8.1	4.7	6.4	7.2	6.9	**33.3**	1.8	4.1	**39.2**
Portugal	3.6		2.8	3.2	3.0	**12.6**	0.8	1.8	**15.1**
Spain	16.9	9.8	13.4		14.3	**54.5**	3.7	8.5	**66.7**
Total	**135.2**	**78.9**	**108.7**	**108.2**	**96.3**	**527.3**	**29.1**	**55.7**	**612.2**

Figure V.12: Illustrative official sector losses (% GDP)

Sovereign	Losses relating to:					GIIPS	Belgium	France	Total
	Greece	Portugal	Ireland	Spain	Italy				
Austria	1.3%	0.8%	1.0%	1.2%	1.1%	**5.4%**	0.3%	0.7%	**6.3%**
Belgium	1.3%	0.8%	1.1%	1.2%	1.1%	**5.5%**		0.7%	**6.2%**
Finland	1.3%	0.8%	1.1%	1.2%	1.1%	**5.5%**	0.3%	0.7%	**6.4%**
France	1.5%	0.8%	1.2%	1.3%	1.2%	**6.0%**	0.3%		**6.3%**
Germany	1.5%	0.9%	1.2%	1.3%	1.3%	**6.2%**	0.3%	0.8%	**7.2%**
Greece		1.1%	1.5%	1.6%	1.6%	**5.8%**	0.4%	0.9%	**7.1%**
Ireland	1.4%	0.8%		1.3%	1.2%	**4.8%**	0.3%	0.7%	**5.8%**
Italy	1.6%	0.9%	1.3%	1.4%		**5.2%**	0.3%	0.8%	**6.4%**
Netherlands	1.3%	0.8%	1.1%	1.2%	1.1%	**5.5%**	0.3%	0.7%	**6.5%**
Portugal	2.1%		1.7%	1.8%	1.8%	**7.3%**	0.5%	1.1%	**8.8%**
Spain	1.6%	0.9%	1.2%		1.3%	**5.1%**	0.3%	0.8%	**6.2%**

Source: Authors' calculations, BIS

Figure V.13 below shows that sovereign exposures are, on the whole, larger than bank exposures in each country.

Figure V.13: Total sovereign losses in a GIIPS exit and debt restructuring scenario (% GDP)
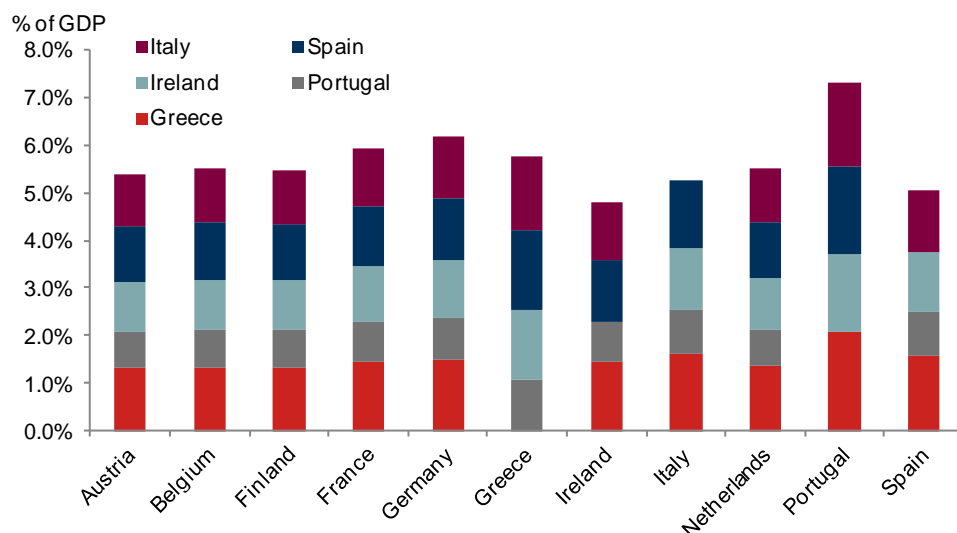
Note: Losses at the ECB level are allocated to member countries for illustrative purposes.

Source: Authors' calculations, BIS

When considering sovereign exposures over time as a share of total Eurozone GDP, it may be more relevant to use a measure of Eurozone GDP excluding GIIPS, since if these countries exit the Eurozone, the burden will all fall on the remaining 12 countries. Using this approach, total sovereign exposure jumps to 33.1% of GDP versus 21.9% of total Eurozone GDP.

Figure V.14: Sovereign exposure (% of current Eurozone GDP)

(% GDP)	SMP	Target 2 balance	General government loans	Total
2006	0.0%	0.0%	0.2%	**0.2%**
2007	0.0%	0.2%	0.3%	**0.5%**
2008	0.0%	1.0%	0.4%	**1.4%**
2009	0.0%	1.8%	0.5%	**2.3%**
2010	0.8%	3.7%	0.9%	**5.4%**
2011	2.2%	7.0%	2.2%	**11.4%**
2012	2.3%	9.1%	2.7%	**14.0%**
End-2012*	2.4%	15.4%	4.2%	**21.9%**

*Note: End-2012 shows annualised increases for each country by extrapolating Q1 2012 data forward to the end of the year.

Source: National central banks

Figure V.15: Sovereign exposure (% of Eurozone GDP, excluding GIIPS)

(% GDP)	SMP	Target 2 balance	General government loans	Total
2006	0.0%	0.0%	0.3%	**0.3%**
2007	0.0%	0.2%	0.5%	**0.7%**
2008	0.0%	1.4%	0.7%	**2.1%**
2009	0.0%	2.7%	0.8%	**3.5%**
2010	1.2%	5.6%	1.4%	**8.1%**
2011	3.4%	10.6%	3.3%	**17.3%**
2012	3.4%	13.7%	4.1%	**21.2%**
End-2012*	3.6%	23.3%	6.3%	**33.1%**

*Note: End-2012 shows annualised increases for each country by extrapolating Q1 2012 data forward to the end of the year.

Source: National central banks

Explanation of cost-benefit analysis (Chapter 7)

Each column in Box 7.1 in Chapter 7 represents one of five effects resulting from a break-up. The two first columns represent country specific effects, while the three last columns represent spill-over effects to the remaining EMU countries.

Reduced FX overvaluation: This effect captures the output effect from currency depreciation in an exit scenario. A country with a strongly overvalued exchange rate currently stands to yield a *Very Large* positive output effect. We have tiered the countries based on the estimated current misalignment of real exchange rates as well as input from market shares as outlined in Appendix III.

Balance sheet mechanism: This effect captures the output effect from balance sheet losses in an exit scenario. We have tiered the countries based on a multi-dimensional assessment of various balance sheet metrics, including gross relevant external asset positions (% of GDP), adjusted net relevant external asset positions (% of GDP), and a metric derived from the interaction between adjusted net relevant external asset positions (% of GDP) and estimated nominal exchange rate moves from Appendix III. A country with large relevant external liabilities will face a *Very Large* negative output effect.

Spill-over effects from bank losses: This effect captures the negative implication for financial stability and output through spill-over effects to other EMU countries (or itself, in Germany's case) through bank losses. These figures are based on total bank losses resulting from FX depreciation and equity losses (see Figure V.7 above). Measuring these losses as a percent of each country's GDP, we chose the maximum country loss in the case of each exit and used that figure to scale the bank spill-over effect for each exiting country. We have tiered the countries in accordance with the following ranges: maximum losses under 2% of GDP were considered *Moderate*, losses of 2-4% were considered *Large*, and losses above 4% of GDP were considered *Very Large.*

Spill-over effects from public losses: This effect captures the negative implication for sovereign finance, financial stability, and output through official sector losses in other EMU countries (see Figure V.12 above). We apply the same thresholds and tiering system for official sector losses as we did for bank losses in the prior explanation.

Political risk: This effect captures the disruptive impact of a break-down in political cooperation within the Eurozone and the EU on output in other EMU countries, as well as the exiting country itself. We tier the countries based on our subjective assessment, referring to the analysis in Appendix VI.

Appendix VI:
Avoiding breakdown in European cooperation

A break-up process could happen as a function of 'political accidents' and could involve hard default on obligations to the official sector. An optimal plan for break-up would seek to avoid instances of political instability at the country level and a breakdown in European cooperation, with negative impacts through declining trade and financial market integration at the Eurozone and EU level.

While we focus on economic transmission mechanisms, we cannot ignore the potential link between political stability and growth. Clearly EU cooperation and the host of benefits that many ascribe to it (including freedom of movement of goods, capital, services and people, as enshrined in the single market) are some of the cornerstones of recent relative European prosperity. While there is plenty of disagreement about the costs and benefits of the EMU (hence, this paper), there is a more general consensus (see Boltho (2008) and CEPII (2011)) that the European Single Market for goods and services has had meaningful benefits on growth in the region, in particular the rapid move towards economic integration and convergence.

While the EU is based on political harmony, the EU and Eurozone have not always been in political consensus historically, and typically these times of lack of consensus have been times of crises. In particular, in the recent past, we have seen French attempts to impose taxes EU-wide in what the UK deemed to be an unfair manner, leading to the UK's refusal to participate in the 'fiscal compact' treaty. During the unveiling of the fiscal compact in late 2011, Merkel and Sarkozy upset even their closest allies by indicating that the Franco-German means of fiscal discipline were superior to others. Additionally, the spectre of sovereign PSI was unveiled, surprising even Germany's northern allies, during the Franco-German (and Russian) Deauville summit. The shifting alliances and the seemingly dysfunction of the EU have led to near catatonia in finding an approach to Eurobonds and to concrete plans for deposit insurance. At some level, this has spread to the ECB, as evidenced by the resignation of Axel Weber and Juergen Stark, and the continued disagreement of Jens Weidmann.

The level of recent discord and disagreement within Europe has been the cause of one failed summit after another, during a period of immense Eurozone stress. While these political tensions are large, EU institutions ensure that the single market continues to function even if certain parts are damaged, and this political tension has limited influence on most day-to-day functioning of the Eurozone countries.

As fractious as the current time is, there is little to prepare us for the level of political discord which could come from exits or full-blown break-up of the Eurozone. It is more straightforward to draw conclusions from the relationship of Merkel and Sarkozy to Papandreou when the latter called for a referendum (and was shortly thereafter pushed from power and replaced by the technocrat Lucas Papademus), or the acrimony between other EU leaders and the leader of SYRIZA, Alexis Tsipras.

Should there be sequential exits from the Eurozone or a full-blown break-up, the possibility of further competitive devaluation and currency wars within Europe could bring further disagreements. And, given that exit from the Eurozone is unlikely to be on the basis of Article 50 of the Treaty on the functioning of the European Union (TFEU) and will instead be done unilaterally and extra legally, the ability to retain EU membership in the current 27 countries may be seriously compromised.

At the regional level, political instability carries costs relating to a breakdown in European cooperation. Importantly, a breakdown in European cooperation could have sizeable negative effects by undermining the positive effects of basic integration of the goods markets.

It is well known in the European context that economic downturns precede extremism, and the recent sharp drops in growth possibly exacerbated by pro-cyclical fiscal tightening have already led to the rise of more extreme right wing parties (in France, Netherlands and Greece) and more extreme left-wing parties (in Greece). This destabilising influence in Europe is essentially pressuring the EMU, a body which depends on implicit compromise close to the brink.

In addition, a break-down in European cooperation could see a reversal of the benefits of financial market integration, which have been achieved over the last three decades or so. Unfortunately, this process has already started and has gathered speed since the summer of 2011. Since 2007, there has been a marked reversal of the financial integration process within the Eurozone and within the EU (ECB 2012). But a further break-down in cooperation has potential to accelerate this financial disintegration process, potentially with large negative impacts on growth, depending on how the process is managed.

Since political dynamics are complex, it is hard to predict exactly from where we will see a catalyst for a breakdown in cooperation. The recent political developments in Greece have illustrated how a shift towards populist governments in the periphery poses a serious risk to European cooperation. Specifically, we can imagine a scenario associated with hard default on bond holdings of the ECB's SMP and Greek official sector liabilities, including default on official sector debt in the form of bilateral loans, EFSF loans, IMF support and even funding through the ECB. A hard default on such obligations, likely as a function of a 'political accident', would potentially put overall cooperation in jeopardy, and could even involve a form of 'persuasion' to exit the EU, even if 'expulsion' is not explicitly an option in the legal basis for the EU, as outlined in Athanassiou (2007).

At the country level, political instability carries costs in the form of low investment, inability to attract FDI, and weakening confidence, consumption, capital flight and wealth effects. This is well documented in the literature and this instability is effectively pro-cyclical (Pastor et al. 2011). These mechanisms have typically been the factors holding growth back in emerging market countries with unstable government structures.

Another type of risk, at this point still a tail risk, comes from the fact that the very large build-up in official sector exposures could lead to a splintering of the EMU from the inside. We can imagine a scenario where German policymakers lose control of decision making, including within the ECB, implying that they would no longer be willing to accept continued escalation of ECB liquidity expansion. This is a horror scenario, but given the extent of the build-up, it is no longer a zero risk.

An awareness of political constraints, at the country level, and at the region level (including within the ECB) is crucial to avoid a break-down in European cooperation. Some of these risks may seem remote at this point, but issues are building fast, and some political risks which seemed remote a year ago are clearly growing.

A return to the basis of economic integration that was set out in the Werner Report, with economic unions to precede political union (and monetary union) has merit in this context, and efforts to ensure that exiting countries remain in the EU and are able to continue to benefit from the institutions and be part of the single market in goods and services may be key to avoiding political instability and breakdown in European cooperation

Appendix VII:
The role of the ECU-2 in a full-blown break-up

A new European Currency Unit (ECU-2) could play an important role in facilitating an orderly redenomination process for the myriad contracts and obligations under foreign law in a full blown break-up scenario where the Euro ceases to exist. The ECU-2 would be a currency basket, similar to the SDR or the official ECU before 1999, mechanically linked to the performance of new national currencies of Eurozone countries in accordance with a pre-determined weighting scheme. The ECU-2 would play a crucially important role in facilitating efficient redenomination of foreign law contracts, and thereby serve to minimise unnecessary insolvencies due to protracted legal battles about redenomination issues and due to losses on new currency exposure, some of which could be purely a function of unpredictable court decisions. The ECU-2 would be a device for settlement of Euro-denominated contracts, a bridge between the old Euro and the new national currencies. The ECU-2 would not be a new stand alone currency, however.

The case for using the ECU-2 to settle foreign law EUR contracts

The advantage of applying an ECU-2 based redenomination in a full-blown break-up is that it removes legal uncertainty around obligations that would otherwise be difficult to re-denominate into national currencies.

There are many examples of obligations and contracts where there is no clear nexus to a specific Eurozone country. Examples where it would be very hard to link EUR-denominated obligations to a specific country include:

- A EUR-denominated loan from a UK bank to a Polish corporation.

- A EUR/USD FX forward transaction between a Japanese bank and a US asset manager.

- A fixed/floating interest rate swap between a French bank and a German insurance company.

We have argued (in Chapter 3 and Appendix I) that the notional value of contracts and obligations where a redenomination into new national currencies would be problematic and potentially arbitrary is very large. Without claiming any great degree of precession, we suggested that foreign law Euro-denominated instruments could easily amount to something in excess of EUR30 trillion in terms of notional value, including foreign law bonds, cross-border loan contracts, and FX derivatives such as currency forward contracts (but excluding interest rate swaps).

How the redenomination process would work for assets and obligations of this nature is crucially important since case law suggests that contracts and obligations are unlikely to be 'frustrated' simply due to their redenomination. Contracts and obligations would continue to live on after the Euro ceased to exist. Hence, making the redenomination process as smooth, fair and efficient as possible is an important goal in its own right, including in relation to macroeconomic performance, such as growth.

From this perspective, a new European Currency Unit (ECU-2) – which would be a basket currency linked to new national currencies according to a pre-determined weighting scheme—could play an important role in facilitating an orderly redenomination process for the myriad contracts and obligations that do not have a clear country specific nexus.

Creating the legal basis for the ECU-2

By issuing an EU directive, English courts would be instructed to interpret EUR in any contract to mean ECU-2 thereafter. In this context, we note that the Euro itself was created by the process of EU directives as well as passage of legislation in NY, Tokyo and other localities (while some were

determined to need no further statutes)[37]. These statutes were passed to ensure continuity of the contract and in order to do so, they specifically stated that frustrations that force major clauses, redenomination clauses or the possibility of claiming material adverse change would all be overruled. In order to ensure a timelier and more certain outcome, an EU directive could compel UK courts to re-denominate contracts into some official new currency such as the ECU-2, at a specified rate.

While courts themselves will be unable to apply a conversion to a new ECU-2 without some overriding legislation, it would be necessary for the EU Council to adopt a directive, essentially to the effect of:

> *Where the EUR was previously the currency of denomination of any contract that is not so determined to have a nexus to any one particular country whose currency was previously the EUR, it will henceforth be redenominated into the ECU.*

As Governing Law is one of several determinants of the nexus of a given contract, it is altogether likely that national courts would only apply this directive in the case where the governing law is that of an EU country, not in the Eurozone, i.e., England, Scotland, Northern Ireland, Wales, Sweden, Denmark and the CEE. Furthermore this directive could only apply where there was no means for the courts to infer a nexus of the contract under the other typically usual terms of Lex Monetae as highlighted in the grey box in Appendix I.

As mentioned, the new European Currency Unit (ECU-2) would be a basket currency linked to the new national currencies created after a break-up – akin to the original ECU basket (although there would be technical differences, as detailed below).

The value of the new ECU would be mechanically linked to the performance of the new currencies of previous Eurozone countries, and the redenomination process would mirror how ECU-denominated instruments were redenominated into Euro in 1999.

Potential weights of the new ECU

The specific nature of any break-up process would play a role in determining the weights of individual national currencies in a new European Currency Unit (ECU-2).

If the break-up process happens in sequential fashion where weaker Eurozone countries exit before the later full-blown break-up, then there would be zero weight attached to certain of the current Eurozone countries in the new European Currency Unit.

However, if a break-up happens more like a big-bang, presumably all Eurozone countries (including weaker Eurozone countries) would have a weight in the ECU-2, provided that the break-up is multilaterally agreed.

The original ECU weights, shown in Figure VII.1, were determined based on the size of the economy and the magnitude of intra-EU trade, although no strict mathematical formula was applied. A similar approach may be applied in the future, but it is more likely that the ECB equity weights (derived from the size of the national population and GDP) will be used.

Baseline ECU-2 weights, based on normalised ECB weights, are shown in the final column of the table. Note that we have excluded the six smallest Eurozone countries from this calculation (Luxemburg, Cyprus, Malta, Slovenia, Slovakia and Estonia). This is because their weights are likely to be very small (their combined ECB weight is 2.3%) and because having very small and illiquid basket components in the new ECU may make it harder to manage from an operational perspective. Specifically, considerations around liquidity may make it preferable not to account for countries with very small or insignificant ECB weights in the currency basket, and this type of consideration could be used to exclude additional currencies, as appropriate.

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[37] Scott (1998) lists particulars of UK and NY adoption of legislation to ensure continuity of contract.

Linked to this, an additional caveat in relation to the weights is that the ECU would only work efficiently if new national currencies remain convertible and actively traded. This is similar to the considerations behind the IMF's SDR basket, which only consists of highly liquid convertible currencies (USD, EUR, JPY and GBP). Such considerations could become particularly relevant in a situation where the break-up process creates a need for capital controls in certain countries (as discussed below).

Figure VII.1: Historical ECU basket weights and ECB weights

	Original ECU Weights			Possible ECU-2
	Apr 1990 - Nov 1992	Nov 1992 - Mar 1995	Mar 1995 - Dec 1998	Weights
Belgium	7.8%	8.1%	8.4%	3.5%
Denmark	2.5%	2.6%	2.7%	-
Germany	30.5%	31.7%	32.7%	27.1%
Greece	0.8%	0.6%	0.5%	2.8%
Spain	5.2%	4.8%	4.2%	11.9%
France	19.4%	20.2%	20.8%	20.3%
Ireland	1.1%	1.2%	1.1%	1.6%
Italy	9.9%	9.0%	7.2%	17.9%
Luxembourg	0.3%	0.3%	0.3%	0.2%
Netherlands	9.5%	9.9%	10.2%	0.1%
Portugal	0.8%	0.8%	0.7%	2.5%
UK	12.1%	10.9%	11.2%	-
Austria	-	-	-	2.8%
Finland	-	-	-	1.8%
Estonia	-	-	-	0.3%
Cyprus	-	-	-	0.2%
Malta	-	-	-	0.1%
Slovenia	-	-	-	0.5%
Slovak Republic	-	-	-	1.0%
Total	100.0%	100.0%	100.0%	100.0%

Note: Possible ECU-2 weights are derived from normalised ECB key capital ratios. Source: Nomura, ECB

A brief history of the original ECU

The European Currency Unit (ECU) was created by the European Monetary System (EMS) in March 1979. The ECU originated as a basket of nine national currencies, each with its own particular weight based on economic factors such as the country's GNP and intra-community trade. The ECU basket was adjusted in 1984 to include the Greek drachma and amended again in 1989 to include the Spanish peseta and the Portuguese escudo. The ECU was intended to stabilise the national currencies and eventually create a single composite currency. Moreover, all Eurozone budgets were denominated in ECU and increasing portions of national debt over time.

There was never an official mechanism to convert private ECUs one for one into the basket of the ECU currencies corresponding to the definition of the official ECU. From 1979 to 1988, a group of private European clearing banks stood ready to convert private ECUs into the basket at par. This 'convertibility' at par ended in 1988, and from then on the private ECU was in principle a free floating currency. Linked to this, a gap between the composite interest rate on underlying ECU currencies at the actual ECU interest rate (a fixing of which was administered by the BIS) also opened up.

Initially, however, the private ECU continued to trade close to par versus the official basket and this period of stability (1990-91) saw significant issuance of ECU-denominated debt instruments by European sovereigns and supranational institutions. A large derivatives market developed, including LIFFE futures, which were ECU denominated futures, settling at the BBA EUR LIBOR fixing, (after the launch of the EUR, new contracts were later based on the EURIBOR fixing, although the EUR LIBOR fixing continues to be quoted).

Things changed during 1992 as tensions in European currency markets surfaced. This was the case especially during the ERM crisis, when the private ECU traded at a discount of 250bp to the basket. The exchange bands of the ERM had to be expanded to 15% in 1993, and only France, Denmark, Belgium and the Netherlands managed to avoid devaluations of central ERM parities, while the UK, Italy, Spain, Portugal, Finland and Sweden all had to exit the ERM in some form.

The value of the private ECU eventually converged to that of the underlying basket on increasing expectations (in 1997-98) that the ECB would eventually enforce par convertibility between the private ECU and the official ECU basket. Finally, on 1 January, 1999, the ECU was replaced by the Euro at parity.

The process of redenominating ECU obligations into EUR is also interesting as it involved an EU regulation stating that the introduction of the Euro should not terminate (or alter the terms of) any legal instruments. Moreover, several foreign jurisdictions, including the State of New York, passed legislation to ensure that the Euro was recognised as the successor to the ECU. These steps ensured that ECU obligations, whether under local (EU) jurisdiction or foreign (e.g., New York) law, could be smoothly redenominated into Euro, with effect from 1 January, 1999.

A few technical considerations around the ECU-2

Settlement issues: Following the implementation of the EU directive and re-denomination into ECU-2 of certain contracts, payment on contracts and obligations which were originally in Euro would then be affected by delivering ECU-2, or more specifically, an acceptable equivalent in a given new national currency, based on official fixing rates between the ECU-2 basket and national currencies.

Transparent pricing: In order to use the ECU basket effectively for settlement and delivery purposes, its component parts would need to be transparently priced (likely with the BIS as pricing agent) and actively traded.

Capital controls and convertibility: If capital controls are imposed by a given country, it may make sense to exclude the currency of that country from the ECU-2 basket for operational reasons, similarly to how certain currencies were excluded from the original ECU basket, and reweight the basket in a fashion which would minimise the fall-out, including jumps in the ECU-2 exchange rate versus the Dollar and other global currencies. Specifically, having non-convertible currencies in the new European Currency Unit (ECU) would be potentially problematic in relation to maintaining efficient settlement and pricing mechanism. Such issues could be partially addressed by allowing settlement of payments on ECU-2 assets and obligations in one convertible currency (rather than delivering the components of the basket) in accordance with the market exchange rate between that currency and the ECU-2. But allowing delivery in one convertible currency would not address issues around lack of pricing transparency, and this could become a real issue in a situation of severe capital controls and potential dual currency regimes.

Differences relative to the original ECU regime: As mentioned above, from 1990 to 1998, the private ECU traded freely in the market and there was no private or official mechanism in place to ensure it traded in line with its theoretical value, as defined by the weights of the individual ECU component parts and their market-based exchange rates. The private ECU was to some degree anchored by expectation of eventual conversion of ECU assets into EUR assets, but the strength of this anchor varied based on the conviction of the market that eventual conversion would happen. However, during a reverse process of re-denominating Euro obligations into ECU-2, there would be no such anchor because there would be no expectations of future conversion at a given rate.

To avoid problems associated with this lack of determinacy, some provision would likely be needed to allow settlement of ECU-2 denominated obligations in national currencies, in accordance with the market-based value of the ECU-2, as calculated from ECU-2 weights and the exchange rates of its component parts.

ECU-2 interest rates: Linked to the currency redenomination, there would also be a need to shift from Euro interest rates to ECU-2 interest rates, this would be a blended interest rate, derived arithmetically from the underlying interest rates in individual Eurozone countries, and the weights stipulated in ECU-2 basket, possibly with the BIS as a fixing agent for daily ECU interest rates.

Valuing a new ECU-2

Conceptually, there are two key fundamental inputs in the ECU-2 valuation exercise:

- The weights of individual national currencies in an ECU-2 basket; and

- The (expected) FX rates of the individual new national currencies.

Turning to the potential value of the ECU-2, we will rely on the initial estimates of new national currencies we have published separately (Nordvig 2011) and presented in Appendix III of this document. We note that these estimates are based on a simple, two-factor framework, and should be viewed as longer-term equilibrium estimates, rather than an attempt to predict where currencies would trade immediately following a break-up. All estimates are expressed versus the USD.

Appendix VIII:
A hedging market for intra-Eurozone FX risk

As corporates and other financial market participants have become more aware of their risks to individual exits and break-up of the Eurozone, they are increasingly aware of their own needs to either consolidate their exposures, net their risks, or hedge their exposure. Hedging is often the least costly outcome in that the possibility of hedging an exposure rather than disinvesting makes for far less disruptive outcomes.

The creation of non-deliverable currency forward markets (NDFs) for potential new national currencies of Eurozone member countries would effectively complete a currently incomplete market, and would be an important step in facilitating both risk transfer and systemic risk reduction. The availability of an efficient hedging market for intra-Eurozone currency risk ahead of a break-up would serve to minimise redenomination related disruptions and balance sheet effects in an actual break-up.

The need for a hedging market for intra-Eurozone exposure

A key element of our proposed transition process would involve creating a *hedging market for intra-Eurozone currency exposure.* This should include creating a non-deliverable FX forward market (NDF) for potential new national currencies of current Eurozone member countries. Given the legal risk analysis and contingency planning exercises previously outlined (and the recent and somewhat more public push by EU regulators to undertake this risk management exercise), financial firms and many nonfinancial corporates will be increasingly aware of their redenomination risks and exposures to potential new individual currencies.

But risk management can never stop at identification and quantification (in relation to intra-Eurozone currency risk) alone. Given the awareness of large exposures, corporates would be faced with two alternatives—lower the exposure by deleveraging or by hedging. Such hedging requires an instrument, which shields market participants against depreciation of potentially weak new Eurozone currencies and against appreciation of potentially strong new Eurozone currencies, depending on the type of exposures present at the micro level. These instruments would help to ensure the survival of a greater number of banks who should be able to exchange and mitigate some of the ongoing redenomination risk of which they are increasingly aware.

It is generally perceived that a new Greek Drachma would be substantially weaker than the Euro's current value. Similarly, it is generally perceived that a new German Mark would be stronger than the Euro's current value. In Appendix III, we show some specific illustrative estimates of potential fair values for new Eurozone currencies, based on a simple two-factor approach, incorporating metrics of current misalignment, as well as future inflation risk. These estimates show appreciation potential of the new German Mark and a significant depreciation risk for the new Greek drachma (all estimates are expressed relative to the dollar). The important aspect here is not the specific point estimates, but rather the general finding that a Eurozone break-up would likely see large currency moves between the new currencies of the individual Eurozone countries.

Of course it is altogether likely that firms will have heterogeneous risk exposures—while some firms will have larger exposures to Spain, others will have larger exposures to Italy. Given the ability to trade these risks, it would be mutually beneficial for two such firms to net their Spain and Italy exposures by trading NDFs on the two (potential) future currencies. In aggregate, this of course will not eliminate redenomination risk, but will lower the overall systemic risk by netting it and spreading it out between firms both financial and nonfinancial. Moreover, those countries whose corporate

sectors have the larger net foreign liabilities have the most to gain by corporates' hedging, and by doing so reduce the net balance sheet constraint on devaluation.

We note that this product is already in the final phases of development by market participants and is likely to start trading in OTC form during June or July. Hence, the creation will require no government involvement as such, while we explain below that policymakers' encouragements could help the market grow.

Market incompleteness, deleveraging, and FDI

Due to market incompleteness, certain risks (intra-Eurozone currency risk) cannot be hedged without the introduction of the NDF. In the absence of any ability to hedge and share risk with holders of foreign currency assets, the exit could create significant balance sheet effects and possibly trigger large numbers of bankruptcies. Corporations with foreign direct investment in countries which may be subject to possible exit and devaluation can choose to hedge. And banks and corporate with liabilities in the form of foreign law Euro instruments can hedge those risks by buying Euro forwards.

The ability to hedge foreign exchange risk is both welfare-enhancing and capable of improving multi-national firms' ex-ante and ex-post incentives to make FDI (Wong 2007), reduce firms' weighted cost of capital (Broll et al. 2006), while empirical results show that hedging foreign exchange risk (and having strong internal governance) is related to strong shareholder value (Allayannis 2009). Finally, the existence of hedges is thought to be a determinant of the empirical result that host-country risk is not a large determinant of FDI (Broll et al. 2010). Consequently, this ability to hedge, will likely reduce rapid deleveraging, on the margin create a more stable environment for FDI into possible exit candidates, and reduce the overall impact of devaluation.

Creating instruments for hedging intra-Eurozone currency risk

A so-called non-deliverable forward contract (NDF) could be used to allow market participants to hedge currency risks associated with current exposures (asset and liabilities) to certain Eurozone countries. Since current Eurozone member countries don't have their own currencies at this stage, this would be a contract linked to their potential future national currencies.

Specifically, we imagine a new market with the following characteristics:

- Non-deliverable forward (NDF) contracts, very similar to NDF contracts in many offshore emerging markets e.g. Brazil, China, India.

- Settlement based on FX rate of official currency of the current Eurozone member country, versus US dollar.

- Official currency and FX rates determined by the country's central bank, with new currencies entering the picture in a break-up scenario.

- Cash settled in US dollars offshore (e.g., in London or NY).

- Maturity on specific quarterly dates, likely corresponding to IMM futures, for standardisation purposes.

There would be NDF contracts associated with each Eurozone currency. For example, there would be a German NDF, which would settle at expiry based on the value of the German currency at that time. If Germany has the Euro at the time of expiry, the contract would settle in accordance with the EUR/USD exchange rate at the time. If Germany has adopted a new German Mark as its currency ahead of the expiry of the contract, the contract would settle in accordance with the DEM/USD exchange rate at the time.

As is generally the case with NDF contracts, an official fixing rate, generally from the central bank, would be used to determine the specific pricing at expiry, and similar to the majority of NDF contracts (which are common in emerging market countries), contracts would settle in USD at

expiry. While it would be straightforward for those wishing to purchase protection (e.g., those who want to pay ITL vs USD), those firms wishing to sell protection (e.g., pay USD vs ITL) would be required to have offshore foreign-law assets (e.g., Bunds or Gilts) to hedge their exposure while earning a premium for their sale (based on the market-based ITL-USD forward rates which will trade at a premium to EUR/USD based on both probability of devaluation and expected size of devaluation). Hence, local asset managers in exiting countries would be the logical sellers of protection, essentially giving up a portion of FX gains in an exit.

The rationale for the contract being non-deliverable (i.e., settled entirely in USD), as opposed to deliverable (i.e., where EUR or DEM is paid for USD at time of delivery), has to do with the risk of capital controls at time of settlement, effectively preventing the free exchange of currency. If the non-deliverable contract expires during the (hopefully brief) period of capital controls, the NDF would be paid based on the official exchange rate, irrespective of capital controls or other legal stratagems which may prevent easy payment.

Ensuring efficiency of intra-Eurozone NDF markets

As mentioned, such a market is set to develop in coming months given that end-users are increasingly concerned about and looking to reduce Eurozone currency exposures, including intra-Eurozone currency mismatches.

However, creating a hedging product is only one step towards creating an efficient hedging market. In order to build a liquid and efficient market, the market would need to have active participation from a diverse set of banks, as well as a diverse set of end-users globally, especially those with assets providing a natural hedge. Given that Eurozone banks are likely to be under severe pressure from various sources in a break-up scenario, it would be important that other global banks, including US, UK, and Japanese banks participate actively in the market.

Global banks should be able to redistribute the risk more efficiently (at an appropriate price) to financial market participants around the world, including asset managers, hedge funds, etc. In addition, having participation of global banks would be crucial in terms of limiting counterparty risks in an actual break-up.

Having NDF contracts trade on an exchange could also help reduce counter-party concerns, and make the hedging product more liquid, and such an option should be investigated as part of the planning process for creating efficient hedging markets for intra-Eurozone currency exposures.

In the ideal world, the NDF market would allow banks, and other systemically important institutions, to manage and limit their intra-Eurozone currency risk. By reducing excessive exposures, it would make them more resilient in an actual Eurozone break-up, as well as in the run-up to the actual break-up event.

Relative to the current situation, where risk is likely to be concentrated in certain Eurozone financial institutions and corporate balance sheets, the availability of hedging instruments would offer an avenue for risk reduction at the Eurozone institutional level. Moreover, this would also serve as an avenue to reduce systemic risk in the Eurozone banking system, which would already be under severe pressure in a break-up scenario.