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MŰHELYTANULMÁNYOK **DISCUSSION PAPERS**

MT**-DP – 2011/33**

Debt restructuring in the euro area: a necessary but manageable evil?

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INSTITUTE OF ECONOMICS, HUNGARIAN ACADEMY OF SCIENCES
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Debt restructuring in the euro area: a necessary but manageable evil?

Zsolt Darvas

Abstract

There are two possible responses to the Greek debt crisis: 'Plan A', continued official lending, for as long as needed, with possible voluntary private sector involvement, and 'Plan B', coercive pre-emptive or post-default restructuring with significant face value reduction in privately-held debt. Both options have risks, but it is necessary to move to Plan B sooner or later. The impact on Greece could be mitigated by foreign bank ownership and proper liquidity support measures. The direct spillover impact on the rest of the euro area seems small. But there is the risk of contagion, which is a serious concern. There is a cautious case for delaying somewhat Plan B in order to prepare for it.

Keywords: debt restructuring; euro-area crisis; fiscal sustainability; financial interdependence; Lehman Brothers

JEL Classification: F34; E60; H63

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Államadósság-átstrukturálás az euróövezetben: szükséges, de kezelhető rossz?

Darvas Zsolt

Összefoglaló

Két lehetséges válasz létezik a görög adósságválságra. Az ’*A* terv’ további államközi hitelnyújtás ameddig csak szükséges a magánszektor esetleges önkéntes szerepvállalásával. A ’*B* terv’ kényszerítő erejű előzetes vagy egy formális csődöt követő utólagos államadósság-átstrukturálás a magánhitelezők követeléseinek jelentős csökkentésével. Mindkét lehetőség kockázatokat hordoz, de előbb-utóbb szükséges a ’*B* terv’ megvalósítása. Ennek Görögországra gyakorolt hatása mérsékelhető megfelelő banki likviditást biztosító eszközökkel, valamint azzal, ha a görög bankokban tulajdont szereznek külföldi bankcsoportok. Az euróövezet többi részére gyakorolt direkt hatás kicsinek tűnik. Ugyanakkor egy görög átstrukturálás fertőző hatást gyakorolhat más euróövezeti országokra és bankokra, amely komoly következményekkel is járhat. A ’*B* terv’ bizonyos mértékű késleltetése indokolt lehet annak érdekében, hogy Görögország és az euróövezet megfelelően fel tudjon rá készülni.

Tárgyszavak: adósság-átstrukturálás; euróövezeti válság; költségvetési fenntarthatóság; pénzügyi egymásrautaltság; Lehman Brothers

JEL kódok: F34; E60; H63

EXECUTIVE SUMMARY

BACKGROUND

It is increasing likely that Greece will not be able to return to markets any time soon. There are two possible scenarios: the so called 'Plan A', continued official lending with perhaps voluntary private sector involvement, and 'Plan B', which should entail a significant reduction in privately-held Greek government debt. The goal of this Policy Contribution is to assess these two options in light of historical experience.

MAIN CONCLUSIONS

- Both options have serious risks.
- The risks of Plan A relate to implementation, sufficiency, external politics, and the official takeover in Greek lending and thereby complete 'socialisation' of Greek public debt. There would also be a risk of a euro-area political crisis. 'Voluntary' private sector involvement is unlikely to work.
- Plan B has the potential for creating significant adverse effects within Greece and beyond its borders. But since Plan B is necessary, Europe should prepare for it. A sudden default without preparation would have more serious adverse effects.
- The risks for Greece mainly relate to the banking sector, because non-bank resident holdings of Greek debt are not large. Policymakers should explore options for bringing significant foreign bank ownership to the Greek banking system, which would help mitigate the three major problems: capital, access to liquidity and credibility to avoid runs on banks. If additional bank capital from private sources cannot be secured, certain EU funds should be used. A well-designed debt exchange and reliance on the Exceptional Liquidity Assistance could also help in supporting Greek banks with liquidity.
- The relatively small direct exposure of non-Greek euro-area banks suggests that direct spillover is a manageable risk. But contagion is a serious worry and there is a strong case for a thorough ESRB analysis. However, the Greek case is fundamentally different from the bankruptcy of Lehman Brothers. Also, other euro-area countries could well differentiate themselves from the three programme countries at a time when the probability of a Greek default is very high.

- There is a cautious case for delaying somewhat Plan B in order to prepare for it.
- Plan B is not an alternative to fiscal adjustment, structural reforms and proper reform or privatisation of state-owned enterprises, but a prerequisite for a successful fiscal consolidation.
- Plan B has no implication for an exit from the euro area.
- Restructurings in emerging countries during the last 15 years were followed by a quick rebound in output, with GDP increasing by 17 percent on average in three years after restructuring. However, the Greek situation is fundamentally different and such quick turnaround in economic performance cannot be expected.
- Time to market access after sovereign restructurings has shortened substantially recently. It largely depends on the way the restructuring is organised and if post-restructuring public debt is seen as sustainable.

1. INTRODUCTION

The euro-area sovereign debt crisis has entered a new phase. It is increasing likely that Greece will not be able to return to markets anytime soon and European policymakers disagree on the solution to remedy to this problem. The rating of Greek sovereign debt has been downgraded further, to the lowest level among countries currently rated, and secondary market yields have skyrocketed. There is now a very high perceived probability of a Greek restructuring.

The euro area has entered this situation despite very significant efforts made by the Greek government to implement the May 2010 programme with the financial and technical support of European partners and the IMF. But due to difficulties in implementing the programme and the weaker than expected economic performance, the Greek public debt to GDP ratio has been further revised upwards making it even more unlikely that additional privatisation and austere measures will restore public debt sustainability.

Concerns over the consequences of a Greek restructuring are justified. It has the potential to create significant adverse effects within Greece and beyond its borders. Yet options are limited. There are basically two options, differing whether a significant debt reduction is sought or not:

- Plan A: Continued official lending, for as long as needed, with possible

voluntary private sector involvement (PSI) without face value reduction and with an attempt to avoid a credit event (see Appendix 1 for the definition of credit events);

- Plan B: Coercive pre-emptive or post-default restructuring of privately-held Greek government debt with significant face value reduction, which can be well-prepared or messy; yet this option will also require the continuation of official lending (but on a smaller scale).

The goal of this Policy Contribution is to assess these two options in light of historical experiences.

2. CAN RESTRUCTURING BE AVOIDED IN THE EURO AREA?

In a paper published in February 2011 Darvas, Pisani-Ferry and Sapir (2011) came to the conclusion that Greece is the only euro-area country in which public debt is unambiguously unsustainable[1]. More recent information only confirmed this assessment.

Table 1 shows debt and primary balance forecasts for 2012. Forecasts published in November 2010 and in May 2011 are reported in order to make it possible to assess changes in the conditioning information set of forecasts.

- Greece clearly stands out in terms of public debt. Furthermore, forecasts deteriorated in the past half year (10.1 percentage points higher debt and 1.5 percentage points higher primary deficit), suggesting that in spite of significant adjustments, the May 2010 programme is not on track.
- In the other countries forecasts have either improved or remained broadly stable. The exception in terms of debt is Portugal, where debt was revised upwards by 15 percentage points, yet the 107 percent level is well below Greek values, and the primacy deficit forecast has improved. These revisions do not change the assessment that the sizes of the required fiscal adjustment and the persistent primary surplus are not high enough to rule out sustainability.

[1] Both Greece and Ireland have to implement very significant fiscal adjustment. But it is not only the size of the adjustment effort that matters. Our key indicator of solvency is the size of the primary budget surplus which needs to be maintained over a period of several years to achieve, in the medium term, a gradual return to safe levels of public debt. Here Greece stands apart from the other countries with the need for a historically unprecedented primary surplus, while the Irish primary surplus need is not extraordinary. Reasons for this difference are the lower level of Irish public debt at end-2010 and the better growth outlook.

Table 1

Public debt and primary balance forecasts for 2012 in selected euro area countries

		Public debt in 2012 (% GDP)			Primary balance in 2012 (% GDP)		
		Forecast published in November 2010	Forecast published in May 2011	Change in forecast	Forecast published in November 2010	Forecast published in May 2011	Change in forecast
Programme countries	Greece	156.0	166.1	10.1	-0.3	-1.8	-1.5
	Ireland	114.3	117.9	3.6	-4.8	-4.2	0.6
	Portugal	92.4	107.4	15.0	-1.1	0.3	1.4
Selected other countries	Spain	73.0	71.0	-2.0	-2.7	-2.9	-0.2
	Italy	119.9	119.8	-0.1	1.4	1.9	0.5
	Belgium	102.1	97.5	-4.6	-1.1	-0.7	0.4
	Germany	75.2	81.1	5.9	0.6	1.2	0.6

Source: DG ECFIN Autumn 2010 and Spring 2011 forecasts.

Concerning Greece, the recently announced plan to raise € 50 billion in privatisation revenues is very ambitious. It amounts to about 22 percent of GDP and, in spite of the announced creation of an independent privatisation agency, it could prove difficult to implement in full. Yet even in that case, privatisation receipts will not be sufficient to put Greek public debt on a sustainable path (Box 1). In spite of the clearly stated opposition of the European policy community, it is difficult to see how a restructuring can be avoided.

Box 1

Updated sustainability assessment

Darvas, Pisani-Ferry and Sapir (2011) presented a detailed sustainability assessment, which should be updated with more recent data and new prospects. I assume the following:

- Greece will not borrow from the market, but only from the IMF and EU partners. The IMF borrowing and repayment will be carried out according to the modified programme (since the IMF cannot lend to Greece forever) and all additional borrowing to cover the budget deficit and the repayment of existing loans will be funded by euro-area partners at the modified interest rate (Euribor + spread, which is 200 basis points in the first three years and 300 basis points thereafter). Note that borrowing from the EFSF or EFSM, or even a voluntary extension of private lending to Greece at the pre-crisis interest rate would lead to a broadly similar overall interest rate.
- Revenue from privatisation will be € 5 billion in each year during 2011-2013 (which is broadly equal to the current target) and € 17.5 billion both in 2014 and in 2015 (which is a rather dubious assumption in order to total privatisation revenues to € 50 billion).
- The 2010 level of debt/GDP is set equal to the May 2011 forecast of DG ECFIN (which is 2.6 percentage points higher than the value of the November forecast).
- GDP growth in 2011 and 2012 is set according to the May 2011 forecast of DG ECFIN (which is, in total, 0.6 percent lower than the value of the November 2010 forecasts). For later years I continue to use two scenarios as in Darvas, Pisani-Ferry and Sapir (2011).
- Primary balance/GDP (excluding privatisation revenues) in 2011 and 2012 is set according to the May 2011 forecast of DG ECFIN (which is, in total, 3.3 percentage points lower than the value of the November 2010 forecast). Both in 2013 and in 2014 I assume a 2 percentage points of GDP improvement compared to the previous year.

With these assumptions, in order to bring down the debt/GDP ratio to 60 percent by 2034, a 6.3 percent of GDP persistent primary surplus is needed in every year starting in 2015 in the optimistic scenario, and a 9.5 percent of GDP persistent primary surplus in the cautious scenario. Note that in the optimistic scenario Greek debt will be € 393 billion by 2020, of which euro-area partners will hold € 316 billion.

3. SOME LESSONS FROM RECENT DEFAULTS AND RESTRUCTURINGS

Lessons from historical restructurings for the euro area are instructive but limited, because all recent restructurings took place in emerging and developing countries under different circumstances. However, there are important general lessons with implications for a possible sovereign restructuring within the euro area.

3.1. CHANNELS THROUGH WHICH SOVEREIGN DEFAULTS AND RESTRUCTURINGS IMPACT THE ECONOMY

There are various channels through which a sovereign default or debt restructuring can impact the economy, as emphasised by, for example, IMF (2002):

- A direct, negative wealth effect on households and non-financial corporations can squeeze consumption and investment;
- Confidence can plummet and amplify the output fall;
- Public debt restructuring can lead to a collapse of the exchange rate, which adversely impacts all FX borrowers;
- Sovereign debt crises used to coincide with banking and currencies crises, amplifying the impact of each others;
- The banking system has a crucial role. This involves several channels through which banks can be impacted and in turn impact economic activity:
    - Banks' assets suffer directly from public debt restructuring;
    - There can be a bank run (deposit withdrawal) due to loss of confidence;
    - In the event of an exchange rate collapse, unhedged FX position of the banks can further compromise banks' balance sheets, as well as losses on FX lending;
    - Shift from domestic currency to foreign currency deposits can fuel exchange rate depreciation;
    - The interbank market can freeze due to failing banks and lack of confidence in the others;
    - Interest rate hikes, which typically accompanies crises, can increase the cost of funding;

    - Flight to quality can impact weaker banks, as deposit can shift to healthier, often foreign owned, banks;
    - In the event of a bank failure depositors can sustain losses, leading to further wealth effects;
    - As a consequence, credit crunch can occur and the payment system can also suffer, pushing the economy further down.
- The interruption of capital inflows may force to a prompt current account adjustment (that typically characterises countries ending in a restructuring), which is costly in terms of output;
- The impact on non-financial corporations can be mixed: highly leveraged corporations can suffer – either form the balance sheet effect in the case of FX borrowing, or from the interest rate hikes in the case of local currency borrowing –, while less leveraged firms can benefit from the exchange rate depreciation;
- Restructuring of the sovereign's obligations can undermine the confidence in the value of other economic contracts;
- Finally, restructuring in a country may have spillovers and contagious effects on other countries, which may feed back to the country through trade and financial linkages.

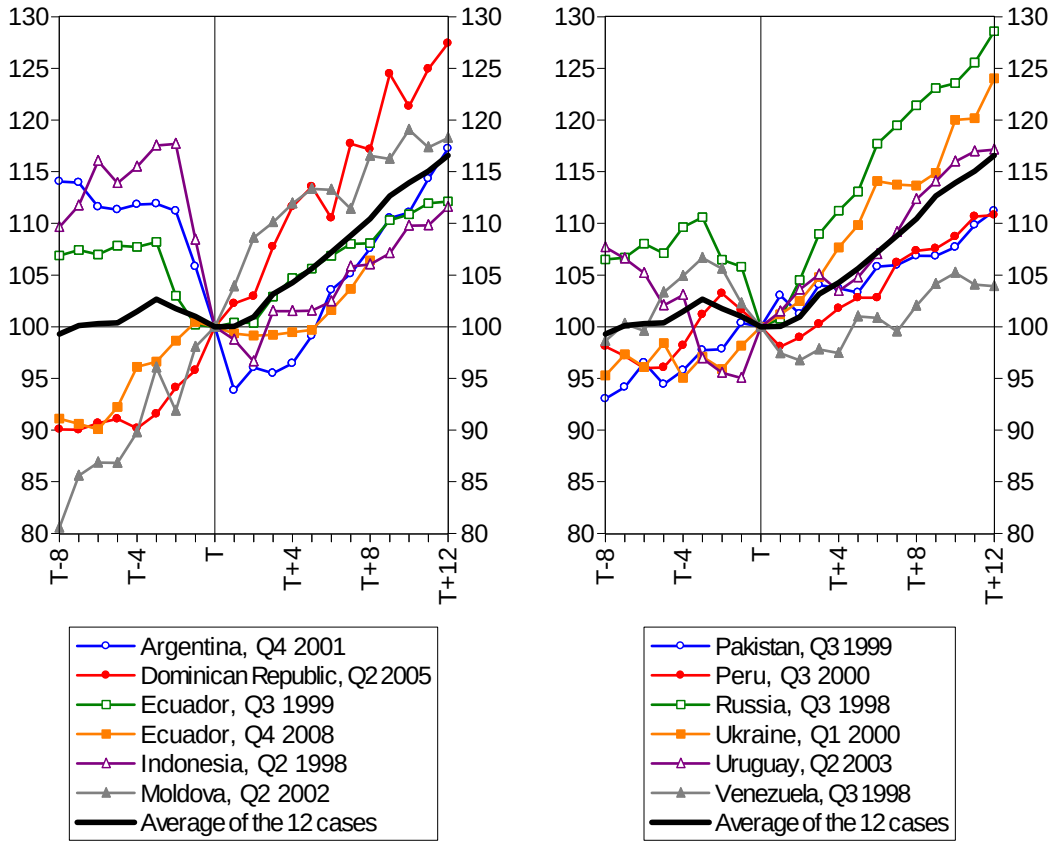
3.2. SOME RECENT EXAMPLES

Restructurings have sizeable domestic costs as emphasised by eg Panizza, Sturzenegger and Zettelmeyer (2009). The importance of the channels discussed in the previous subsection determines the impacts. Yet economic outcomes *after* recent sovereign defaults and restructurings were quite favourable, especially in light of the aftermath of the Latin American debt restructurings of the 1980s: GDP picked up quickly and the output level in the 12 cases shown on Figure 1 was on average 17 percent higher three years after restructuring (see Appendix 2 for the list of these cases and some additional information)[2]. Similar results apply to employment developments.

[2] Quarterly data is more informative than annual data, which is exemplified by the case of Argentina. The default occurred in Q4 2001. *Average* annual GDP was 11 percent lower in 2002 than in 2001, suggesting that there was a significant output fall *after* the default. But quarterly data clearly indicate that the dynamics was different (Figure 1): there was a sizeable output fall before the default and in the quarter of default, but after it there was a single quarter (Q1 2002) when GDP fell further. Note that the exchange rate collapsed in January 2002 with all associated consequence on foreign currency borrowers and the banking system. GDP started to recover already in Q2 2002. According to Blejer (2011), stabilisation of the banking system played a crucial role in the quick recovery.

Figure 1

Quarterly GDP developments before and after twelve public debt defaults or restructurings during the past 15 years (quarter of restructuring = 100, at constant prices)



Sources: National Institute of Statistics and Censuses of Argentina, Banco Central de la Republica Dominicana, OECD (for Indonesia), IMF IFS (for Moldova: only GDP in current prices is available that I deflated with the consumer price index), Instituto Nacional de Estadística e Informática (Peru), Federal Stat Statistics Service of the Russian Federation, State Statistics Committee of Ukraine, Banco Central del Uruguay, Banco Central de Venezuela and Kemal and Muhammad Farooq Arby (2004) for Pakistan. Seasonally adjusted GDP is available only for Ecuador; I have adjusted all other series using Census X12.
Note: T on the horizontal axis indicates the quarter of default. See Appendix 2 for a brief description of the shown cases.

What factors explain the minor growth impact of recent defaults and restructurings and the quick economic growth in the aftermath? [3] Several factors may have played a role:

- It is important to observe that in six cases shown in Figure 1 (Argentina, Indonesia, the 1999 case of Ecuador, Russia, Venezuela and Uruguay) a sizeable output fall preceded restructuring. On the one hand, this suggests that deteriorating economic performance may have brought about the default/restructuring, but on the other

[3] In answering this question I draw on IMF (2002) and Sturzenegger and Zettelmeyer (2006).

hand, the output fall has likely lead to negative output gaps and it is easier to grow when there are idle capacities;

- Support of the banking system primarily from the central banks, as governments have very limited resources in the midst of a crisis;
- Some sort of deposit freeze to avert a further escalation of banking problems;
- Some sort of restrictions on capital outflows, in some cases even on current transactions, to keep money inside the country;
- Giving up the fixed exchange rate in some countries. In six of the 12 cases the real effective exchange rate (REER) depreciated sharply either before or after restructuring (appendix Figure 1), which may have boosted exports. On average across the 12 cases, REER was 10 percent lower three years after the restructuring compared to two years before (with wide variations);
- The direct wealth effect on households and non-financial corporations was limited: partly due to little direct holding of government papers, partly because certain groups of government paper holders were excluded from the restructuring (eg households in Russia), and partly due to the pension systems, were largely pay-as-you-go type systems and therefore did not have significant government bond holdings;
- Defaults and restructurings in several cases lead to a return of domestic confidence, which is also reflected in access to market funding: defining "access" in terms of bond issuance or bank borrowing in international markets, Gelos, Sandleris and Sahay (2004) find that the duration of default episode has shortened considerably between the 1980s and the 1990s from 4.7 years to less than 1 year on average (Appendix 2).[4] An earlier market access is an indication of improved confidence, which is supportive for economic growth;
- Increased hydrocarbon prices in the late 1990s in the years after the Ecuadorian, Russian and Venezuelan defaults helped economic recovery;
- Lesser role of the banking system in the economy lessened the impact of the banking crisis. For example, even though Russia suffered from a severe banking crisis after restructuring, the role of financial intermediation was reasonably small: credit to GDP was only about 30 percent before the default (IMF, 2002).[5]

[4] Analysing 106 episodes of default and using a stronger definition of access (as positive net transfers), Richmond and Dias (2009) find that countries were able to re-enter the capital market after 5.5 years on average in the 1980s and after 2.5 years in the 1990s.

[5] According to IMF (2002), government papers constituted 31.5 of total assets of banks in June 1998 (98 percent of these papers were restructured). Excluding the state-owned Sberbank, which accounted for almost a quarter of all assets, most of the remaining top 50 banks became insolvent following the government default. After the failure of some banks, household deposits were transferred to the Sberbank, where they were guaranteed.

- Fiscal tightening typically accompanied the programmes, which may had non-Keynesian effects due to improved confidence, and structural reforms could have boosted economic growth.

3.3. LESSONS FOR THE EURO AREA

The situation of Greece is fundamentally different from these recent historical cases due to the following reasons:

- Much higher debt level;
- Much more important role of banking in the economy;
- Being part of an integrated union;
- Lack of a stand-alone central bank;
- Lack of a stand-alone currency;
- EU regulations prevent the adoption of some measures (eg capital controls).

But there are important lessons and implications for an eventual Greek restructuring.

First of all, the most important lesson from past crises is that the collapse of the banking system should be avoided. To this end, recapitalisation, continued access to liquidity will be needed as well as confidence to avoid bank runs. I argue in the next section that – after ensuring that Greek banks will have positive values after a restructuring – selling Greek banks to major euro-area banking groups would bring all of these elements and there are ways to support the Greek banks with liquidity.

Second, it is crucial to establish confidence. Concerning Greece, it is difficult to see how such a confidence can be restored in the absence of a sizeable debt reduction. Return of confidence in the event of debt reduction very much depends on the way the debt reduction is organised.

Third, while real exchange rate depreciation characterised six cases, in the other six cases (Dominican Republic, the 2008 case of Ecuador, Moldova, Pakistan, Peru, and Venezuela) fast economic growth emerged after the restructuring without sizeable real exchange rate depreciation. Therefore, one cannot conclude that it is impossible to grow after a restructuring without real exchange rate depreciation. However, the non-depreciating countries had some special features (such as the reliance on oil revenues in the case of Venezuela) and the volumes of defaulted claims were generally smaller and quick solutions were found.

4. EURO-AREA OPTIONS AND IMPLICATIONS

There are basically two options[6] concerning Greek public debt, depending whether a significant debt reduction of privately held debt is sought or not:

- Plan A: Continued official lending, for as long as needed, possibly with some form of *voluntary* private sector involvement (PSI) through the roll-over of existing exposure but without face value reduction and with the aim of avoiding a so called 'credit event' (see the Appendix for the discussion of credit events);
- Plan B: Coercive pre-emptive or post-default restructuring with significant face value reduction in privately-held Greek government debt. Restructuring can either be well-prepared or messy, yet this option will also require the continuation of official lending (but on a lower scale).

Both options have several variants and my dividing line is different from recent policy discussions. For example, in my categorisation the positions of both the German government ('soft restructuring' implying a seven-year maturity extension of private lending at a non-market interest rate, but without a face value reduction) and the ECB (only a purely voluntary private sector involvement is acceptable) belongs to Plan A, even if the German proposition may go beyond a purely voluntary solution. However, there is a significant difference between the German and the ECB's positions. While both could be helpful as giving more time to Greece, these options would not bring a significant reduction in the net present value of debt.

4.1. PLAN A

Even though news reports are conflicting, Plan A will likely continue, at least in the short run. A kind of private sector involvement may be sought, yet with the aim of avoiding a credit event. But continued official lending without debt reductions has serious risks and PSI with the aim of avoiding a credit event is unlikely to work, but even if it works, it will not resolve the issue of public debt unsustainability.

The risks in continued official lending without a significant debt reduction are numerous.

[6] In principle, there is a third option as well: buyback of Greek debt at discounted prices by an EU-fund. However, as we have argued in Darvas, Pisani-Ferry and Sapir (2011), this is unlikely to work and therefore we do not discuss this option in detail here.

1. Implementation risk: Domestic social and political developments, as well as the resistance of the public sector which fear the loss of privileges, may hinder the proper implementation of the programme even if the prime minister is determined to push the programme through.

2. Sufficiency risk: Even if the programme will be implemented in full and all planned privatisation revenues will be collected, this will not make public debt to a sustainable path (see Section 2).

3. External political risk: Due to domestic political developments, a bilateral lender may unilaterally decide to stop disbursing further loans to Greece, putting official lending in jeopardy.[7]

4. Risks in official takeover in Greek lending: Without a debt reduction and the consequent lack of market access in later years as well official creditors will continue to replace private creditors and eventually will hold all Greek debt. Thereby the euro area will enter a "support union", a phrase coined by Wolf (2011), which may lead to a loss of sovereignty of Greece, unwarranted disputes between the Greek government and its official lenders, and would also create moral hazard.

5. Risk for a Euro-area political crisis: Depending on the timing, any of the above risks can lead to an eventual haircut for official lending to Greece. This has the potential to create a euro-area wide political crisis with wide-ranging consequences.

Debates among policymakers have moved away from the pure version of Plan A without any private sector involvement, which was envisioned in May 2010. A growing number of policymakers, most loudly from the German government, demand a kind of private sector involvement. Motivated partly by the fears from the unknown consequences of a private debt reduction and partly by harsh opposition from the ECB, a solution that does not trigger a credit event is sought.

However, such a private sector involvement is unlikely to deliver sufficiently. The discussion is about bank holdings. If at all, banks could at most be led through moral suasion to accept a voluntary maturity extension with the same face value. But banks holding are not particularly large: at the end of 2010 Greek banks held about 21 percent of Greek debt, while other euro-area banks held about an additional 16 percent (Table 2). Hence even if successful, such a maturity extension would bring a little relief only and at

[7] The Slovakian parliament decided in August 2010 not to lend at all to Greece, which was not followed by others. However, at that time the programme just begun and other euro area partners were more determined to finance Greece. The political agreement on financing Greece is more fragile now and more and more governments recognise that the situation is unsustainable.

best it could give a bit more time before an ultimate solution, ie debt reduction, is implemented.

But even for banks this solution is unlikely to work, as highlighted, among others, by Roubini (2011b). The analogy to the Vienna Initiative (VI) of early 2009 is flawed. The VI was about maintaining the exposure of major European banking groups to their central European subsidiaries. Western European banks owned the bulk of the banking system in these countries and it was their self interest to resolve a collective action problem (ie if a bank withdraws its operations, the economic situation deteriorates and hence the others will suffer, while the joint commitment make all better off as the situation was more about liquidity and uncertainly). But with Greece the situation is very much different:

- the exposure is to the government,
- the holdings of banks is relatively small and in particular the combined holdings of non-Greek euro-area banks is only 16 percent,
- the collective maintenance of these bank exposures will not make the situation sustainable, because the issue is solvency, and a significantly large reduction in the net present value of Greek debt is not pre-emptively negotiable in a purely voluntary way,
- and it is uncertain whether a private sector involvement, which is labelled voluntary, would not or would constitute a credit event: the ultimate decision rests on a committee (see Appendix 1) that may conclude that the rescheduling was partly forced.

Also, the interest rate to be applied to the rolled over debt is at question: market rates would make the situation even more unsustainable (compared to the alternative of official lending), while the incentive for low (ie non-market) rates is zero, unless senior creditor status or collateral is provided, which are not justified by the situation.

Table 2.

Holdings of gross public debt in selected countries
(€ billion at face value, end-2010)

	Programme countries			Other countries		
	Greece	Ireland	Portugal	Belgium	Italy	Spain
Total debt	329	153	160	341	1,843	639
Domestic banks	69	9	22	31	252	229
Other euro-area banks	54	13	35	55	191	81
Other banks	6	9	6	n/a	n/a	23
Non-banks (domestic and foreign)	119	100	77	255	1,400	305
ECB	50	22	21	0	0	0
IMF/EU	32	0	0	0	0	0

Source: updated from Darvas, Gouardo, Pisani-Ferry and Sapir (2011).

4.2. PLAN B

Having said that Plan A, even with a 'voluntary' roll-over of banks' exposures, is unlikely to work, the implications of Plan B should be assessed. This is a very difficult and contentious task. Under Plan B I envisage a sizeable reduction in the net present value of *privately held* Greek public debt[8]. Therefore, I do not consider other alternatives, such as a partially coercive debt exchange with the same face value (Roubini, 2011a), because that would not solve the solvency problem and would just postpone the necessary debt reduction some years into the future; see also Pisani-Ferry (2011). Therefore, Plan B in my understanding will constitute a credit event and its consequences should be assessed.

Before discussing Plan B, two important features should be highlighted.

- First, Plan B is not an alternative to fiscal adjustment, structural reform and proper reform or privatisation of state-owned enterprises: these should continue. But Plan B is a necessary condition for achieving a successful fiscal adjustment.
- Second, the Greek government will need official financing after a restructuring or default, albeit at a reduced level compared to Plan A. This is because Greece still has (and is forecasted to have, see Table 1) a budget deficit, including a primary deficit. Market access may return once a sustainable situation has been achieved, but there will be an interim period and given the specific features of the Greek situation (see section 3.3), it is difficult to foresee the length of this period.

[8] I do advocate that Greece should pay back in full all emergency assistance received form official creditors since May 2010 and the face value reduction should apply to privately held debt only. Yet there is a rationale for further lowering of the official lending interest rate to Greece (Darvas, Pisani-Ferry and Sapir, 2011). Whether (and if so, how) ECB bond holdings can be excluded from the haircut is a valid question (see section 4.5).

Plan B can be a coercive debt exchange before actually declaring a default, or a restructuring post-default. The impact of the second possibility would likely be more damaging. The concerns with a Greek restructuring can be divided into two main categories:

1. possible impact on Greece, and
2. possible spillover/contagion effects on the rest of the euro area and even on countries outside the euro area.

4.2.1. Impact on Greece

With regards to impacts on Greece, the direct wealth effect on households and non-financial corporations from a haircut for government debt may not be too large. According to estimates of Barclays Capital (2011), € 29.0 billion of the € 284 billion marketable Greek government papers are held by resident 'Mutual funds, pension funds and others' and an additional € 5.6 billion by Greek residents other than banks, insurance companies, mutual funds, pension funds and monetary authorities. Altogether, these holdings constitute approximately 15 percent of GDP. Some of these holders may have already marked to market their holdings, implying that the additional impact of a haircut could not be large. The drag on economic growth (through reduced demand due to wealth effect) also depends on the distribution of these holdings among the various investor groups.

The main concern is the stability of the Greek banking system. For the banks the crucial issues are new capital (as losses will likely wipe out current capital), access to liquidity (as the defaulted bonds will likely not be eligible anymore at ECB operations) and the avoidance of bank runs.

All of these tasks are extremely difficult to handle. The situation would be much better with significant foreign ownership in the Greek banking system, which would bring credibility and stability to the Greek banking system and additional capital and liquidity if needed. The presence of foreign banks can also avert bank runs. Historical examples show that at times of stress domestically owned banks suffer more than foreign owned banks and even there were capital flights from domestically owned to foreign owned banks. The recent experiences of Central and Eastern European countries support this observation.

Therefore, a priority should be to bring foreign ownership to the Greek banking system (Darvas, 2011), which is not an easy task. Capital loss can be so substantial after a sizeable debt reduction that the residual value of Greek banks could be too small or even negative.

Consequently, recapitalisation from an official source[9] and/or the bail-in of some creditors of Greek banks may be needed before inviting foreign banking groups to acquire Greek banks. But the difficulties with the solution should not hinder a proper analysis of this option and preparation for it, since bringing foreign ownership to the Greek banking system would be the best solution among various alternatives to save Greek banks in the event of a sizeable public debt reduction.

The second best solution is recapitalisation of Greek banks from official EU money, such as from the European Investment Bank, or (if its mandate is amended) the European Financial Stability Facility (EFSF), or from a specially designed new banking fund of the EU. Investing EU money into Greek banks is still much better solution than Plan A, which carries the risk of significant direct losses to EU lenders (section 4.1), and also much better than let the Greek banking system collapse. Bank shares held by the EU could be sold later.

Access to liquidity is a further crucial problem of Greek banks. According to market estimates, Greek banks have posted approximately € 70 billion of Greek government papers at the ECB as collateral for liquidity. The ECB has rightly indicated that defaulted/restructured bonds, with their legal uncertainty and unknown recovery values, cannot be considered as eligible collaterals. An immediate recall of ECB liquidity would likely render most Greek banks bankrupt absent alternative options for access to liquidity. One option is bringing foreign ownership to Greek banks, which –at least partially– could mitigate the liquidity problem. A second option would be a debt exchange of Greek government bonds: either to a new bond of the Greek state supported by appropriate collateral, or a Brady-type bond[10] guaranteed by, for example, the EFSF. A third option is a liquidity provision by the Greek central bank with the Exceptional Liquidity Assistance (ELA) facility (see Box 2).

[9] The EU-IMF programme put aside €10 billion for bank recapitalisation. This amount may be broadly sufficient even in the event of a large haircut for Greek public debt because Greek banks hold €69 billion of Greek public debt (see Table 2) and have bank capital and reserves of approximately €44 billion (see http://sdw.ecb.europa.eu/browse.do?node=2019194).

[10] See Clark (1993) on the Brady-plan.

Box 2

Exceptional Liquidity Assistance (ELA) by national central banks of euro-area countries

Central banks used to have certain means for emergency liquidity support (see eg Padoa-Schioppa, 2003) and this is the case in the Eurosystem as well. The facility is called Emergency Liquidity Assistance (ELA). This facility is in the hands of the national central banks and can be used over and above the assistance provided by the ECB (Buiter, Michels and Rahbari, 2011). The statutes of the ECB and the European System of Central banks (ESCB) state that:

"14.4. National central banks may perform functions other than those specified in this Statute unless the Governing Council finds, by a majority of two thirds of the votes cast, that these interfere with the objectives and tasks of the ESCB. Such functions shall be performed on the responsibility and liability of national central banks and shall not be regarded as being part of the functions of the ESCB."

Buiter, Michels and Rahbari (2011) further highlight that the existing legal documents and recommendations make it clear that ELA facilities are *"for most purposes, a national matter, with details [of their] scope, terms and procedures to be spelt out in national legislation and arrangements"* (Buiter, Michels and Rahbari, 2011, p. 4). They further stress that although national central banks are not constrained by the rules that apply to ESCB operations, a certain number of restrictions still apply: prohibition of overdraft facilities for official bodies, of purchasing government bonds, and of carrying out tasks that go beyond those of a central bank (such as supporting insolvent institutions).

Full disclosure of the terms and conditions of ELA facilities is not required, and has not been published by the central banks most active in using them. The amounts of ELA financing provided can be inferred from the balance sheets of central banks, grouped under the "Other Assets" category, but the breakdown and the amounts specifically concerning ELA are not available.

Although these facilities do not require explicit approval of the ECB, they can be terminated by vote if they are deemed to run counter to the ECB's mandate. Moreover, the same degree of independence is required for national central banks performing ELA functions as they enjoy in carrying out ESCB-related operations.

In the euro-area the National Bank of Belgium provided an ELA to Fortis Bank between 26 September 2008 and 9 October 2008 amounting to € 51 billion in the peak (according to Irish Independent, 2011). The Central Bank of Ireland has been using this facility for a much longer period and estimates suggests that currently it amounts to about € 50 billion.

4.2.2. Spillover and contagion

The second major concern with Plan B is the possible spillover and contagious effects. Spillover can be assessed with data on exposures and this seems to be a manageable risk. But nobody really knows much about contagion and various views that are expressed are not based on thorough analyses.

As for spillovers, the € 54 billion direct bank combined exposure of euro-area banks outside Greece is sizeable, but not large (Table 2). Outstanding credit default swap (CDS) positions are also not large: the net positions amount to € 3.5 billion and the gross positions to € 52 billion (Table 3 – see the note to the table on the definition of gross and net positions and Appendix 1 for further details). Gross position could matter in a crisis situation when counterparties deny to honour their obligations, or when a major counterparty fails. Lacking bank-specific data, it is difficult to assess whether any major bank or other financial institution is at risk. But the small amount of the net CDS positions along with the relatively small direct bank holdings of Greek government bonds, which are distributed among several banks, suggests that the direct impact of a Greek restructuring *in itself* may not threat the failure of a major financial institution, and eventual recapitalisation need may not be excessive.

Table 3.

Outstanding credit default swap (CDS) positions as registered by Depository Trade and Clearing Corporation (DTCC) (€ billion), 25 May 2011

	Gross	Net
Belgium	35.7	5.1
Germany	65.6	11.4
Greece	51.8	3.5
Ireland	26.8	2.9
Italy	186.8	17.2
Portugal	42.8	4.5
Spain	98.1	12.6

Note: we report the outstanding positions in € billions, while most news reports indicate values in $ billions. **The gross notional amount** is the sum of all CDS contracts bought (or sold). The gross figure does not take into account the fact that market participants can (and do) simultaneously buy and sell protection on the same reference entity. **The net notional values** are calculated with reference to individual market participants, and are equal to the sum of net protection bought (or sold) by net buyers (or net sellers). As such, they represent the maximum possible net funds transfers between net sellers and net buyers. See more details in Appendix 1. The table shows trades registered with DTCC; there could be other trades as well.
Source: Depository Trade and Clearing Corporation

The more difficult question is outright contagion to other sovereign borrowers and threats to financial stability of the euro area financial system. This is primarily because a restructuring would signal a change in the policy stance of the official community. If Greece defaulted, markets could panic, denying funding for other weaker countries and pushing them into default, too. An attempt to pull off a 'concerted default' by several peripheral countries at once could lead to a renewed banking crisis in core eurozone countries such as Germany and France since their banks are exposed by their loans to the governments (or to banks backed by their governments) in these peripheral eurozone sovereign member states.

This is indeed a major concern and warrants a thorough analysis, for which the ESRB would be the most suitable institution (Wolff, 2011).

While I cannot assess the risk of contagion, it is instructing to compare the September 2008 bankruptcy of Lehman Brothers, a major US investment bank, to a possible restructuring of Greece, because Lehman's case has often been cited as illustrating the potential consequences of a Greek sovereign default. The bankruptcy of Lehman Brothers led to a spike in perceived counterparty risk and a subsequent freeze of the interbank lending markets. But the differences between the cases of Lehman and Greece are striking. Table 4 compares the two cases along various dimensions. In short, Lehman Brothers was a highly interconnected systemically important financial institution (SIFI) and its bankruptcy emerged rather suddenly in a very uncertain environment. Greece is not a SIFI, exposures to Greece are reasonably well known, restructuring of Greek debt is widely expected, and the global financial architecture carries less risk now.

Table 4

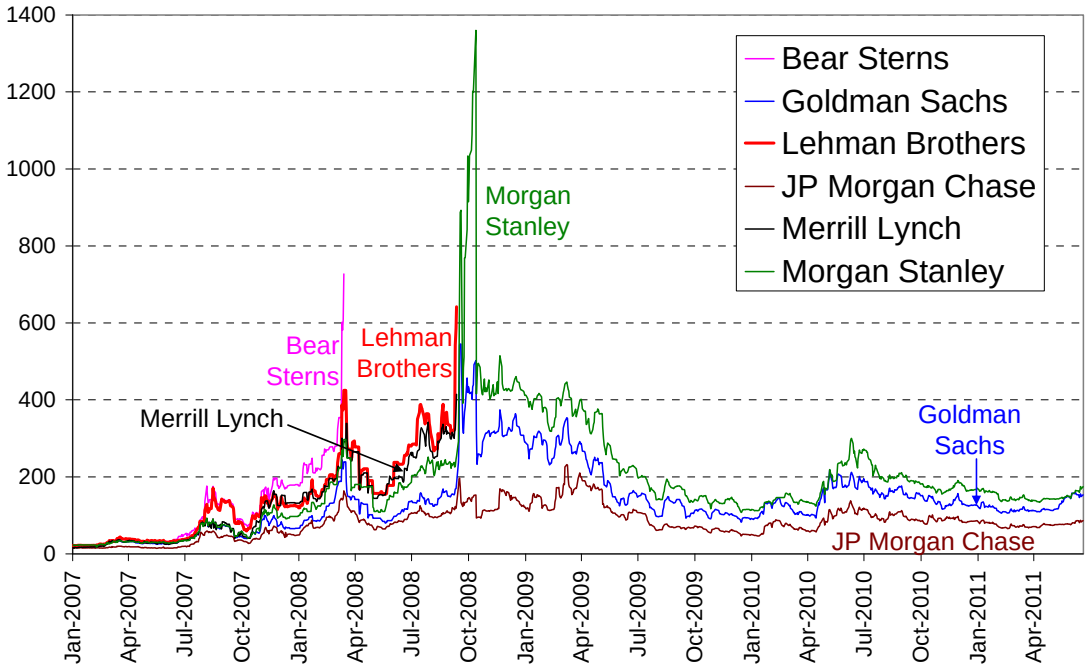
Systemic implications of the bankruptcy of Lehman Brothers and the looming restructuring of Greek public debt

	Lehman Brothers	**Greece**
CDS exposure	When Lehman Brothers failed, there was vast uncertainty concerning CDS exposures to Lehman. Initial estimates suggested that gross claims could reach $ 400 billion (Duquerroy, Gauthier and Gex, 2009), but figures published one month after the event showed $ 72 billion of gross notional outstanding on Lehman, and a $ 6 billion net exposure (ECB, 2009). Overall, only $ 5.2 billion changed hands following the auction and settlement.	Transparency on CDS exposures has increased since then and exposure to Greece is reasonably well known. Further initiatives could increase market awareness.
Counterparty to CDS trades	Lehman was a significant counterparty to CDS trades, ie investors had bought insurance from Lehman	Not a counterparty
Issuer of short-term debt	Lehman was a significant issuer of short-term debt and its paper was considered attractive by funds investing in money markets. In the aftermath of the Lehman bankruptcy investors shunned commercial paper and other forms of short-term debt, prompting Fed action to substitute private investors with purchases of short-term private debt.	Since April 2010 only marginal issuances of short-term debt
Broker-dealer	Lehman was also an important broker-dealer of securities. As a consequence of the bankruptcy procedure, investors that had placed investment assets with Lehman's broker-dealer units to serve as collateral lost access to these assets (at least for the duration of the procedure). This prompted the liquidation of other assets.	Not a broker-dealer
Business model	Coming a few months after the demise of Bear Sterns, Lehman's failure was regarded as a signal that the business model of investment banks was vulnerable.	Greece was not a prototype of euro-area fiscal management
Bail-out	The refusal by the US government to bail-out Lehman had the broader consequence of signalling that bankruptcy of a well-known financial player was a possibility. This resulted in an across-the-board re-pricing of risk.	Greece was given official help and restructuring will come when the failure of the programme becomes obvious. The Greek restructuring does not impact official help to other countries (Ireland and Portugal). Yet it would signal that sovereign restructuring is a possibility in the euro area.
Suddenness	The bankruptcy of Lehman was largely unexpected. As Figure 2 indicates, the CDS spread on Lehman was around 160 basis points in May 2008 and about 300 basis points in later months up to 9 September 2008. Only three working days prior to its bankruptcy, the CDS spread increased to about 600 basis points.	Greek CDS spreads have hovered around 800 basis points from April 2010 to early 2011 and have risen above 2000 basis points since then (Figure 3).
Stability of the global financial system and global economic outlook	At the time of Lehman's bankruptcy there was an extreme uncertainty concerning the global financial system and economic outlook.	While we cannot claim that the financial crisis is over, the uncertainty surrounding the global financial system has declined and economic growth has resumed in most countries.

Sources: Information on Lehman Brothers was taken mostly from Fender, Frankel and Gyntelberg (2008), with some additions from Duquerroy, Gauthier and Gex (2009) and ECB (2009). The assessment of the Greek situation is mine.

Figure 2

5-year credit default swap (CDS) spread on major US investment banks, 2 Jan 2007 – 20 June 2011, in basis points



Source: Fender, Frankel and Gyntelberg (2008) and Bloomberg.
Note: The time series for Bear Stearns and Merrill Lynch end on the date of the announcement of their acquisitions: 16 March 2008 for Bear Stearns (later acquired by JP Morgan Chase) and 14 September 2008 for Merrill Lynch (later acquired by the Bank of America).

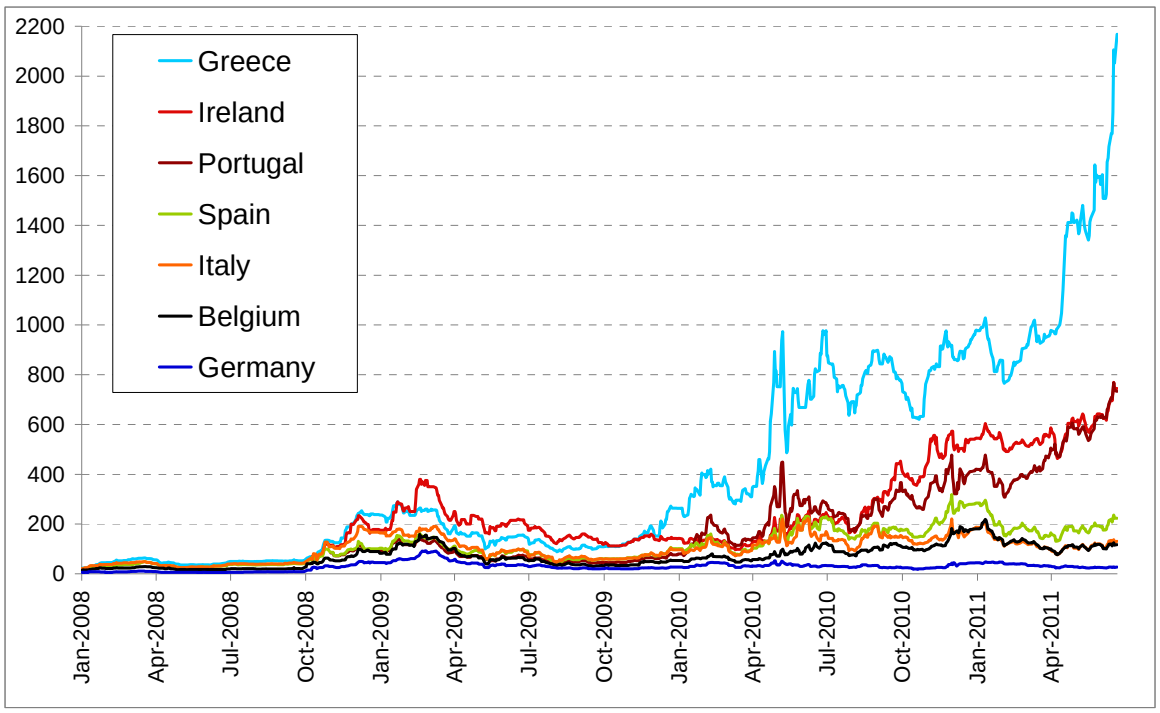
Therefore, the case Greece is fundamentally different from the default of Lehman Brothers, but without access to detailed data one cannot assess the possible contagious effects of a Greek restructuring, be it pre-emptive or post-default.

In this regard Ireland and Portugal are not really issues, since both countries are already out of the market: neither their governments, nor their banks borrow from market sources. A possible turbulence in their secondary government bond market could only hurt the holders of their debt.

The defining countries are Spain, Italy and Belgium, which are sometimes indicated as being at risk in the event of a Greek restructuring. This worry has to be taken seriously. But these countries could well differentiate themselves from the three programme countries at a time when the probability of a Greek restructuring has increased to very high level (Figure 3), largely because these countries have indeed much better fundamentals.

Figure 3

5-year credit default swap (CDS) spread on sovereigns, 2 Jan 2008 – 20 June 2011, in basis points



Source: Datastream

European policymakers could do a lot to reduce the contagion risk by dispelling the fog of doubt surrounding their banks by finalising the stress tests initiated by the EBA, publishing comprehensive results and recapitalizing the banks that need it (Darvas, Pisani-Ferry and Sapir, 2011). A ban on bank dividends or bonuses, which could contribute to self-recapitalisation, could also be considered.

4.3. TIMING: WAIT FOR OR RUSH TO PLAN B?

While Plan B is necessary in my assessment (and the only reason for not being inevitable is that euro-area partner governments could hoard all Greek debt), its timing can be chosen within certain limits. The main arguments for waiting are:

- a proper programme for supporting Greek banks can be put in place;
- adjustment in other euro-area countries can advance, lessening the risk of contagion;
- banks in other countries can better prepare, which should be fostered by stringent stress tests and recapitalisation if needed;

- the potential for privatisation in Greece can be better assessed and thereby the haircut can be better calibrated;
- it would give time for thorough studying of the systemic implications of a Greek restructuring.

The arguments for a swift restructuring:

- a delay will increase the official share in Greek debt and private creditors with maturing debt will be paid in full in the meantime, leading to higher haircuts for the remaining privately held part, or even haircut for official lending with the potential of a deep political crisis (Section 4.1);
- a delay risks a disorderly outcome should the social and political situation deteriorate in Greece;
- restructuring could end the uncertainty that currently is hampering private investment and consumption in Greece;
- a restructuring, seen as a fair burden sharing with foreign creditors, may increase the ownership of the current fiscal and structural adjustment programme and hence can lead to better implementation and less resistance from Greek social and political partners;
- if restructuring is well prepared and proper measures are implemented in advanced to contain contagious effect, Greece may gain market access sometime after the restructuring. This could have a stabilising impact on the government bond markets of other euro-area countries as well;
- a delay will prolong the euro-area sovereign debt crisis, which could damage the prestige of the EU.

The decision on timing should weight these pros and cons. Since the stability of the Greek banking system is crucial and stress-testing and recapitalising of other euro-area banks will take some time, it would be worth waiting a few quarters until proper measures are put in place.

4.4. EXIT FROM THE EURO AREA?

Even though legally impossible and it would blow up the European integration process since WWII, some argue for an exit from the euro area in the event of Plan B. I disagree with this suggestion and claim that Plan B should have no implication for exit from the euro area. A more substantial argument in favour of an exit is the growth enhancing impact of the likely depreciation of the new Greek drachma. Unfortunately, we also lack a thorough analysis of the pros and cons of this issue. Let me briefly mention a few factors that could be considered.

Greece is relatively closed economy, even when considering tourism, and the share of the manufacturing sector (the sector that typically produces most of the export goods) is the lowest among the euro-area countries. The assessment of the price-wage competitiveness problem of Greece is a controversial issue: different studies arrive at different conclusions. Even though an improvement in price-wage competitiveness could help any country, Greece has an enormous potential to improve the non-price dimensions of its competitiveness (Brau, 2011). For example, in 2010 Greece ranked only 109 out of 185 countries in the Ease of Doing Business indicator of the World Bank. Also, growth in the short term could be helped with a quick mobilisation of idle Structural Funds (Marzinotto, 2011) and with a proper restructuring that ends uncertainty.

An exit from the euro area would bring the "mother of all financial crises" as described by Eichengreen (2007a and 2007b), since all financial assets would leave the country absent capital controls. An exit would render most of the private sector with debt bankrupt. Since the current liabilities of corporations and households are denominated in euros, they would become increasingly expensive to pay off in the depreciating new Greek drachma that were likely losing value against the euro. A sharp depreciation of the exchange rate could push much of the country's private sector into bankruptcy and lead to extensive litigation against "bad debtors" in the country. A forced exchange from euro denominated debt to new Greek drachma would have similar effect. Widespread bankruptcies of domestic firms and households would stress Greek banks much more than the restructuring of the sovereign debt. Such a situation would constrain any bank lending for many years.

An exit from the euro area would have other adverse effects as well. The low credibility of the newly stand-alone Greek central bank would likely lead to much higher real interest rates as well as to a period of high inflation. All of these would be drags on economic growth.

Concerning retail interest rates, Table 5 indicates that private sector in Greece, Ireland and Portugal still enjoy reasonably low interest rates, which are well below the government bond yields of their sovereigns. This is most likely a euro-area effect, since the private sector in non-euro area countries pay rates above their sovereigns as the sovereign is typically considered the benchmark. But in the euro area another sovereign can also serve as the benchmark. Therefore, with an exit from the euro area the Greek private sector would face much higher interest rates (in real terms as well) with negative implications for growth and welfare.

Table 5:

Selected interest rates in euro-area and non-euro area countries, April 2011

		Corporate loans		Household loans		Government bond yields	
		Up to and including EUR 1 million	Over EUR 1 million	Housing	Consumption	2 year	10 years
Euro area	Belgium	4.5	2.2	3.9	6.3	2.4	4.3
	Germany	5.4	3.1	4.1	6.2	1.8	3.3
	Greece	5.5	5.6	4.3	10.2	19.6	13.9
	Ireland	5.5	3.2	3.5	6.4	9.9	9.8
	Italy	4.9	2.7	3.0	7.6	3.0	4.8
	Portugal	6.7	5.0	3.4	9.8	10.2	9.2
	Spain	4.8	3.2	3.2	7.5	3.3	5.3
Non-euro area	Czech Republic	4.6	n.a.	4.6	13.9	1.7	4.1
	Hungary	8.9	n.a.	10.4	23.4	n.a.	7.1
	Poland	9.2	n.a.	7.2	15.9	5.0	6.1
	Romania	11.9	n.a.	9.0	11.8	n.a.	7.3
	Sweden	4.2	n.a.	4.5	n.a.	2.8	3.3
	UK	n.a.	n.a.	4.6	7.5	1.2	3.8

Source: ECB except the 2-year government bond yield, which is from Datastream.
Notes. Corporate and household loans are weighted averages of different maturities for euro-area countries as calculated by the ECB, but unweighted averages of less than 1, between 1 and 5, and more than 5-year loans for the non-euro area countries. For non-euro area countries only domestic currency loans are considered. Corporate loans: Loans other than revolving loans and overdrafts, convenience and extended credit card debt, New business. Housing loans: Lending for house purchase excluding revolving loans and overdrafts, convenience and extended credit card debt, New business. Consumption loans: Loans for consumption excluding revolving loans and overdrafts, convenience and extended credit card debt, New business.

4.5. IMPACT ON ECB

A Greek debt restructuring would directly impact the ECB through:

- own Greek bond holdings, which were acquired though the Securities Market Programme (SMP), and
- the Greek bonds that banks placed as collateral for ECB liquidity.

The indirect channels may relate to:

- financial stability of the euro area, and
- a change in the economic and inflationary outlook of the euro area.

Lack of proper transparency of SMP makes it difficult to assess the impact of an eventual Greek debt restructuring on the ECB's balance sheet. Market estimates suggest that the ECB bought Greek government bonds for approximately € 40 billion at market prices, which could be € 50 billion at face value. I do not want to speculate about the needed haircut in the event of a restructuring, but for illustration I can consider a 50 percent reduction in the net present value of debt, which is a typical estimate of some analysts. This would lead to an approximately € 15 billion loss for the ECB, which should be borne by member states according to their capital share in ECB. Yet in past restructurings several countries excluded certain investor groups from losses. The ECB holdings of Greek debt may also be excluded.

The ECB's position of excluding defaulted bonds from eligible collaterals is justified. However, the Eurosystem should prepare for an eventual Greek debt restructuring and other ways to support Greek banks with liquidity should be explored (section 4.2.1) and made instantly available in the event of a sudden disorderly default.

As discussed in the previous sections, it is difficult to predict the likely impact of a Greek public debt restructuring on the financial stability of the euro area. The ECB should stand ready to safeguard euro-area financial stability in the event of adverse effects, as it did during the recent financial crisis.

Finally, it is also difficult to predict the likely impact of a Greek public debt restructuring on the economic and inflationary outlook of the euro area. Yet a debt restructuring (or the lack of it) should not impact the conduct of monetary policy, which should consider euro-area aggregates.

5. SUMMARY

There is a growing recognition that the Greek government will not be able to borrow from the market anytime soon, and there is an intense debate about possible responses. The so called 'Plan A', continued official lending with perhaps a voluntary private sector involvement, is unlikely to work and has various risks, including the hoarding of all Greek debt by official creditors and the potential of a political crisis. The hoarding of all Greek public debt in the hands of euro-area partners ('debt socialisation') may not serve the best interests of Greek and other EU citizens, and would also require wide-ranging changes to the functioning and the institutional framework of the EU, which does not seem to be a political reality at present. A sufficiently large debt reduction is not pre-emptively negotiable without coercion. 'Plan B', which should entail a significant debt reduction in privately-held Greek sovereign debt, is therefore necessary. But it is also risky: it has the potential to create significant adverse effects within Greece and beyond its borders. But since it is necessary, European policymakers should prepare for a Greek debt restructuring, because an unplanned default would have more serious impacts.

Debt restructuring in Greece is not an alternative to fiscal adjustment, structural reforms and proper reform or privatisation of state-owned enterprises, but a prerequisite for a successful fiscal consolidation. Debt restructuring does not have an implication for exit from the euro area.

There are various channels through which a sovereign debt restructuring can undermine economic performance and there are serious domestic costs. Yet restructuring in emerging countries during the past 15 years has been followed by a quick rebound in output, with GDP increasing by 17 percent on average in three years after restructuring. However, there are obvious differences between Greece and these emerging countries, suggesting that such a quick turnaround in economic performance should not be expected in Greece after a restructuring. Greece has much higher level of debt and a sizeable banking sector, the country is part of an integrated monetary union, it does not have a stand-alone central bank or currency, and EU regulations exclude certain measures that were implemented during emerging country debt restructuring episodes.

In preparing for the debt restructuring, several measures should be implemented to strengthen the Greek banking system, but also the banking systems in other euro-area countries. For Greek banks, new capital, access to liquidity and confidence to avoid bank runs are the crucial issues, in which foreign bank ownership would be a significant plus. Policymakers should explore options for bringing significant foreign bank ownership to the Greek banking system after ensuring that Greek banks will have a positive value after a

restructuring. If additional bank capital from private sources cannot be secured, it would be still better to use certain EU funds than let the Greek banking system collapse. A well-designed debt exchange and the reliance on the Exceptional Liquidity Assistance could also help Greek banks by supporting them with liquidity. Concerning the banking system of other euro-area countries, proper stress-testing and recapitalizing of banks that need it should have a very high priority to contain contagious effects. A ban on bank dividends or bonuses, which could contribute to self-recapitalisation, could also be considered.

It is very difficult to assess the possible contagious effects of an eventual Greek restructuring. The case of Greece will be clearly different from the bankruptcy of Lehman Brothers, because Greece is not a systemically important financial institution, exposures to Greece are reasonably well known, restructuring of Greek debt is widely expected, and the global financial architecture carries less risk now. But the possible contiguous effects should not be underestimated and there is a case for a careful study by the ESRB.

The crucial issue is timing. There are both cons and pros for waiting for a while and for a swift restructuring. Waiting would further increase the official financing share in Greek debt, prolong uncertainty, risk a disorderly outcome, and damage to the prestige of the EU, but would also give time to prepare, to understand the risks, and to allow other euro-area countries to accelerate and advance with their adjustments. A swift restructuring, on the other hand, could end the uncertainty, may increase the ownership of the current fiscal and structural adjustment programme and may lead to earlier market access, thereby helping economic recovery. Since the uncertainty about the possible impact of a Greek restructuring is very high and Greek banks are not yet prepared to withstand the losses, there is cautious case for waiting. Also, it would be very important that policymakers from various EU institutions and countries come to an agreement on the most adequate solution, which will also take time.

Last but not least, the EU should mobilise idle Structural Funds to foster economic growth in Greece and in other countries struggling with fiscal and structural adjustment (Marzinotto, 2011).

6. REFERENCES

BaFin - Federal Financial Supervisory Authority (2010), 'BaFin prohibits naked short-selling transactions and naked CDS in government bonds of euro zone', press release available at: http://www.bafin.de/cln_152/nn_721140/SharedDocs/Mitteilungen/EN/2010/pm__100518__cds__leerverkauf__allgemeinverfuegungen__en.html

Barclays Capital (2011), 'Greece: The (long) countdown to restructuring', 11 May 2011

Blejer, Mario I. (2011), 'Argentina: Crisis and Recovery', paper presented at the conference "Economic Crisis and Governance", IOBE - The Foundation for Economic & Industrial Research, Athens, 16 May 2011, http://www.iobe.gr/index.asp?a_id=87&news_id=999

Brau, Eduard (2011), 'Greece: From Economic Disaster to Economic Miracle?' paper presented at the conference "Economic Crisis and Governance", IOBE - The Foundation for Economic & Industrial Research, Athens, 16 May 2011, http://www.iobe.gr/index.asp?a_id=87&news_id=999

Buiter, Willelm H., Juergen Michels and Ebrahim Rahbari (2011), 'ELA: An Emperor without Clothes', Citi Investment Research and Analysis, February 2011, available at: http://www.nber.org/~wbuiter/ela.pdf

Clark, John (1993), 'Debt Reduction and Market Reentry under the Brady Plan', Federal Reserve Bank of New York Quarterly Review, Volume 18, Number 4, available at: http://www.newyorkfed.org/research/quarterly_review/1993v18/v18n4article3.html

Darvas, Zsolt (2011), 'Debt Default by EU Governments?', 12 April 2011, European Affairs, The Journal of the European Institute, available at: http://www.bruegel.org/publications/publication-detail/publication/522-debt-default-by-eu-governments/

Darvas, Zsolt, Christophe Gouardo, Jean Pisani-Ferry and André Sapir (2011), 'A comprehensive approach to euro-area crisis: background calculations', Bruegel Working Paper, February 2011, available at: http://www.bruegel.org/publications/publication-detail/publication/499-a-comprehensive-approach-to-euro-area-crisis-background-calculations/

Darvas, Zsolt, Jean Pisani-Ferry and André Sapir (2011), 'A comprehensive approach to the euro-area debt crisis', Bruegel Policy Brief, February 2011, available at: http://www.bruegel.org/publications/publication-detail/publication/491-a-comprehensive-approach-to-the-euro-area-debt-crisis/

Duquerroy, Anne, Nicolas Gauthier and Mathieu Gex (2009), 'Credit default swaps and financial stability: risks and regulatory issues', Banque de France, Financial Stability Review, no. 13, p. 75-88.

ECB (2009), 'Credit Default Swaps and counterparty risk', ECB, August 2009.

Eichengreen, Barry (2007a), 'The Breakup of the Euro Area', NBER Working Paper 13393

Eichengreen, Barry (2007b), 'Eurozone breakup would trigger the mother of all financial crises', VoxEU, 17 November 2007, http://www.voxeu.org/index.php?q=node/729

Fender, Ingo, Allen Frankel and Jacob Gyntelberg (2008), 'Three market implications of the Lehman bankruptcy', BIS Quarterly Review, December, pp 6–7.

FSB Senior Supervisors Group (2009), 'Observations on Management of Recent Credit Default Swap Credit Events', March.

Gelos, R. Gaston, Ratna Sahay and Guido Sandleris (2004) 'Sovereign Borrowing by Developing Countries: What Determines Market Access?', IMF Working Paper 04/221

IMF (2002), 'Sovereign Debt Restructuring and the Domestic Economy: Experience in Four Recent Cases', Policy Development and Review Department, 21 February 2002, http://www.imf.org/external/np/pdr/sdrm/2002/022102.pdf

Irish Independent (2011), 'We are not first to use emergency liquidity assistance to dig out lenders', 10 February 2011, http://www.independent.ie/business/irish/we-are-not-first-to-use-emergency-liquidity-assistance-to-dig-out-lenders-2533374.html

ISDA (2003), ISDA 2003 Credit Derivative Definitions. The International Swaps and Derivatives Association, Inc.

ISDA (2008), 'ISDA to publish protocol for Ecuador'. The International Swaps and Derivatives Association, Inc., available at: http://www.isda.org/press/press121708.html

Kemal, A. R. and Muhammad Farooq Arby, (2004) 'Quarterisation of annual GDP of Pakistan', Statistical Paper Series No. 05, Pakistan Institute of Development Economics, Islamabad. http://www.pide.org.pk/pdf/Quarterisation%20of%20Annual%20GDP.pdf

Marzinotto, Benedicta (2011), 'A European Fund for Economic Revival in Crisis Countries', Bruegel Policy Contribution, February 2011, available at: http://www.bruegel.org/publications/publication-detail/publication/504-a-european-fund-for-economic-revival-in-crisis-countries/

Manuel, Dave (2010), 'Which Countries Have Most Recently Defaulted on Their Sovereign Debt Obligations?' 12 February 2010, http://www.davemanuel.com/2010/02/12/the-last-13-major-sovereign-bond-defaults

Padoa-Schioppa, Tommaso (2003), 'Remarks on Central Bank and Financial Stability', Speech at Jakarta, ECB Speeches & Interviews, 7 July 2003, available at: http://www.ecb.int/press/key/date/2003/html/sp030707.en.html

Panizza, Ugo, Federico Sturzenegger and Jeromin Zettelmeyer (2009), 'The Economics and Law of Sovereign Debt and Default', Journal of Economic Literature vol. 47(3) pp. 651-98, September

Pisani-Ferry, Jean (2011), 'Thank you Mr. Roubini, but can I see the menu again?', 2 June 2011, available at: http://www.bruegel.org/publications/publication-detail/publication/558-thank-you-mr-roubini-but-can-i-see-the-menu-again/

Richmond, Christine and Daniel A. Dias (2009), 'Duration of Capital Market Exclusion: Stylized Facts and Determining Factors', mimeo, http://personal.anderson.ucla.edu/christine.richmond/Marketaccess_0709_Richmond_Dias.pdf

Roubini, Nouriel (2011a), 'Much ado about relatively little: Contagion Risks form an Orderly Greek Debt Restructuring are Modest, Contained and Manageable', 24 May 2011, Roubini Global Economics

Roubini, Nouriel (2011b), 'From reprofiling to Vienna Initiative 2.0: the nonsense of purely 'voluntary' bail-ins of Greece's sovereign creditors', 3 June 2011, Roubini Global Economics

Sturzenegger, Federico and Jeromin Zettelmeyer (2006), 'Debt Defaults and Lessons from a Decade of Crises', MIT Press 2006

Wolf, Martin (2011), 'Intolerable choices for the eurozone', 31 May 2011, Financial Times, http://www.ft.com/intl/cms/s/0/1a61825a-8bb7-11e0-a725-00144feab49a.html

Wolff, Guntram B. (2011), 'ESRB should act on sovereign risk', 5 May 2011, available at: http://www.bruegel.org/publications/publication-detail/publication/528-esrb-should-act-on-sovereign-risk/

7. APPENDIX 1: CREDIT DEFAULT SWAPS (CDS) AND CREDIT EVENTS[11]

Credit default swaps (CDS) have received considerable attention since the beginning of the financial crisis, not least because of the part they played in amplifying market reactions following the failure of Lehman Brothers in September 2008. Credit Default Swaps have also repeatedly been put under the spotlight in the context of the euro-area crisis: in the early days they were blamed for fuelling excess volatility and "*jeopardis[ing] the stability of the whole financial system*" (BaFin, 2010), leading to a ban on naked selling of CDS written on euro-area sovereigns by the German financial regulator. More recently, they have re-entered discussions as one of the channels through which the consequences of a sovereign default or restructuring of a sovereign's debt could be amplified.

7.1. DEFINITION OF CREDIT DEFAULT SWAPS

Credit Default Swaps are the most common form of credit derivatives. They allow investors to transfer the risk of default to the entity selling protection, or to gain exposition to credit risk without entering into a loan agreement or purchasing a bond. The protection buyer pays a quarterly premium (the spread) to the seller of protection until a credit event occurs or until the contract ends. Market participants include banks, hedge funds, asset manager and insurers, the latter having larger net seller positions at industry level.

Although regulators and industry organization have make significant steps in standardising credit derivatives and moving trades to central counterparties, the vast majority of CDS trades still take place Over-the-Counter. Consequently, transparency is low and counterparty risk remains high. However, since the beginning of the crisis, statistics on the net and gross amounts of outstanding single-name CDS contracts have been published every week by the Depository Trade and Clearing Corporation (DTCC), allowing closer monitoring of aggregate exposures.

7.2. SETTLEMENT

[11] This appendix has been prepared by Christophe Gouardo.

If a credit event (see the next section) that is defined in the terms of the contract occurs, the protection seller is required to compensate the protection buyer. In practice there are two basic settlement procedures for CDS contracts. In a *physical* settlement, the protection buyer delivers the defaulted obligation to the protection seller and receives compensation for the full notional value of the obligation (meaning, in the case of naked credit default swaps, that the buyer of protection first needs to acquire the bond on the market, which can be troublesome if many participants are attempting to do the same thing). In a *cash* settlement, the protection buyer receives the difference between the notional value of the defaulted obligation and its price on the market or as determined by an auction process. In the cash settlement, the fund transfer from the protection seller to the protection buyer upon the occurrence of a credit event is in fact lower than the insured amount, and ultimately depends on the recovery rate and the amount of collateral already posted to guarantee against counterparty risk.

The 2009 Supplement and Restructuring Supplement (which also apply to legacy trades for those that have entered into the "Big Bang" and "Small Bang" protocols) require market participants to settle CDS transactions through market auctions (to determine a single market-wide reference price for the impaired assets). Although these auctions do not allow for multilateral netting, they allow orderly and rapid settlements via standardized procedures and a central architecture that market participants have acquired significant experience with in the past years (FSB Senior Supervisors Group, 2009), thus mitigating some of the risks that stem from large gross system-wide exposures and the complexity of the web of bilateral positions. However, the increasing use of collateralisation as a means to limit the counterparty risk borne by buyers in CDS contracts means that margin calls could be potentially destabilising if spreads were to widen abruptly.

7.3. CREDIT EVENTS

CDS compensations are triggered upon the occurrence of pre-determined *credit events*, the standard definitions of which are laid out in the 2003 Credit Derivative Definitions of the International Swaps and Derivatives Association, Inc. (ISDA). In the case of euro-area sovereigns, three types of credit events apply; Failure to Pay, Repudiation/Moratorium, and Restructuring.

a. Failure to Pay: a failure to pay credit event occurs when the reference entity fails to make payments on one of its obligations before the expiry of grace periods written into the obligation.
b. Repudiation/Moratorium: a repudiation/moratorium credit event occurs when the reference entity either disaffirms, disclaims, repudiates, rejects, or challenges the validity of an obligation concurrently with the occurrence of a Failure to Pay event.
c. Restructuring: restructuring credit events are broader in scope than the above two, and thus require more criteria to be met. A restructuring event can occur in the following cases:
    - If the interest rate or coupon amount is changed from the contractually agreed terms;
    - If the principal amount is changed from the contractually agreed terms;
    - If the payment of any obligation, principal, interest or premium, is postponed or deferred with reference to the contractually agreed terms;
    - If the ranking of an obligation is changed, causing is to be subordinated to another;
    - If the currency or composition of payments (principal of interest) is changed to a currency that is not a "Permitted Currency".

Other criteria must be met for a restructuring credit event to be declared; namely, the above events must result directly or indirectly from deterioration in the reference entity's creditworthiness or financial conditions and must occur in a form that binds all holders.

Previously, the occurrence of a credit event was determined by one of the counterparties by the delivery of a credit event notice describing the event in detail, leaving open the possibility of disputes. The 2009 supplement to the 2003 ISDA Credit Derivative Definitions instead established regional Determination Committees, tasked with making market-wide binding decisions on the occurrence of credit events (ECB, 2009). The Determination Committees are comprised of 15 voting members and 3 non-voting members.12 An 80 percent majority is required for decision; if this supermajority is not obtained, the decision is taken by majority vote unless an external review panel opposes it (unanimously or by a 2/3 majority, the panel comprising 3 members). As highlighted by the ECB (2009), the Determination Committees "*improve the certainty of processes following a credit event and remove the operational burden*".

[12] As of May 2011, the 15 voting members for Europe are: Bank of America / Merrill Lynch, Barclays, BNP Paribas, Credit Suisse, Deutsche Bank, Goldman Sachs, JP Morgan, Morgan Stanley, Société Générale, UBS, BlackRock, BlueMountain Capital, Citadel Investment Group, D.E. Shaw Group and Rabobank International.

Unfortunately, as far as CDS triggers are concerned, there are no historical experiences that can serve as guides: because all restructurings are different, for a start, but also because no sovereign restructuring events have occurred under the current ISDA definitions and with the Determination Committees in place. The settlement protocol following the default of Ecuador in 2008 was the first protocol published by ISDA in reference to a sovereign credit event (ISDA, 2008). It should be noted that any form of purely voluntary exchanges would most likely not trigger CDS, as they would entail substituting one obligation for another and those unwilling to participate could simply retain their old bonds.

7.4. AVAILABLE STATISTICS ON EXPOSURES

The figures published by DTCC show the gross notional and net amounts of single-name CDS written on entities. The gross amount is the sum of CDS contracts bought (or sold). However, this figure does not take into account the fact that market participants can (and do) simultaneously buy and sell protection on the same reference entity, for trading purposes, but also because closing a CDS position often involves taking on an offsetting position rather than transferring the contract to another counterparty. *The net notional values* published calculated with reference to individual market participants, and are equal to the sum of net protection bought (or sold) by net buyers (or net sellers). As such, they represent the maximum possible net funds transfers between net sellers and net buyers. In practice, amounts transferred will be lower. The cash settlement procedure involves transferring only the difference between the notional value of an insured bond, for instance, and its market price/the recovery rate.

Statistics on the net positions of individual counterparties are not available. This hinders the evaluation of systemic risk.

8. APPENDIX 2: RECENT SOVEREIGN DEBT DEFAULTS AND RESTRUCTURINGS: FURTHER INFORMATION

Dave Manuel's website (http://www.davemanuel.com/2010/02/12/the-last-13-major-sovereign-bond-defaults/) list 13 recent sovereign defaults:

Venezuela, July 1998 - defaulted on $270 million worth of domestic currency bonds

Russia, August 1998 - a massive $72.7 billion default (first missed payments on local Treasury obligations and later extended to include foreign currency obligations); Russia's debts were eventually restructured in later years.

Ukraine, September 1998 - $1.27 billion dollar default

Pakistan, July 1999 - defaulted in July of 1999 but quickly resolved the situation

Ecuador, August 1999 - missed a payment, leading an eventual restructuring of over 90 percent of their bonds. Default amount was around $6.6 billion

Ukraine, January 2000 - defaulted again ($1.06 billion) of foreign currency denominated bonds; the situation was rectified by exchanging their current obligations for bonds with a longer term and lower coupon.

Peru, September 2000 - defaulted on $4.87 billion of debt but rectified the situation within 30 days

Argentina, November 2001 - a massive $82.26 billion dollar default

Moldova, June 2002 - defaulted on $145 million worth of debt, only to rectify the situation a short while later, once to default once again

Uruguay, May 2003 - defaulted on $5.7 billion dollars worth of debt; the country eventually completed a restructuring of their debt obligations with their bondholders

Dominican Republic, April 2005 - Defaulted on $1.62 billion dollars worth of debt; eventually completed a debt restructuring that ended up extending the maturity of their debt obligations by five years

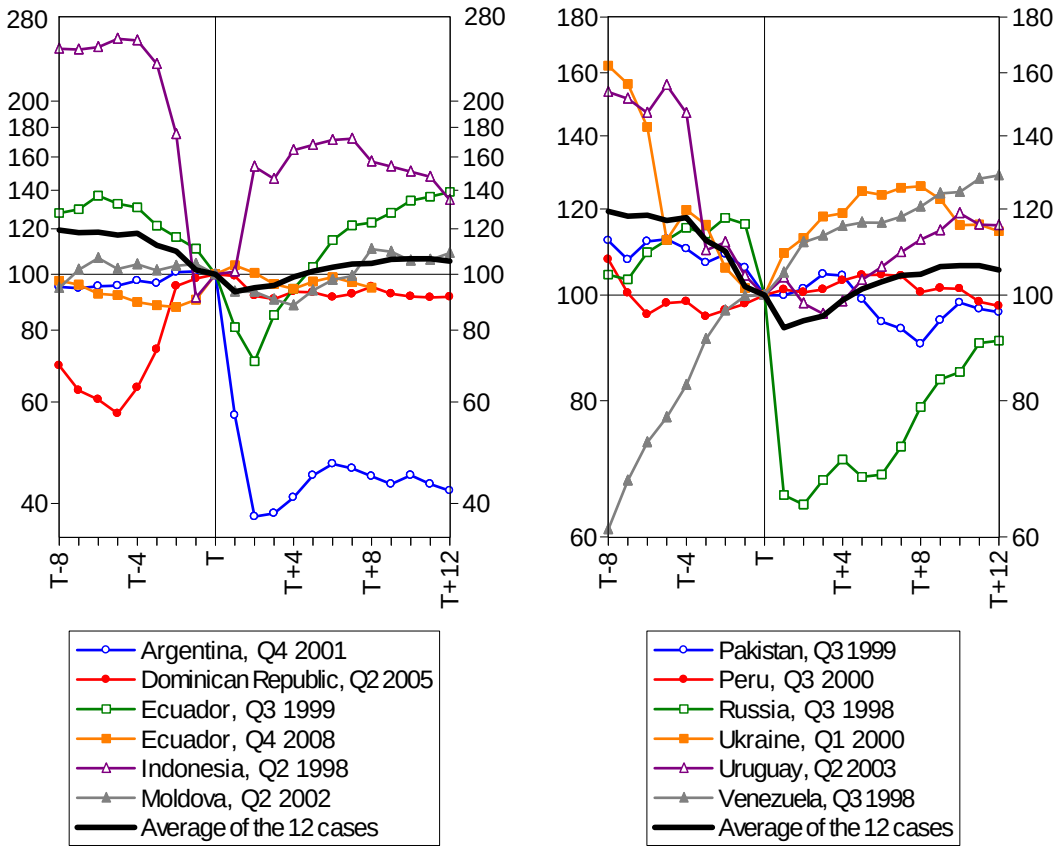
Belize, December 2006 - Defaulted on $242 million dollars worth of debt

Ecuador, December 2008 - Defaulted on $3.2 billion dollars worth of debt obligations after calling several of their previous debt offerings "illegal and illegitimate", ie the default is for "moral" reasons, not the lack of resources to service the debt.

I could not find quarterly GDP data for Belize, but added Indonesia, a country that in June 1998 concluded an agreement for restructuring interbank debt by the end of March 1999, and in September 1998 an agreement on rescheduling and refinancing Indonesia's bilateral external debt to official creditors ($ 4.1 billions covering principal payments on official debt and export credit for the period August 1998 to March 2000).

Figure A.1

Quarterly real effective exchange rate developments before and after twelve public debt defaults or restructurings during the past 15 years (quarter of restructuring = 100)



Note: the real effective exchange rate is calculated by us against 143 countries of the world using consumer prices indexes. A fall in the index indicates real depreciation.
Source: Bruegel.

Table A.1

Time to market access after defaults/debt restructurings in the 1980s and 1990s

Default	Resumption of Market Access	Country	N° of years until resumption
1980	1980	Peru	0
1981, 84	1994	Costa Rica	13
1981	1994	Honduras	13
1981	1983	Jamaica	2
1981	1988	Madagascar	7
1981	1982	Poland	1
1981	1985	Romania	14
1982	1986	Argentina	4
1982	1987	Ecuador	5
1982	1985	Mexico	3
1982	1989	Nigeria	7
1982	1982	Turkey	0
1983	1983	Brazil	0
1983	1990	Chile	7
1983	1992	Cote d'Ivoire	9
1983	1985	Morocco	2
1983	1983	Niger	0
1983	1993	Peru	9
1983	1988	Philippines	5
1983	1992	Uruguay	9
1983	1987	Venezuela	12
1984	1988	Egypt	4
1985	1988	South Africa	3
1986	1988	Gabon	2
1986	1988	Morocco	2
1986	1990	Romania	4
1987	1990	Ghana	3
1987	1988	Iraq	1
1988	1992	Trinidad and Tobago	4
1989	1989	Argentina	0
1989	1993	Jordan	4
1989	1989	South Africa	0
	Average 1980s		**4.7**
	Median 1980s		**4.0**
1991	1991	Algeria	0
1991	1992	Ethiopia	1
1991	1992	Russian Federation	1
1992	1992	Philippines	0
1993	1993	South Africa	0
1995	1995	Venezuela	0
1998	1998	Indonesia	0
1998	1998	Ukraine	0
1998	2000	Russian Federation	1*
1999	2000	Ecuador	1
	Average 1990s		**0.3**
	Median 1990s		**0.0**

Source: Gelos, Sandleris and Sahay (2004).

Notes. The table lists episodes of debt default between 1980 and 1999, covering only countries that had access to the capital market during the year of default or during the two preceding years and that regained market access until 2000. Access is defined as issuance of public or publicly guaranteed bond or syndicated loan. Year of default is defined as year in which the sovereign defaulted on foreign-currency bond or bank debt according to Standard & Poor's.*continued to acess in 1998

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