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Greece: The (long) countdown to restructuring

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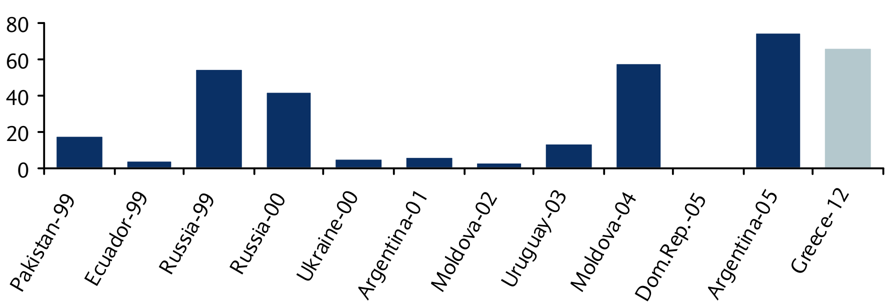
- We argued in April 2010 and again last October that it was still too early to restructure Greek sovereign debt, as the benefits of postponing it clearly exceeded the costs. We thought Greece and the EU authorities needed time: Greece to advance on fiscal adjustment and structural reforms and the EU to minimize contagion. Crucially, we believed that Greece was not trading off an orderly restructuring then for a messy one later on. A restructuring, when and if it happened, was likely to be orderly, given financial support from the official sector.
- However, as a result of weak growth and sizeable fiscal slippages, Greece has reached the point where, under realistic scenarios, debt dynamics are unsustainable. The countdown to restructuring has started, in our view.
- But accepting insolvency does not make restructuring imminent. We argue that it may take longer than many think. First, the country's debt dynamics post-restructuring need to be sustainable. This would require Greece to be on a clear path to achieving a sustainable primary surplus. Second, we expect contagion fears to continue to dominate EU decisions. In our view, European authorities will try to avoid a Greece restructuring in 2011, then likely proceed with one in H1 12. By then, the status of Ireland and Portugal should be clearer.
- In our baseline scenario, the Greek government could realistically achieve a cumulative primary balance adjustment of about 7.5% of GDP in 2011-15. To achieve "solvency" (eg, 60% of debt/GDP in the long term), they would require 13% of GDP. Fiscal consolidation will need to be helped by an effective debt reduction.
- If we assume that the maturity of EU/IMF loans is extended by 10 years and concessional rates of 4.5% vs. exit yields of 7% (ie, the yield that would prevail post-debt restructuring), the implicit debt relief obtained from the official sector could be almost 9% of GDP. In addition, private debt would need to be reduced by two-thirds (excluding short-term T-bills) to achieve an unambiguously solvent fiscal position. In that case, assuming exit yields of 6.5-7.5%, recovery values would range from 25 to 28. Options that consider maturity extensions and lower coupons but not a notional haircut may be the preferred choice for bonds in HTM portfolios.

Figure 1: NPV debt reduction in recent debt restructurings



Source: Barclays Capital

In October we argued that it was still too early to restructure

Last October, we argued that it was still too early to restructure Greek sovereign debt (*Euro Themes*, 29 October 2010). The fiscal consolidation required to move towards a primary surplus was more likely under the umbrella of the ongoing EU/IMF programme. We also argued that by not restructuring, yet pushing forward with the fiscal adjustment and reform agenda, Greece was not worsening the problem. The programme seeks not only to reduce debt/GDP by curbing the deficit and moving towards a primary surplus, but also to enhance long-term growth. Some of these reforms have been delivered, including a substantive pension reform, a first round of labour market reforms, significant improvements in fiscal policy implementation, and a primary balance adjustment, from -10.5% of GDP in 2009 to -4.9% by end 2010.

However, we also argued that should the EU/IMF programme fail to deliver substantial adjustment, as a result of insufficient fiscal consolidation through 2013, lower-than-programmed growth performance, reform fatigue or political constraints, a debt restructuring might eventually be needed. Should there be a trade-off between an orderly restructuring now and a disruptive one in the future, a pre-emptive restructuring would likely be preferable. However, we also argued that such a trade-off does not exist in the Greek case. In our view, it is likely that any future restructuring is likely to be orderly. There are several reasons for this:

We also argued that any restructuring, if needed, would probably be orderly

First, most of the debt held abroad is largely at EU financial institutions. Ownership is also highly concentrated: on to our estimates, the largest 30 accounts hold 65-75% of the debt (see Appendix 1). Many of these foreign holders are public sector bodies (eg, central banks, or public institutions), rather than private creditors (in that category, German and French banks dominate, with about 30% of the total). Second, the vast majority of the outstanding debt has been issued under Greek law, which may prevent hold-outs in the event of a restructuring (only about €18.6bn was issued under international law). Third, most of the debt holdings are in the hold-to-maturity (HtM) books and a restructuring engineered to avoid upfront write-offs (ie, haircuts) should prevent default triggers. Fourth, EU/IMF participation in the restructuring procedures should facilitate the outcome.

Contagion to other periphery has been a key factor in the decision against a sovereign restructuring

In addition, fear of contagion has played a key role in EU decisions related to sovereign and/or bank restructuring (hence the ECB and EC stance against a restructuring of Greek sovereign debt or of senior bank debt in Ireland). Indeed, in 2010, contagion remained high, especially "country-contagion" to periphery economies, with sovereign spreads highly correlated and financial institutions in these countries relying heavily on ECB exceptional liquidity facilities. Many of the periphery banks, including Greek and Irish banks, and most Portuguese banks, are still fully dependent on ECB funding.

With the market pricing a high probability of a debt restructuring and news about programme slippages having emerged, it makes sense to take stock and update our analysis.

Fiscal slippages, bleak growth prospects, and unsustainable debt dynamics

As a result of weak growth prospects, sizeable fiscal slippages, and substantial revisions to the deficit and debt figures, Greece is reaching a point where, under most realistic scenarios, debt dynamics are unsustainable.

Despite some progress, fiscal slippages and persistent statistical discrepancies have prevailed

Greek fiscal consolidation has suffered several setbacks, including missing the 2010 fiscal debt and deficit targets. The deficit target was originally set at 8% of GDP, but the 2010 deficit reached 10.5% of GDP. The target for the primary balance was -2.4% of GDP, but the government delivered a primary balance of -4.9% of GDP. It seems very likely that tax revenues will continue to disappoint in the near term, making the target of a primary surplus for 2012 look very challenging. As indicated by the recent EU and IMF reports corresponding to the third programme review, revenues have been weaker than projected (growing 5.6%, compared with the programme target of 13.7%). There were also sizeable expenditure overruns in sub-national entities and social security funds. These were partly offset by state budget under execution.

Statistical discrepancies have also been persistent in recent years. As a result, the stock of public debt has consistently risen faster than reported by Eurostat. Data misreporting and arrears in the public enterprises led to revisions to public debt data in 2009 and 2010. In part as a result of these revisions, gross debt reached 143% of GDP by end-2010 from a projected 133%. Public debt is now projected to reach 153% of GDP in 2011 (instead of by 2014, as we had projected in last October).

Growth has also been disappointing and the outlook remains bleak

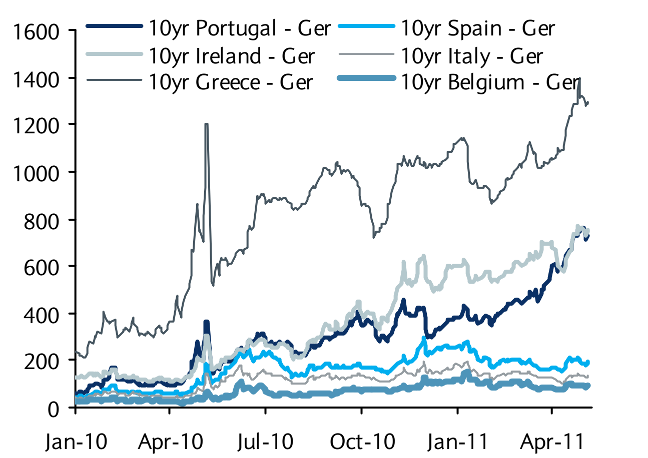
Near-term real GDP growth prospects also remain bleak. According to preliminary data, real GDP shrank by 4.5% in 2010. In 2011, manufacturing PMIs remain well below 50 and our indicator of hiring intentions (EC survey) edged down in March on the back of weaknesses in the retail, construction and service sectors. The Greek unemployment rate reached 14.1% in Q4 2010 (having increased by 6.5pp since the start of the correction in Q3 2008). Overall, the EU/IMF now expect 2011 GDP to shrink by a further 3% in real terms and unemployment to exceed 15% in 2011.

On April 15, as a “last bullet” against the disappointing fiscal and growth performance, the government put forward a new (MTFS) medium-term fiscal strategy. The MTFS programme proposes a consolidation effort of €26bn for 2011-15 (€3bn for 2011 and €23bn in 2012-15) via further adjustments in: the public wage bill, operational expenses, military, state-owned enterprises, health, social security and tax compliance. The measures put forward in the MTFS include some that had been envisaged for 2012-13 under the original EU/IMF programme (eg, reductions in investment spending, further reductions in the wage bill, means-testing of social benefits, state-owned enterprise reform). The MTFS also includes new measures on social security and health reform, (introduction of centralized health procurement, expanded use of generic drugs), rationalization of public administration, defence, and measures to enhance tax compliance.

And there is increasing evidence of reform fatigue

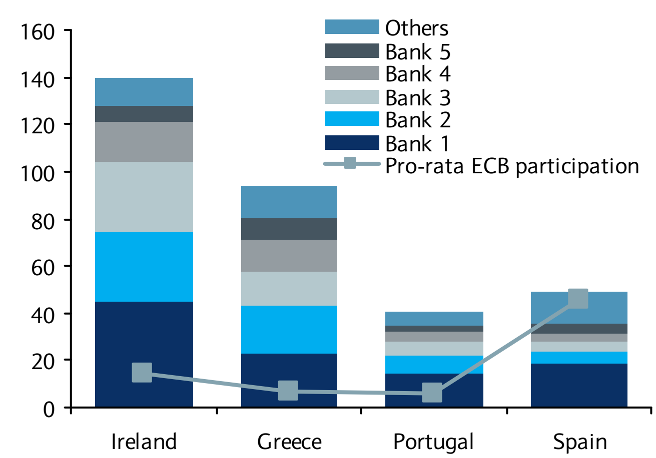
However, there is evidence of reform fatigue (on the fiscal and structural fronts) not only among interest groups, but also within the increasingly fractured governing party, PASOK. In mid-May, the MTFS is to be submitted to parliament. Although PASOK still has an ample

Figure 2: The market has differentiated between periphery countries (bp)



Source: Barclays Capital

Figure 3: ECB liquidity support of periphery banks remains high, with the exception of Spain (€ bn)



Source: Barclays Capital

majority (we expect the multi-year plan to be approved) there is a tail risk that recent dissent within PASOK over the adjustment programme could result in a failure to get sufficient support for the MTFS, which could in turn precipitate a government crisis and derailment of the programme. If PASOK continues to support the adjustment programme, we think that the EU and IMF will also continue buttressing government efforts. Difficult fiscal and structural reforms are more likely under the umbrella of a programme. Yet progress on tax administration reform and controlling debt and deficits, especially at the sub-central government level, remain uncertain, even under the programme.

In our baseline scenario, Greece's debt dynamics are unsustainable

Under most macro scenarios, Greek debt dynamics look unsustainable

In *Euro Themes*, 29 October 2010, we calibrated all the fiscal consolidation measures under the EU/IMF programme. By our estimates, the savings that would result from the 2011-13 fiscal measures would yield 9% of GDP, in contrast to 11.1% of GDP estimated under the EU-IMF programme. After adding up all the measures, including our projections for 2014-15, we estimated that public sector debt would peak in 2014 at 153% of GDP and the primary balance could reach a surplus, hovering around 4% of GDP by 2014.

Given the fiscal slippages under the programme and the statistical discrepancies highlighted by Eurostat's revisions, we have altered our fiscal projections accordingly. By our estimates, public debt by end-2011 will reach 153% of GDP and the primary balance will likely remain at about -2.5% of GDP. We estimate that if the total size of the expected cumulative fiscal adjustment remains at about 9% (as presumed in our October report), the primary balance could realistically reach a surplus of 2-3% of GDP by 2014 and stay on average at that level over the medium term (ie, lower than the 4% of GDP primary surplus we had estimated in October last year).

While the MTFS and, in particular, the privatization plans could deliver some fiscal upside to our baseline projections, we decided to use more conservative estimates to carry out our medium-term fiscal sustainability exercise, given that developments in Greece so far have disappointed relative to EU/IMF targets. In particular, we assume that the government could deliver €4-5bn from privatization receipts. Our medium-term macroeconomic scenario assumes nominal growth of c.3.0% (ie, c.1.5% GDP deflator and real GDP growth at c.1.5%). Under this baseline scenario, any reasonable interest rate results in precarious debt dynamics. Put differently, an unrealistically low interest rate of 4.6% would be needed from 2013 onwards to stabilize debt dynamics. Assuming Bund yields of 3.8% by 2013, the spread that would stabilize the debt dynamics would be of c.80bp, compared with current spreads of 40bp in France, 140bp in Italy and more than 200bp in Spain.

Even under a more "optimistic" macro scenario, debt dynamics are challenging. For example, if we assume medium-term nominal growth of about 3.5% (1.5% GDP deflator and real GDP growth at 2%), a primary balance of 4% of GDP by 2014 (and averaging around that level thereafter) and privatization proceeds of about €10bn, the long-term debt-stabilizing interest rate would be 6.1%, implying a spread to the Bund of about 230bp. Spain, with debt at 60% of GDP and public debt dynamics widely deemed sustainable (we project Spanish public debt to peak at under 80% of GDP by 2014), currently has a spread to the Bund of more than 200bp.

Greece is in a negative feedback loop in which the high restructuring probability implies precarious debt dynamics, while such dynamics imply even higher default probabilities. We do not see any triggers – very high growth or a draconian fiscal adjustment – that could move yields from current levels to those (6% or below) needed to stabilize debt dynamics in the near term.

Debt restructuring and the risk of contagion to the periphery and beyond

In our view, Greece is probably insolvent. However, this does not necessarily mean that a restructuring is imminent. We argue that this process is likely to take longer than many think.

Yet a restructuring may not be immediate

Among the reasons supporting postponing restructuring is that it makes little sense to rush it until it is clear how much money will be available. A successful debt restructuring needs to show that a country's debt dynamics are sustainable post-haircut. This would require Greece to be on a clear path to achieving a sustainable primary surplus. Additionally, further recapitalization and backing from the EU/IMF, as well as an alternative funding facility (ex-OMOs), will probably be needed before a restructuring can be carried out on Greek banks' bond holdings. These factors argue not for restructuring immediately, but for waiting until the effect on the banking system can be managed effectively.

Further fiscal consolidation towards a primary surplus is needed…

…and contagion risk remains high

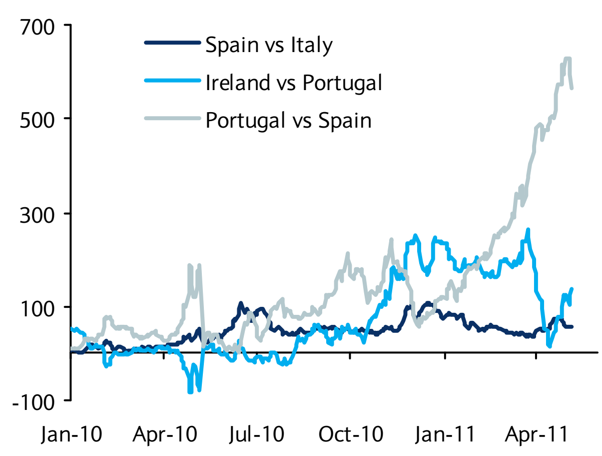
Third (and most important from an EU standpoint), since contagion has not disappeared, postponing the restructuring would be a relatively cheap way to buy time (from an EU standpoint). Portugal and Ireland are obviously very interested in avoiding a Greek default in the near term. While there are direct risks in a debt restructuring to those investors directly exposed to Greece, most European financial institutions are probably able to absorb those losses (with the exception of Greek banks). It is, however, "sovereign-contagion", mainly to Portugal and Ireland, and their respective banks, which is the fundamental concern to policymakers and markets alike (see Appendix 2 for a detailed assessment and quantification of contagion risks to other countries, financial institutions and other investors).

It could be argued that once it is obvious that a restructuring is needed, it does not make sense to postpone it for much longer, as private sector activity may be affected (although not as much as in previous episodes because Greek government and banks are, on the margin, still getting cheap funding from the official sector). Restructuring sooner rather than later would also increase the burden shouldered by the private sector (as the proportion of debt held by the public sector increases under the EU/IMF programme) and save resources to put towards productive uses (ie, not paying bondholders in full), including recapitalization of the Greek banking system.

The EU will need to decide soon how to close Greece's funding gap for 2012

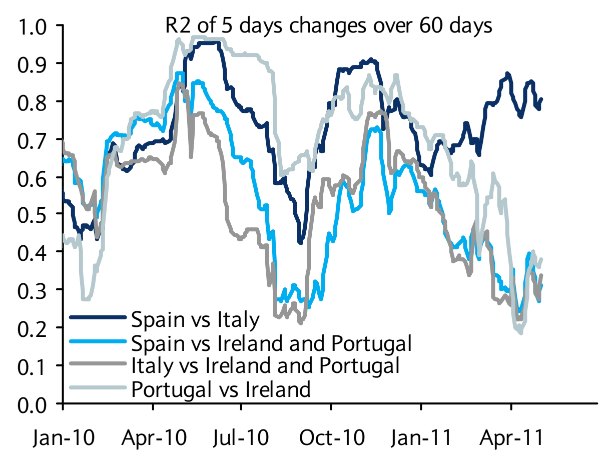
In addition, there is an inconsistency in the EU/IMF programme. At inception, it was planned that Greece would return to the markets with long-term debt issuance of about €25bn (starting in Q1 12 with €11.3bn). We think it is unlikely that it will be able to tap the market

Figure 4: Spreads show considerable co-movement…



Source: Barclays Capital

Figure 5: … but correlations differ widely, even among peripherals



Source: Barclays Capital

as early as Q1 12 unless there is a sudden change in the fiscal/growth outlook (eg, hefty privatization receipts or a sudden reversal in growth dynamics). The funding gap risk is indeed material; it would be unusual to have quarterly reviews approved by the EU/IMF (at least from the IMF side) when there is a clear funding gap in the near term. This will be a problem for the June programme review, and more so in September. In our view, the natural route to closing the funding gap, should the EU choose to continue supporting Greece, would be via EFSF funds.

EU policymakers are likely to buy some time, before launching a Greek restructuring, possibly in early 2012

Overall, we believe contagion fears will dominate EU decisions (as they have for the past 15 months). Hence under our baseline scenario European authorities will want to avoid a Greece restructuring in 2011 and will probably launch one in H1 2012. By then, a few EU/IMF revisions of the Irish and Portuguese programme will have passed and the status of these countries should be clearer (ie, whether structural reforms in Portugal have been set in motion and whether the March 2011 stress tests in Ireland have really set a floor on bank losses).[1] If Greece is allowed to default, investors will automatically increase their default probabilities for the debt of Ireland and Portugal, especially as their debt dynamics are not clear cut. The dynamics are better than those of Greece, but we can easily envisage plausible scenarios with either stable or dangerous debt dynamics (see *Euro Themes*, 30 November 2011, for an assessment of debt sustainability under alternative scenarios). However, if Greece restructures, domestic and external pressure for restructuring in Ireland and Portugal would likely be heavy. Politically, it will be difficult to resist the temptation of defaulting if Greece has an orderly restructuring. External pressure would be related to contagion. Nevertheless, if the EU/IMF programme is derailed or further reforms become politically unfeasible, a debt restructuring could happen before 2012.

Spain, while not fully decoupled, seems to be on safer ground.

By contrast, markets seem to have separated Spain from the other three peripheral economies under scrutiny. There is no certainty that this will continue, despite the better solvency ratios in Spain relative to the other countries, particularly as "latent risks" in Spain remain unresolved: the recapitalization costs of the cajas (to be resolved in principle by end-September 2011); the (lack of) commitment and capacity among the regions and municipalities to achieve sufficient fiscal consolidation and meet fiscal targets; and an uncertain growth outlook amid private sector deleveraging. The widening of Spain vs. Italy, in the context of political discussions of a Greek restructuring, demonstrates that the decoupling of Spain is not a given.

Quantifying potential haircuts in Greece

If it is clear that it is politically or economically unfeasible to undertake the fiscal adjustment required to stabilize Greek debt dynamics, the alternative is to present a combination of debt face value/coupon reduction and maturity extension that, combined with feasible fiscal adjustment, restores solvency.

Decisions on the NPV losses (ie, haircuts) to investors cannot be taken in the vacuum. The debt sustainability framework allows us to calculate the debt reduction needed to restore solvency. The standard debt dynamics equation is

$$\Delta\left(\frac{D}{Y}\right)_t = \left(\frac{r_t - g_t}{1 + g_t}\right)\left(\frac{D}{Y}\right)_{t-1} - pb_t \qquad (1)$$

[1] Furthermore, EU policymakers have indicated repeatedly that there will be "no restructuring" before mid-2013, when private sector burden sharing would be implemented through CACs into the new financial rescue mechanism called the European Stability Mechanism (ESM). However, in our view, the market conditions and programme performance have changed markedly. The public sector funds under the EU/IMF programme have failed to become the catalyst for private sector money. In fact, the opposite dynamics are in motion. More public money now discourages private investors, as more "senior money" implicitly imposes higher haircuts in the event of a debt restructuring.

where D is the debt stock, Y is nominal GDP, r is the average nominal interest rate, g is the nominal growth rate, pb is the primary fiscal balance (ie, revenues minus no debt service related expenditures) as a share of GDP, and Δ indicates a change over the previous year. If for the sake of simplicity (and only with expositional purposes), one assumes that the nominal interest (r) and growth rates (g) do not change over time, the primary balance (*pb**) required to stabilise debt dynamics is defined below:

$$pb^* = \left(\frac{r-g}{1+g}\right)\left(\frac{D}{Y}\right) \qquad (2)$$

However, if such a primary balance target (*pb**) is unachievable, the alternative would be to bring down the RHS of (2), ie, reduce the debt stock (D), the coupons paid (r) or both, to make debt service consistent with the achievable primary balance.

Under our baseline scenario, fiscal consolidation is not enough to stabize debt/GDP, hence the debt stock has to be reduced to put debt/GDP on a sustainable path

Figure 6 sets out combinations of primary balance and debt reductions that achieve 60% of debt to GDP in 2050. Debt reduction can only partially substitute for fiscal adjustment as Greece needs to be on a credible path to a primary surplus. Otherwise, not even full debt reduction (ie, writing off all debt) would be consistent with sustainability. In our baseline scenario (a primary balance of -2.5% in 2011), Greece would need to extract about 60% (or about 90% of GDP) from all its debt holders by 2012 (with a primary balance of 4%, in the optimistic scenario, the debt reduction required would be about 45%).

Figure 6: Greece – Combinations of fiscal adjustment and debt haircuts

Combinations of primary fiscal balance adjustment and debt stock reductions compatible with 60% debt-to-GDP in 2050		
Primary balance adjustment over 2011-2015 (% GDP)	Final primary balance from 2015 onwards (% GDP)	One-off reduction of total outstanding debt stock in 2012 (%)
12.8	7.9	0
11.5	6.6	15
10.2	5.3	30
8.8	3.9	45
7.4	2.5	61
6.6	1.7	75
4.8	-0.1	90
3.9	-1.0	100

Source: Barclays Capital

The mapping of required debt reduction into haircuts of bonded debt is not automatic. First, there is the issue of debt seniority. Greek public sector debt currently stands at c.€280bn (excluding €37.9bn held by EU and €14.5bn by the IMF) and is split between approximately one third held by Greek residents and about two thirds by non-residents. Of the Greek residents, €48bn is with Greek banks, c.€6.7bn is with the Greek central bank, c.€29bn is held by mutual funds, pension funds and insurance companies, and the rest by others. The ECB, under the government bond-buying program (SMP), holds approximately €40bn (see Annex 1 for details on debt holdings).

Not all debt holders may be restructured; EU/IMF loans and short-term T-bills might be excluded

Which debt holders would be excluded from a restructuring? IMF debt (€21.4bn by end 2011; €30bn by the end of the programme in mid-2013) is likely to be spared. T-bills are also unlikely to be restructured, mainly to avoid disruptions in this market (about €10bn). There are also EU governments that provided bilateral loans under the EU/IMF program with concessional rates.. Although this is not officially senior debt (unlike the IMF, it does not have preferred creditor status), in our view, it is politically difficult to see them receiving a haircut.[2]

Yet the official sector may provide non-negligible debt relief in the form of lower rates and longer maturities

However, we believe that some debt reduction could be implicitly extracted from the official sector. Under the current program, lending yields are below the exit yield (the yield that would prevail post debt-restructuring) and hence already providing some debt relief. If bilateral/IMF loans are extended, relief could be substantial. For example, if we assume that the maturity of all official loans is extended by 10 years (and assuming concessional rates of 4.5% vs. exit yields of 7%) the percentage of debt relief obtained from the official sector could be 18%, or nearly 9% of GDP.

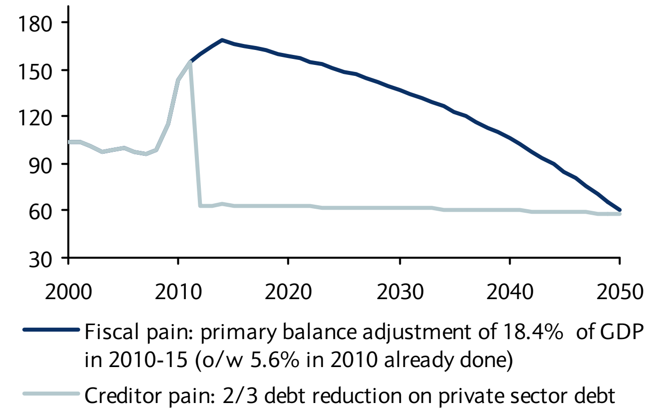
We do not think it is possible to extract much debt relief from the Greek banking system. Banks are holding EUR48bn of Greek government debt, against capital of EUR28bn. A 58% haircut would, thus, wipe out their entire capital. Any outright debt reduction is likely to require future recapitalization by a large (probably similar) amount. Banks, though, largely hold sovereign bonds in their banking book (not mark-to-market) and are likely to remain at zero risk weight (assuming the "haircut" takes the form of a bond swap for a much longer maturity), so they may not have to take impairments. One additional risk for the banking sector of any restructuring is the effect it would have on the collateral value of the GGBs held and their eligibility at the ECB. The alternative collateral they have is likely insufficient to cover their ECB borrowings (about EUR90bn) if the GGBs value were to be affected substantially (see Appendix 2 for details). Hence, some kind of additional liquidity provision would need to be made available (via ELA or a special "addicted bank facility") for the ECB to continue lending to them. Note that the ECB via OMOs, and NCB via ELA, would always lend against collateral (or government guarantees), so any drop in the value of the collateral would need to be replaced. The effect on Greek banks would also come via profitability, especially as the credit quality of the loan portfolio would likely continue deteriorating, market funding would remain inexistent and funding costs would remain elevated.

Given the implicit debt reduction obtained by the official sector (c. 9% of GDP), bonded debt needs to contribute an additional 83% of GDP. Given that this represents c.120% of GDP by end-2011, it is equivalent to a haircut of 67%.[3]

[2] International debt (€18.6bn) might be excluded from debt restructuring to prevent hold-outs and triggers of CDS. Excluding that debt from our calculation would not change significantly our calculations.

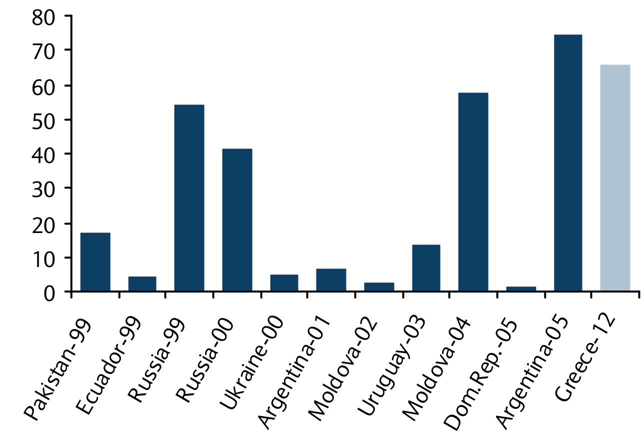
[3] Notice that the definition of haircut is not straightforward. We are implicitly assuming that "claim" is the NPV of old cash flows discounted at the exit yield. The haircut is obtained by comparing NPV of old and new cash flows at the exit yield. If we assume claim is 100 instead (as all bonds are accelerated upon default) haircut calculation would be higher to the extent coupons of existing debt are lower than exit yields. See Annex 3 for further details.

Figure 7: Paths to solvency (debt/GDP, in %)



Source: Barclays Capital

Figure 8: NPV debt reduction in recent debt restructurings



Source: Barclays Capital, IMF

The required debt reduction from the private sector in our baseline scenario would be 67%

Exit yields of 6.5-7.5% imply an effective recovery rate of 28-25%

A useful approximation of recovery values using haircut calculation can be obtained by assuming that all current Greek bonded debt subject to restructuring would be represented by one synthetic bond paying a coupon of c.5.15% (the average interest rate of Greek debt) with maturity of about eight years (the average maturity of Greek debt). We then assume that in a restructuring, the notional principal of the bonds included in the restructuring is reduced by a given percentage (say 67% in a baseline scenario; or 48% assuming a higher primary balance in a more favourable fiscal scenario). To obtain recovery values, we simply obtain the price (ie, the NPV) of a synthetic bond with coupons of 5.3% with notional principal of 100*(1-0.67) paid in 20 years (assuming that new maturity) and discounted at our exit yield. The price of that hypothetical bond would be the recovery value (Figure 9). The range of exit yields is arbitrary but levels in the 6.5-7.5% range seem reasonable. This would suggest a range of recovery values between 28 and 25 (44 to 40, in a more favourable fiscal scenario). These calculations suggest that a restructuring is still not fully priced in and, hence, suggest further downside risks to Greek bonds.

Figure 9: Preliminary recovery values under different primary balance and exit yields compatible with 60% debt-to-GDP in 2050

2011-15 primary balance adjustment (% GDP)	Reduction of residual bonded debt stock (in %)	Present value of synthetic Greek bond price assuming:		
		Exit yield of 6.5%	Exit yield of 7%	Exit yield of 7.5%
12.8	0%	85.1	80.4	76.0
11.5	11%	75.8	71.6	67.7
10.2	30%	59.6	56.3	53.2
8.8	48%	44.3	41.8	39.5
7.4	67%	28.1	26.5	25.1
6.6	84%	13.6	12.9	12.2

Source: Barclays Capital

The haircuts involved in the debt restructuring calculations are very high relative to past emerging market defaults. Part of the problem is that markets punished the country only once the stock problem was already very big (hidden liabilities only added to the problem). This would make a restructuring process challenging. We believe, however, that the high concentration of ownership structure raises the probability of a successful restructuring. As noted above and in Annex 1, we estimate that the top 30 investors in Greek debt hold about two-thirds of the current total.

Clever financial engineering may boost the price of bonds offered. Our figures are only rough estimates. It does not make sense to conduct exact valuation exercises until options are not clearly on the table. We do think however that consistent with previous restructurings, among the options available there may be a zero (or very low) coupon bond par bond without haircut on the notional claim. Indeed, options that avoid notional haircuts and instead consider maturity extensions and lower coupons may be the preferred choice for those institutions keeping Greek bonds on their investment books (ie qualitatively similar to the debt relief provided by the public sector, but with much longer maturity extensions).[4] In addition, there may be a discount bond with higher coupons but with a haircut on the notional claim. Those bonds may need to have a similar price as the suggested exit yield. Other options, such as bonds with step-up coupons, GDP kickers, etc, are also likely to be considered.

Figure 10: NPV debt reduction (in %) through a combination of maturity extension and different average coupons; calculations based on an assumed 7% exit yield

	10y	15y	20y	25y	30y	35y
5%	14	18	21	23	25	26
4%	21	27	32	35	37	39
3%	28	36	42	47	50	52
2%	35	46	53	58	62	65
1%	42	55	64	70	74	78
0%	49	64	74	82	87	91

Source: Barclays Capital

Conclusions

Greece is in a negative feedback loop whereby a high restructuring probability implies precarious debt dynamics, which in turn imply even higher default probabilities. We do not see any triggers – very high growth or a draconian fiscal adjustment – that could move yields from current levels to those (6% or below) needed to stabilize debt dynamics in the near term. Thus we see a debt restructuring as ultimately unavoidable.

Yet sovereign restructuring may not happen immediately; there are at least two good reasons for that. First, Greece needs to put measures in place to reach a sustainable fiscal path that delivers a positive primary balance. Second, the European Union remains concerned about contagion to other periphery, especially Ireland and Portugal. Debt dynamics in these two countries are less challenging than in Greece, but sustainability is not clear cut. We think the EU/IMF programme may work in both cases; hence, buying some time (at least two more programme reviews) may be a relatively low price for the EU to pay to avoid further contagion. By end-2011 it should be clearer whether Ireland and Portugal are closer to Spain (sustainable debt dynamics) or to Greece (insolvency). At that point, the EU and Greece may decide to launch a restructuring. Clearly, if the EU/IMF programme is off track and/or further reforms become politically unviable, a restructuring could come sooner.

[4] The experience of the debt restructuring of Grenada in 2005 might be a useful example in this regard. The maturity of bonded debt got expanded notably and the coupon was lowered substantially based on a staggered step-up coupon schedule. The overall NPV haircut accepted by private investors accounted for 45%. At the same time, Paris Club creditors agreed with the government of Grenada to a debt restructuring that resulted in a reduction of over 90% of the debt service due to these creditors for the duration of the IMF programme.

Appendix 1: Greek debt holders are highly concentrated

We have long argued that the holdings of Greek government debt are fairly concentrated (the top 30 holders likely account for roughly wo-thirds of the debt), and that this should make it easier to negotiate and achieve a decent success rate on any restructuring. The main categories of holders of Greek government debt are shown in Table 1: on the bond side, they have likely not changed that much since the end of Q3 10. Indeed, there were big portfolio shifts in H1 10, but, since then, the illiquidity of the market has probably prevented further reshuffling. This is confirmed by the Greek financial accounts for Q4 10, which do not suggest big shifts relative to Q3 10 (once the data are adjusted for market price moves). There are three main groups of debt holders:

Official debtors. On the Greek government debt side, we estimate about €75bn (20% of the total debt, as of end-Q1 11) is held by central banks around the world: probably about €40bn by the ECB under the SMP (excluding the €3bn held by the Bank of Greece under the SMP), with other euro area central banks holding a bit less than €10bn (more than half being with the Bank of France and Bank of Portugal) and probably up to €25bn held by other central banks (likely mainly in Asia). The Bank of Greece holds about €6.7bn (including the SMP part), which represents 2% of the debt.

On the loan side, the EU and IMF loans now account for 15% of the total debt (this is expected to rise to 28% by the end of the program), and another 2% of the debt is held by the Bank of Greece (some legacy loans, for about €6bn). So in total, it seems that about 10 official holders represent 20+15+2%+2%=39% of the total Greek debt and about 28% of domestically issued Greek government bonds.

Euro area banks reduced their holdings of Greek debt in Q2 10 (from €57bn at end-Q1 10), but the BIS data show roughly stable holdings as of end-Q3 10, at about €48bn (14% of the total debt, 17% of the GGBs). The CEBS stress tests details (which related to Q1 10 data) showed that about 10 banks held more than €1bn each, for a total of about €30bn, with the next 20 banks holding between €100mm and €1bn each (for a total of €10bn). By country, German and French banks were the biggest holders, with a combined €34bn on their (mostly HTM) books (€19bn and €15bn respectively end-Q3 10, with French banks showing the biggest reduction vs. Q1 10, although they have the most concentrated portfolios). The top 30 euro area banks holders probably hold €40bn of the debt, 14% of GGBs.

Private domestic holders. Bank of Greece data show that about €90bn of Greek government bonds (and bills) were held domestically at end-Q3 10 and Q4 10, with half of that held by seven banks (see below). Next to the banks, the Bank of Greece itself is holding about €6.7bn of securities (part for its portfolio, part for the SMP), with a further €29bn held and managed by the Bank of Greece on behalf of social security funds and public sector pension funds (as of end-2010; this figure had risen to about €32.5bn in February 11 – this represents about 10% of the debt; these funds can invest only in GGBs). Other domestic holdings are very limited: about €3.7bn from insurance companies and pension funds, and €5bn of others (mutual funds, households, etc). Thus, broadly speaking, the bulk of the domestic holdings (probably more than €80bn) are among 10 investors: banks and Bank of Greece-related investors.

Putting it all together, we estimate that the top 30 investors in Greek debt hold close to €250bn (GGBs and loans), or about 70% of the current debt. Similarly, the 30 biggest holders of GGBs probably account for about 65% of the total. We also think that most of these holders could probably take the hit from a restructuring, with one big exception: domestic banks.

Figure 11: Estimated Greek government securities holdings as at end-Q3 10 (€bn)

€ bn	Banks	Insurance	Mutual funds, pension funds and others	Monetary authorities	Others	Total (end-Q3 10)	% of total	Change in pp since Q3 09
Greek residents	**45.1**	**3.7**	**29.0**	**6.7**	**5.6**	**90.1**	**32%**	6%
All non residents	**53.0**	**33.5**	**28.3**	**74.1**	**5.2**	**194.1**	**68%**	-6%
Eurozone	47.8	31.1	20.2	48.5	4.7	152.2	54%	-2%
ECB SMP				39.1		39.1	14%	14%
France	14.6	16.0	2.5	6.8	1.0	40.9	14%	-3%
Germany	19.3	3.5	1.5	-	0.3	24.6	9%	-1%
Italy	1.9	4.0	3.0	-	0.7	9.6	3%	-3%
Belgium	2.0	2.5	3.5	-	2.0	10.0	4%	-2%
Netherlands	2.0	1.5	3.0	0.5	0.2	7.3	3%	-3%
Luxembourg	2.0	-	6.0	-	- 0.1	7.9	3%	-2%
Austria	2.0	1.1	-	-	0.3	3.4	1%	-1%
Portugal	0.5	0.8	0.2	2.1	0.1	3.6	1%	0%
Spain	0.5	0.5	0.5	-	0.1	1.6	1%	0%
Other	3.0	1.2	-	-	0.0	4.2	1%	0%
RoW	5.2	2.4	6.1	0.8	0.5	15.0	5%	-4%
UK	2.4	0.4	0.5	-	-	3.3	1%	-2%
Japan	0.4	0.5	2.5	-	0.3	3.7	1%	-1%
Switzerland	0.3	0.5	-	-	0.0	0.8	0%	-1%
US	1.3	-	0.7	-	0.1	2.1	1%	0%
Other	0.8	1.0	2.4	0.8	0.1	5.1	2%	-1%
Official reserves	-	-	-	7.8	-	7.8	3%	0%
Unallocated (diff BoG-IMF)			2.0	17.0		19.0	7%	0%
Grand total	98	37	57	81	11	284	100%	

Source: Euro System, IMF, Barclays Capital

The problem of domestic banks

The domestic banks held about €48bn of Greek government bonds as of end-February 2011, up from about €45bn in H2 10. We think most of the rise relates to the special zero-coupon bonds issued in late December 2010/early in 2011 to settle the hospital debt (9.2bn). National Bank of Greece is the biggest holder of Greek debt (€13.7bn at end 2010), followed by Piraeus and Eurobank EFG (about €9bn each). The other four main banks each hold €2-4.6bn.

The funding and collateral issue

Looking at the aggregated balance sheet of Greek domestic Monetary and Financial Institutions, it is clear that these banks have limited other ECB-eligible collateral on their balance sheets. On the securities side, they have total holdings of €77bn, of which €48bn are the Greek government bonds, about 20bn are retained self-issued securitizations, and less than €2bn of non traded corporate bonds. Hence, their total holdings of 'other bonds' is below €10bn, and these bonds are likely already used to collateralized the current ECB borrowings (which totalled €90bn as at end February).

It is unlikely that Greek banks have enough non-pledged available securitized collateral that they could use at the ECB if their GGBs were to become ineligible or to plunge further in value, even if all banks are reporting some buffer as at the end of 2010. Of course, they could try to further securitize some of their loans (mortgages or SME and NFCs loans), or use unsecuritised credit claims, but both options are likely to require overcollateralization (ie, a lot of underlying assets) and some time to be implemented. The ECB could well continue to accept restructured Greek government debt (or newly issued government guaranteed debt) as eligible collateral, even if it would be a bit more difficult to justify than currently (when the ECB has basically overruled the rating agencies' assessment), and the mark to market of these bonds could take a further hit. But it would be difficult for the ECB to accept these bonds under its current OMO framework.

Funding via a new ECB facility?

One possibility would be for Greek banks to be funded outside regular open market operations, via emergency liquidity assistance (ELA) – none is currently outstanding in Greece –but the Bank of Greece and ECB have confirmed they are ready to use it if necessary – or via a new "addicted banks" facility. It is worth noting that there is probably very little remaining interbank funding left at Greek banks: the aggregated balance sheets show interbank deposits of €53bn, but we suspect most of that consists of intra-group exposures (indeed the BIS data indicate just €10bn of interbank exposures at end-Q3 10).

Instead, Greek banks rely heavily on ECB funding. Indeed, the current €90bn of ECB funding is fairly split between banks: NBG, EFG and Piraeus all have about €18bn each, Alpha has €13.5bn, ATE and Marfin probably about €8bn each, and the Bank of Cyprus €2bn. On average, 20% of each bank's balance sheet is funded at the ECB – remarkably, this is proportionally more than that of the viable Irish banks (AIB, Bank of Ireland, etc), and an order of magnitude more than that of Portugal's banks.

Greek banks had to produce detailed liquidity and deleveraging plans to the ECB by April 2011. The ECB therefore has a good idea of future demand from these banks. This, (along with a similar exercise by Irish and Portuguese banks) will likely influence its decision on proceeding with an "addicted banks" facility.

The capital hit

Next to the funding/collateral implications, any restructuring could also have important implications for the capital situation: the current capital is €28.8bn (as of February 2011, and not including an additional €15bn in provisions). It seems that most of the GGBs exposures of Greek banks have not been marked to market and have not been the subject of impairments, with a lot of the exposures now having been moved to Loans and Receivables as well as HTM portfolios. Depending upon the type of restructuring, some impairment might have to be recognized and losses taken. Given the current portfolio size of GGBs, this may be large enough to negate the usefulness of the exercise. Crucially, a lengthening of maturities would not have to result in loss-taking by banks on their HTM and L&R books; thus, this might be the banks' preferred option.

Part of the EU/IMF package was set aside to help banks (€10bn, with an additional €30bn of government guarantees being made available for banks to use as ECB-eligible collateral) and some recapitalization has been done already. But it is very likely that further recapitalization will be needed under a heavy restructuring scenario.

The bottom line

Some further recapitalization and backing from the EU/IMF, as well as an alternative funding facility (ex OMOs), is likely to be needed before a restructuring can be carried out on Greek banks' bond holdings. Again, this would argue in favour of not restructuring immediately, but waiting until the effect on the banking system can be managed effectively.

Appendix 2: Measuring contagion risk

There is no question that a Greek restructuring would put renewed pressure on Portugal and Ireland, but also likely on Spain. Contagion would likely be high in Portugal and Ireland, potentially triggering a self-fulfilling negative dynamic in the bond markets. By contrast, we believe that the differentiation that benefited Spain over the past six months will likely prevail: yes there would likely be re-widening of spreads, but they would be unlikely to exceed the December 2010 levels (almost 300bp vs. Germany in 10 years) by much, if at all. More likely, Spanish spreads would trade 175-275bp over bunds.

Country Contagion

There has been contagion among the various EGB markets over the past year, but the nature and extent of contagion has varied, as is evident in the evolution of spreads and the rolling correlation between changes in the spreads of different markets vs. Germany (see Figures 4 and 5 in the main section of this paper).

One can see the various stages and forms of contagion.

- In Q2 10, all spreads were heavily correlated and widened ahead of the Greek package. There were large portfolio shifts, with heavy real-money selling of all peripherals. Greece was hit the most.
- In Q3 10, all peripherals tightened, but Spain, in particular, outperformed on the back of a series of policy measures (fiscal consolidation, labour market reform, restructuring of the cajas, as well as more complete results of banking stress tests). Flows and liquidity were generally limited in the smaller peripherals, but decent for Spain and Italy. From October onwards, the focus turned to Ireland, and the EFSF/ESM mechanisms (CACs and seniority of the ESM post-2013) discussions. There was a generalized (and heavily correlated) re-widening, but in limited volumes, and there was no sign of wholesale liquidations of positions for Spain and Italy (limited selling, but less-than- normal buying from real money investors, and outright selling by leveraged accounts). Ireland suffered the most and the focus turned quickly to Portugal, which experienced large selling of existing positions by foreign real money investors (foreign ownership dropped from 85% to about 50%, ex the ECB).
- 2011 started with positions being uniformly short or underweight all peripherals, and the better fundamentals (Spanish reforms) and good auctions prompted: 1) partial short-covering of these positions in Spain and Italy; 2) a return to these markets of investors who had been absent since early 2010; and 3) a stepping-up of purchases by investors who had remained active in these markets. This made Spanish and Italian spreads highly correlated to each other, but also made them decouple almost completely from the smaller peripherals. Indeed, the smaller markets suffered from idiosyncratic problems (banking, fiscal slippage, political issues, etc), scant liquidity and a severe (probably permanent) shrinkage of the investor base. The correlation between these smaller peripherals was not necessarily very high since they widened at slightly different times, but, overall, these markets were still demonstrating the effects of contagion.
- In early April, flows dried up across all markets (including some of the non peripherals). With a smaller short investor base and more expensive valuations (spreads vs. Germany at their tightest since Q2 10), Spanish (and, to a lesser extent, Italian) spreads re-widened quickly (50bp in three days). This stabilized in subsequent weeks and was largely unwound when market liquidity returned to more normal levels after the Easter and UK holidays. At the same time, smaller peripheral spreads widened quickly to near- record

highs. In this last episode, the contagion to Spain was actually much more muted (in duration and extent) than in Q4 10. This is reflected in the lower correlations observed between Spain and the smaller peripherals, but still very high correlations with Italy.

Quantifying country contagion

One way to quantify contagion is by using market-based indicators. In particular, we can set up a portfolio of (5yr senior) sovereign CDS, including all countries with liquid euro area CDS plus the UK (ie, Germany, UK, France, Italy, Spain, Netherlands, Portugal, Greece, Austria, Belgium, Ireland and Finland). The objective is to extract the joint probability of default (JPD) using a copula approach (see Box 1 for details). To put it simply, we adopt a portfolio approach to factor in the underlying co-dependence structure between sovereigns. Using this framework, we evaluate the likelihood of joint defaults in two scenarios: a Greek debt restructuring and a Greek, Irish and Portuguese restructuring.

Using Q1 11 CDS data, we estimate that the current probability of no sovereign default has fallen to 10% and the probability of just one sovereign default is now 22% (vs, 114% and 27%, respectively, based on 2010 CDS data; Figure 12). By contrast, the JPD of two defaults has risen to 33% (vs. 15% based on last year's data). The JPD of three defaults is 20% and of four or more defaults is 14%. Also notable is the conditional JPD in the event of a Greek default: the conditional JPD of two defaults rises to 36% and the probability of four or more increases to 15%. Furthermore, if Greece, Portugal and Ireland were to default, the conditional JPD of observing four or more defaults would rise to 20%.

Figure 12: Estimated joint default probabilities (JPDs) based on 5yr CDS data (21 April 2011)

	JPD0	JPD1	JPD2	JPD3	JPD4	JPD>4
Estimations based on:						
last quarter CDS data	10%	22%	33%	20%	5%	9%
last year CDS data	14%	27%	15%	26%	7%	11%
Hypothetical scenario: GRE "default"		28%	36%	20%	5%	10%
Hypothetical scenario: GRE + POR + IRL "default"				80%	7%	13%

Note: PD0 denotes probability of no defaults; PD1 is the probability of one default; PD2 is the joint probability of two defaults; PD3 is the joint probability of three defaults; PD4 is the joint probability of four defaults; PD>4 is the joint probability of more than four defaults. The CDS basket includes 12 names: Germany, UK, France, Italy, Spain, Netherlands, Portugal, Greece, Austria, Belgium, Ireland and Finland (ie, all the euro area with liquid CDS plus the UK). Source: Barclays Capital, see Avesani, Garcia Pascual and Li (2006) for details on methodology

Box 1. Extracting joint probabilities of default from market data – A sovereign portfolio approach

To extract the joint probabilities of sovereign defaults from market data, we apply a method developed in Avesani, Garcia Pascual and Li (2006) based on a pricing model for a CDS basket. The main idea is to treat the sovereigns as a portfolio. By doing so, we can evaluate the likelihood of joint defaults. Quantifying joint probabilities of default is obviously important as a "default" by Greece may lead to defaults of other sovereigns. The sovereign portfolio includes all euro area countries with liquid CDS plus the UK (ie, Germany, France, Italy, Spain, Netherlands, Belgium, Austria, Finland, Greece, Portugal, Ireland, and the UK). The method draws on three seminal papers: Vasicek (2002), Merton (1974) and Duffie and Singleton (1997).[5]

First, it is assumed that the "the net worth" of each sovereign in the portfolio is influenced by a common factor and an idiosyncratic factor. The lower the value the common factor(s) and/or the idiosyncratic factor, the earlier a default is likely to occur. Thus, the "net worth" of a sovereign i can be expressed as a random variable x_i, $i = 1,..., N$,

$$x_i = a_i M + Z_i \sqrt{1 - a_i^2} \qquad (1)$$

where the common factor M and the idiosyncratic factor Z_i have independent zero-mean and unit-variance distributions (a_i are the factor loadings). The correlation matrix among the *N* sovereigns, Σ, is such that the pair-wise correlation between sovereign *i* and *j* can be expressed as $a_i a_j$. In practice, we estimate the factor loadings by maximum likelihood (ML). Based on our estimates, two common factors provide a good approximation – they explain over 90% of the variance in the data. The ML estimates show that the first factor has positive loadings for all countries except for Greece and, depending on the sample, also for Portugal. The second factor, which can be interpreted as an indicator of "fiscal/financial weakness", has positive loadings for Greece, Portugal, Ireland, Spain, Belgium, and Italy (from highest to lowest estimated value: ie the highest is 0.81 for Greece and the lowest is 0.24 for Italy); whereas the estimated loadings for the other countries are either near zero or negative.

Second, let H be the cumulative distribution of Z_i. The default probability of x_i, i.e., the probability of x_i falling below a threshold $\overline{x}_i$, is characterized (2) as :

$$p(x_i < \overline{x}_i \mid \mathrm{M}) = Q_i(t \mid \mathrm{M}) = H\left[\frac{\overline{x}_i - a_i M}{\sqrt{1 - a_i^2}}\right] \qquad (2)$$

Let $p(l, t \mid \mathrm{M}),\ l = 0,..., N$, denote the probability that exactly l defaults occur by time t, conditional on the common factors M, in a portfolio of N sovereigns. Let F_i be the cumulative distribution of x_i.

The copula model maps x_i to t_i using a percentile-to-percentile transformation. The percentile point in the probability distribution for x_i is transformed to the same percentile point in the probability distribution of t_i. Defining $Q_i(t)$ as the cumulative risk-neutral probability that institution i will default before time t, the point $x_i = \overline{x}_i$ is mapped to $t_i = t$ where $t = Q_i^{-1}[F_i(\overline{x}_i)]$.

Third, if the default probability for each sovereign *i* is characterized by a (forward) default hazard rate $\lambda_i(t)$, then $Q_i(t)$ can be expressed as:

$$Q_i(t_i \le t) = 1 - e^{-\int_0^t \lambda_i(u)du}. \qquad (3)$$

The functions $Q_i(t)$, $i = 1,..., N$, can be bootstrapped from the quoted CDS spreads and are assumed known for all t (we assumed fixed loss-given-default of 50%). The distribution of the number of defaults conditional on the common factors M can be computed through recursion. Once we have the conditional default distribution, the unconditional default distribution $p(l, t)$ can be solved as

$$p(l, t) = \int p(l, t \mid \mathrm{M}) g(\mathrm{M}) d\mathrm{M} \qquad (4)$$

where *g* (M) is the density distribution of M. In our estimates, we are using a t-copula with 4 degrees of freedom – the t-copula has the advantage over the Gaussian copula of capturing "tail-dependence" ("correlations" increase in tail events).

[5] Avesani, Garcia Pascual, and Li (2006) "A new risk indicator and stress testing tool: a multifactor, nth-to-default CDS basket". Vasicek (2002) "The distribution of Loan Portfolio Value"; Merton (1974) "On the pricing of corporate debt: the risk structure of interest rates". Duffie and Singleton (1997) "Modeling term structures of defaultable bonds".

A clear message from our market-based data is that for the smaller peripherals, overall contagion is likely to remain fairly high as slippage or restructuring prospects in one country will increase scrutiny on others. Moreover, the bond markets are likely to remain very illiquid and without much private support: with limited risk appetite on the dealer or investor side, and limited official support (since the SMP seems to have been mothballed), price moves can become quickly self-fulfilling. Although the situations of the three peripherals are all different and the market assessment of Ireland and Portugal is (rightly) different than that of Greece, it will be very difficult for these countries' markets to resist contagion.

The case of Spain

The differentiation that has emerged between Spain and the smaller peripherals in the past nine months, particularly since January, may be tested again in the coming quarters. Despite its recent better performance, weekly volatility in the Spain vs. Germany spread is near 20bp: this is still very high, and a conjunction of negative factors in an illiquid environment could quickly re-widen the spread by more than 50bp (as seen temporarily in early April). Eventually, though, we see enough fundamental underpinnings for the differentiation to persist.

Spain's debt parameters are more favourable than those of the smaller peripherals: low debt/GDP (60% at end-2010) and limited contingent liabilities (4-5% of GDP, in our baseline scenario, and about 10% of GDP in a stressed macro scenario; see *Euro Themes 7 July 2010* and *Euro Themes 30 November 2010*).

Overall budget execution has shown little slippage, except for the regions and municipalities, though their overall effect is limited (0.5% of GDP in 2010, compensated by better central government performance). In our view, slippages by the regions are likely in 2011 but, again, we think these will probably be offset by central government performance (c.€8-10bn of privatizations and one-off revenues look to be on track for this year).

Rebalancing economy. Growth has been limited but positive (0.2% q/q in the past two quarters) and the current account deficit had moved down to 3.9% of GDP by end-2010 (from more than 10% in 2007, while this measure has barely shrunk in Greece and Portugal). Indicators point to 0.8% growth in 2011 (vs. 1.3% expected by the government), but some key risks remain (eg, unemployment above 21% and the mortgage/housing market situation in a rising rate environment).

The banking sector clearly remains the key concern, although interbank exposures are more manageable than they were six months ago. Moreover, although recapitalization is still pending (to be completed by end September), implying a potentially large contingent liability for the sovereign (more on this below), those cajas under stress and in need of large capital injections are now better understood and better defined (eg, "the bad bank" formed by Bankia, and the resolutions of CAM and Catalunya Caixa).

A significant advantage of Spain over small periphery economies is that the bond market in Spain is bigger (10% of the euro area); it is therefore more difficult for indexed investors to just ignore it like they did with the small peripherals. Spain also benefits from a stable domestic investor base (55% of total holdings vs. 15%, on average, in the smaller peripherals). Investors have had time to differentiate between the various peripherals, though clearly, in a crisis, their most likely behaviour is simply to remain on the sidelines and not buy Spanish debt.

Overall, Spanish entities are surprisingly well advanced in their 2011 funding plans: the government has done 48% of its planned net issuance (42% in gross terms, +4% vs. 2010), with government-related entities (ICO, FADE, and the regions) having funded 70% of their targets (the regions having used their cash balances and relied on domestic bonds and loans).

Bank issuance has been more polarized, with good issuance from commercial banks (€13.3bn in covered bonds and €16.7bn in unsecured, 71% and 56% of maturing amounts) but very limited issuance from cajas (6.5+2.2, or 28% and 16% of maturing amounts).

Of course, on the issuance side, the key swing factor would be the issuance needs related to the recapitalization of banks. There is still a large gap between market estimates of recapitalization needs and Bank of Spain/government estimates. We think additional issuance needs of more than 30bn would likely put considerable pressure on Spanish spreads.

Banking contagion: Holdings of government bonds

As noted above, some banking systems across the euro area (ex Greece) are exposed to Greek government bonds, other Greek bonds, or the bonds of other peripheral countries. It is unclear how much these holdings have been marked to market (we suspect very little), and a restructuring could precipitate further MTM losses and the recognition of impairments. This would weaken the banking systems and potentially trigger generalized equity weakness, a new round of money market stress and limit credit growth.

However, we would note first that any actual impairments would depend on the form of any restructuring. Second, it seems unlikely that any such losses on the Greek portfolio alone would be big enough to pose problems for the bigger, more systematically important of the banks, and there is generally still some official capital that could be used as a backstop. Third, these exposures have been known for more than a year now, and it would be surprising if this were not already reflected to some extent in the market prices of these banks (bonds and shares).

Clearly, if markets start to price in further chances of restructuring in other countries than Greece, as is likely, risks to the euro area banking system could rise very quickly, especially if Spain is affected (because the amounts are so much bigger there).

Figure 13: Exposures of European banks to periphery economies, BIS data set

Foreign exposures to Greece, Ireland, Portugal and Spain, by bank nationality														
End-Q3 2010; in billions of US dollars						Exposure of banking sector from:								
Exposure to:		Type of exposure:	Germany [1]	Spain [2]	France [3]	Italy	Other euro area	Euro area total	GB	Japan	US	Rest of world	Global total
Greece		Public sector	26.3	0.6	19.8	2.6	15.7	65.0	3.2	0.5	1.8	1.5	72
	+	Banks	3.9	0	1.4	0.3	1.3	6.9	4.3	0.5	0.5	1.3	13.6
	+	Non-bank private sector	10.1	0.5	42.1	1.9	13.3	67.9	7.5	0.9	4.7	4.2	85
	=	Total foreign claims	40.3	1.1	63.3	4.7	30.4	139.8	15.1	1.9	6.9	7.1	170.7
	+	Other exposures (4)	29.2	0.4	28.7	1.7	3.1	63.1	5.3	0.1	36.2	2.4	107.2
	=	Total exposure	69.4	1.5	92	6.5	33.5	202.9	20.4	2	43.1	9.5	277.9
Ireland		Public sector	3.4	0.3	6.6	0.8	3.7	14.8	6.6	1.5	1.5	0.7	25.1
	+	Banks	57.8	3.3	16.8	3.3	7.3	88.5	37.4	1.8	17.9	10.6	156.3
	+	Non-bank private sector	92.8	9.4	21.2	10.9	47.4	181.7	116.1	17.7	40.3	25	381
	=	Total foreign claims	154.1	13	44.7	15.3	58.6	285.7	160.2	21	59.7	37.1	563.7
	+	Other exposures (4)	54.3	4.5	33.4	9.1	8.6	109.9	64.4	1.5	54.2	20.2	250.1
	=	Total exposure	208.3	17.5	78.1	24.4	67.2	395.5	224.6	22.5	113.9	57.3	813.7
Portugal		Public sector	8.4	8.8	16.1	0.9	7.8	42	2.6	1.3	1.6	1.5	49
	+	Banks	18.1	6.1	6.5	2.3	4.6	37.6	6.2	0.3	1.4	0.9	46.2
	+	Non-bank private sector	13.6	70.3	14.8	1.5	7.5	107.7	16.5	0.8	1.5	1.8	128.3
	=	Total foreign claims	40	85.2	37.4	4.7	19.8	187.1	25.3	2.4	4.5	4.2	223.5
	+	Other exposures (4)	8.5	23.4	8.1	3.2	2.1	45.3	8.5	0.4	42.6	1.5	98.3
	=	Total exposure	48.5	108.6	45.6	7.9	22	232.6	33.7	2.8	47.1	5.8	321.8
Spain		Public sector	29.4	.	46	3.3	16.9	95.6	10	9.7	4.7	3	123
	+	Banks	85.8	.	55.8	9	49.1	199.7	34	4.5	20.6	11	269.7
	+	Non-bank private sector	85.7	.	81.3	16.2	98.5	281.7	72.4	10.2	26.3	14.7	405.3
	=	Total foreign claims	200.9	.	183.1	28.7	164.6	577.3	116.3	24.4	51.6	28.9	798.5
	+	Other exposures (4)	41.4	.	41.6	13.1	15	111.1	36.1	4.8	136	12.4	300.3
	=	Total exposure	242.4	.	224.7	41.8	179.6	688.5	152.4	29.2	187.5	41.3	1098.8
Total (above four countries)		Public sector	67.5	9.7	88.5	7.6	44.1	217.4	22.4	13	9.6	6.7	269.1
	+	Banks	165.6	9.4	80.5	14.9	62.3	332.7	81.9	7.1	40.4	23.8	485.8
	+	Non-bank private sector	202.2	80.2	159.4	30.5	166.7	639	212.5	29.6	72.8	45.7	999.6
	=	Total foreign claims	435.3	99.3	328.5	53.4	273.4	1189.9	316.9	49.7	122.7	77.3	1756.4
	+	Other exposures (4)	133.4	28.3	111.8	27.1	28.8	329.4	114.3	6.8	269	36.5	755.9
	=	Total exposure	568.6	127.6	440.4	80.6	302.3	1519.5	431.1	56.5	391.6	113.9	2512.2

Note: 1) Foreign claims of German banks shown on an immediate borrower basis, not ultimate risk. 2) Exposures of banks in the respective country are not included. 3) Exposures of the French banks currently under review and subject to revisions. 4) Positive market value of derivative contracts, guarantees extended and credit commitments. Source: BIS, Barclays Capital

Interbank exposures and repo markets.

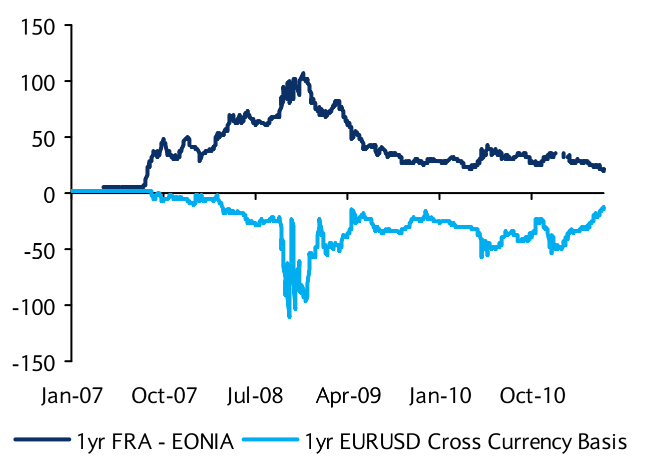
Looking at a score based on market indicators (excess liquidity, FRA-OIS spreads, cross currency bases, repo spreads, etc), we think it is fair to say that money markets are probably now the functioning at their best since 2008, for the vast majority of European banks (then again, there had also been improvements in the lead-up to the Greek crisis in May 2010).

This is not the case for banks in the smaller peripherals, which have essentially been cut off from the money markets. Indeed, remaining interbank exposures across Europe to the Greek, Irish and Portuguese banking systems are limited (probably less than €50bn in total; 10bn, 25bn, 15bn, respectively), and probably collateralized (repos) and very short-term in nature (three months, maximum). Hence, unless a local bank suddenly collapses, direct interbank exposures to the smaller peripheral countries are unlikely to trigger much contagion.

More significant would be if the contagion were to affect the bigger repo markets, eg, in Spain and Italy, where volumes are larger and exposures more spread out. In May/June 2010, a major factor in the underperformance of Spain was the seizing up of the then mainly domestic repo market. Since then, two CCP services have been introduced (LCH London, and LCH Paris, the latter with direct settlement link to the domestic settlement system). This limits the potential for the market to seize again. Volumes under these services are sizeable (€70bn) and concentrated among fewer than 10 banks. They have been a key contributor to reducing Spanish banks' reliance on ECB funding (from about 90bn in Q1 10, to a peak of 140bn in June 10, before falling down now to 40bn, less than its 'fair share' of ECB borrowing). Volumes and spreads at which these repos are executed have been relatively stable over the past 6 to 9 months (about EONIA -5 to 10bp for overnight repos), although with some volatility (end of month, end of maintenance period, etc).

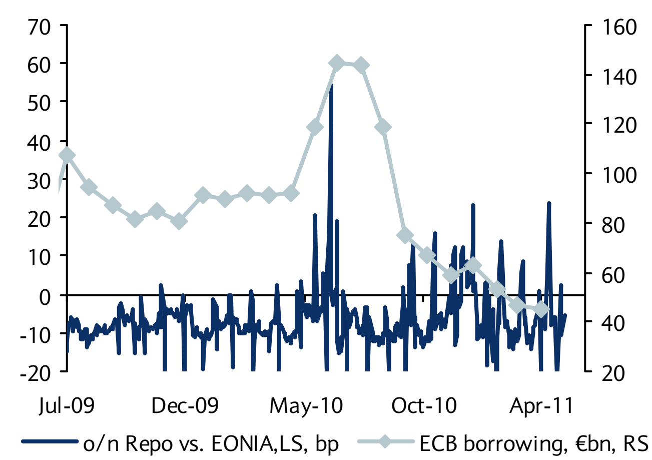
Although the LCH CCP services reduce exposure, a period of renewed stress could occur, further limiting the appetite of banks, and, in particular, Spanish banks, for Spanish debt (LCH volumes are probably about €70bn). Banks have not been large buyers of Spain's domestic debt over the past year (€5-10bn), but have been providing a good backstop bid at times. More important, any liquidation of portfolios could affect the Spanish debt market. A similar situation prevails in Italy.

Figure 14: General liquidity conditions are stabilizing



Source: Barclays Capital

Figure 15: Spanish banks liquidity conditions have improved



Source: Barclays Capital

Appendix 3: Linking debt reduction to haircut

When thinking about debt restructuring, it makes sense to start from the debt sustainability framework as equation (1) in the main text:

$$\Delta\left(\frac{D}{Y}\right)_t = \left(\frac{r_t - g_t}{1+g_t}\right)\left(\frac{D}{Y}\right)_{t-1} - pb_t \qquad (1)$$

The condition that the country does not follow a Ponzi Scheme requires the following intertemporal condition to hold (in continuous time to simplify notation):

$$\left(\frac{D}{Y}\right)_0 = \int_0^\infty \exp(-\int_0^s (r_v - g_v)dv) pb_s ds \qquad (2)$$

For a known path of feasible primary balances, we can solve the above equation to avoid a Ponzi Scheme. The solution requires the following inter-temporal condition to hold:

$$(1-\alpha)\left(\frac{D}{Y}\right)_0 = \int_0^\infty \exp(-\int_0^s (r_v - g_v)dv) pb_s^* ds \qquad (3)$$

where α is the debt reduction necessary to stabilize debt dynamics. r_v and g_v are the average interest and growth rates (that change over time) and *pb** is the economically and politically feasible primary surplus path. As time goes on, the average interest rate will converge to the marginal interest rate.

Under our calculation, α equates the "haircut". The reason for this is two-fold:

First, we have defined haircut as:

Haircut: 1 - NPV (new bond cash flows, r)/ NPV (old cash flows, r) (4)

where r is the "exit yield". The haircut is, hence, defined with respect to a claim associated to the cash flows of the old bonds.

Second, the exit yield, r, in (4) equates the marginal funding rate in our debt sustainability in (2) and (3).

Market participants often define the claim (the denominator) in (4) as 100 with the idea that all bonds are accelerated once restructuring is announced. Since, in general, the coupons of the bonds issued before restructuring are lower than the exit yields, the haircut estimated under our preferred method is higher.

The advantage of our method is two-fold, in our view: it allows us cleanly to map haircuts with debt reduction under a debt sustainability analysis, and it quantifies more precisely the losses suffered by investors in a restructuring.

Analyst Certification(s)

We, Piero Ghezzi, Laurent Fransolet and Antonio Garcia Pascual, hereby certify (1) that the views expressed in this research report accurately reflect our personal views about any or all of the subject securities or issuers referred to in this research report and (2) no part of our compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this research report.

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