

## Greece: A restructuring scenario analysis

### Research Analysts

Helen Haworth  
+44 20 7888 0757  
[helen.haworth@credit-suisse.com](mailto:helen.haworth@credit-suisse.com)

Michelle Bradley  
+44 20 7888 5468  
[michelle.bradley@credit-suisse.com](mailto:michelle.bradley@credit-suisse.com)

Christian Schwarz  
+44 20 7888 3161  
[christian.schwarz.2@credit-suisse.com](mailto:christian.schwarz.2@credit-suisse.com)

News flow surrounding the 16-17 May ECOFIN meeting and the keenly anticipated EU/IMF's fourth progress review are fuelling concerns about a potential Greek restructuring and have driven Greek spreads to new highs.

We consider the three broad options open to Greece, the EU and the IMF: no restructuring (essentially an extension of EU/IMF loans), voluntary restructuring and a hard restructuring event.

Our conclusion is that a voluntary restructuring is the most likely outcome. The question is more one of timing than anything else; in the near term, we expect the EU/IMF to extend their support to address the issue of the Greek government's 2012 funding shortfall.

The economics are relatively straightforward with the debt-to-GDP ratio currently forecast to peak at over 150% which the market believes is unsustainable. The path to resolution, however, is complicated by the politics and the negotiation table is crowded.

We summarise Greece's financial situation and provide details of its debt profile. Greek government debt is primarily held within Europe with the largest lenders coming from the banking sector. The potential for contagion to Ireland and Portugal and for follow-on losses in the banking sector are integral to the resolution. Greece is essentially a European problem to which a European resolution will be found.

We discuss in detail the merits of the three restructuring options. Rather than focus too much on the exact timing (which is clearly subject to "events"), we look at the implications of the various paths. We define a sustainable post-restructuring curve on the basis of Spain's present curve and explore the implications for cash and CDS markets.

Much of the focus in CDS markets surrounds whether or not a restructuring would trigger the Greek CDS contract. We describe Restructuring Credit Events and discuss in detail the implications for the different possible restructuring scenarios.

Finally, we outline a number of different systemic risk hedges in the credit, rates and FX space and evaluate which are currently most attractive if looking to hedge an increase in systemic risk.

Greece's debt problem	3
Introduction	3
The financial picture	4
Who owns Greece's debt?	6
The debt composition	8
Levels of debt sustainability	9
The route ahead	11
The role of the IMF	12
Restructuring scenarios	12
Bond price sensitivity to a restructuring	17
The quant perspective: Greek CDS after a restructuring	22
Cash market implications	24
CDS market implications	26
Background on the Hellenic Republic CDS	26
Types of Credit Event	27
How to identify a Restructuring Credit Event	27
To trigger or not to trigger	28
The implications for CDS	31
Systemic Risk Hedges	32
What history tells us	32
Appendix: Credit Events	35
Lessons from the Anglo Irish Credit Event, 2010	36
Appendix – BIS data	37

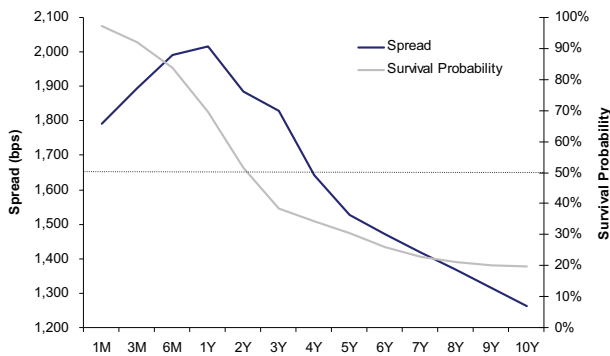
# Greece's debt problem

## Introduction

The EU/IMF's fourth progress review is due by the end of May. It could be released publicly as early as this week since we understand basic conclusions are due to be presented at the ECOFIN meeting on 16-17 May, although recent developments at the IMF may result in a delay. It is keenly awaited for further insight into the sustainability of the situation in Greece. News flow surrounding this event and concern about a potential Greek debt restructuring, have driven Greek spreads to new highs. The market is now pricing in a 50% risk-neutral probability of default over the next two years as shown in Exhibit 1.

### Exhibit 1: Greek CDS curve pricing low survival probabilities

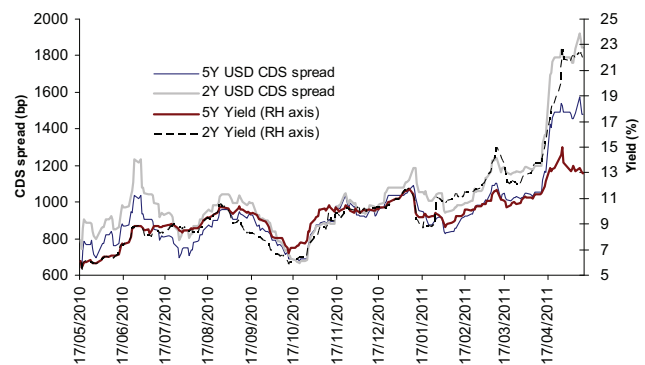
COB 12 May 2011 based on a 43% recovery



Source: Credit Suisse

### Exhibit 2: Greek spreads at extremes

USD CDS spread



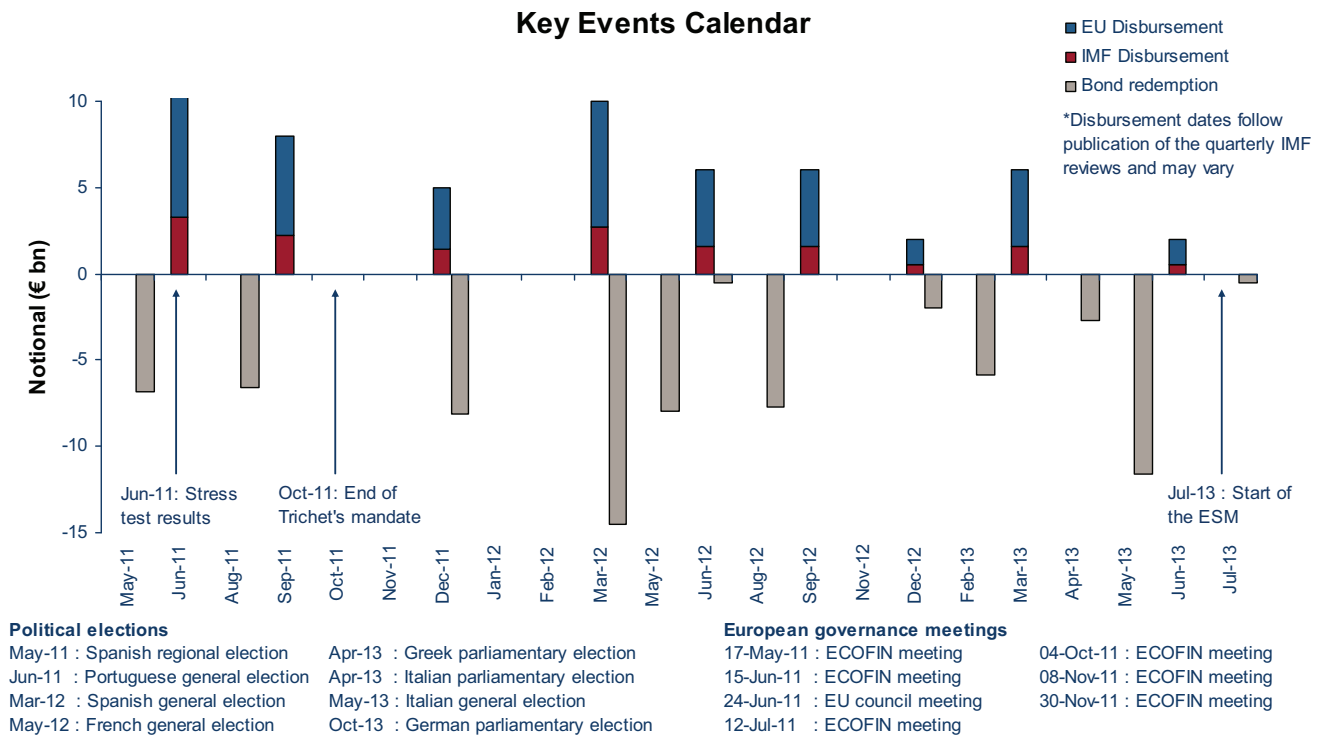
Source: Credit Suisse

The most pressing issue facing Greece is the 2012 funding shortfall. Since it is now widely accepted that the Greek government will not be in a position to return to the markets next year, either an extension of the bailout package is required or some way of reducing 2012 funding needs.

Our view is that some form of restructuring of Greece's debt is unavoidable. The question is the form it will take and when it will happen. In this piece we address the key topics we believe need to be considered when evaluating the most likely restructuring path:

- At what point does a debt restructuring make sense to the EU from an economic and political standpoint, or does it become unavoidable
- How would this best be achieved and how is it likely to be achieved
- How large a debt reduction is required
- What are the implications for the Greek bond and CDS markets, and for bond and CDS markets in other peripherals
- And for market participants which instruments are best suited for systemic risk hedges

**Exhibit 3: Key events calendar**



Source: Credit Suisse, IMF, Bloomberg

For the time being, these remain questions for the EU, and the IMF. We view the role of the latter as distinct and important and discuss why in detail. With Ireland and Portugal now under the EFSF umbrella, in our opinion key objectives for the EU are that

- Greece is incentivized to continue with reforms and shoulder the maximum percentage of costs itself
- Any restructuring of Greek debt does not immediately then result in the same in Ireland or Portugal
- The stability of the European banking system is not in doubt
- The bailouts stop with Portugal

The risk is that at some point the Greek population fails to recognise the benefits and expresses this politically, shifting the decision-making power from Europe to Greece. The likelihood of an orderly resolution at that point would be very low.

### The financial picture

Greece's €110 billion bailout in May 2010 comprised a €30 billion standby agreement with the IMF and a further €80 billion from euro area sovereigns in the form of bilateral loans. An intrinsic part of the bailout plan was that Greece would be able to access the capital markets again in 2012. The subsequent Irish and Portuguese bailouts differ from that of Greece, with funding through a combination of the EFSF, EFSM and IMF. For further details on the EFSF, the reader is referred to [EFSF users' manual, 28 October 2010](#).

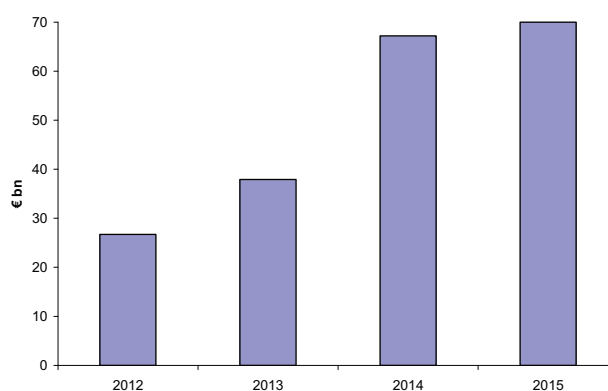
Exhibit 4 summarises the funds disbursed to date. Exhibit 5 shows the IMF’s projections for the Greek government’s funding requirement from the third IMF review, March 2011. After accounting for an increase in stock of T-bill debt by €3 billion, privatisation receipts of €3 billion and the scheduled disbursement of loans from the EU and IMF, Greece will have a funding requirement in the region of €27 billion in 2012 according to IMF forecasts. This number does not take into account any additional measures that may be implemented following the publication of the Medium-Term Fiscal Strategy 2012-15. In this report, published by the Greek Finance Ministry on 15 April, additional cuts in spending and revenue were announced as well as estimates for privatization revenues. The privatization strategy is now an integral part of the plan for Greece to reduce its debt and deficit. The privatization plan in the Medium-Term Fiscal Strategy aims for €50 billion of revenues by 2015 with an estimate of €12-17 billion in 2011-13.

**Exhibit 4: IMF and EU disbursements of loans to the Greek government - to date and future**

	Total	IMF	EU
May-Jun 2010	20	5.5	14.5
10Q3	9	2.5	6.5
10Q4	9	2.5	0
11Q1	15	4.1	17.5
<b>Total To-date</b>	<b>53</b>	<b>14.6</b>	<b>38.5</b>
<b>Future Disbursements</b>			
11Q2	12	3.3	8.7
11Q3	8	2.2	5.8
11Q4	5	1.4	3.6
12Q1	10	2.7	7.3
12Q2	6	1.6	4.4
12Q3	6	1.6	4.4
12Q4	2	0.5	1.5
13Q1	6	1.6	4.4

Source: Credit Suisse, IMF

**Exhibit 5: IMF projections for the funding requirements for Greece’s Government sector**



Source: Credit Suisse, IMF

Given the current level of yields, the probability that Greece can come back to the capital markets in 2012 is extremely small. The current weighted average yield for Greece is in the region of 20% – depending on market fluctuations. We estimate that a sustainable yield on plausible assumptions for growth and the primary fiscal balance is in the region of 6%.

Therefore the immediate pressure facing Greece is that it will have a need for additional funds in 2012. How can this be achieved?

- Access the bond market. Greek politicians have already commented that coming to the bond market as planned in 2012 may not be possible. We also find it hard to see a scenario where Greece can regain the confidence in the market and reduce yields low enough to make issuance a valid option. Therefore we see a low possibility of this solution.
- Increase T-bill issuance. The Greek government is already rolling its T-bill debt so one option may be to increase the amount. We do not think the market would be too impressed with this strategy as we believe any increase in T-bill issuance would simply be reflected in increased bank financing at the ECB.

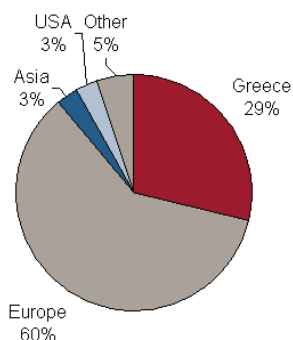
- Debt default. The rhetoric from the EU suggests there is currently very little willingness to let Greece default.
- Restructuring Greek debt could bring it back to a sustainable level.
- Additional funds from the EU. Our read of the unscheduled “secret” Eurogroup meeting on 6 May is that there still remains strong support for Greece within the group. Although there was apparently support for the voluntary participation of private creditors from some euro area countries at the meeting, others, most notably France, are strongly opposed and we understand that on the whole this is not currently a favoured option. We also believe the ECB is against a restructuring event for Greece.

Our view is that the EU and the IMF will enlarge the funding package for Greece.

### Who owns Greece’s debt?

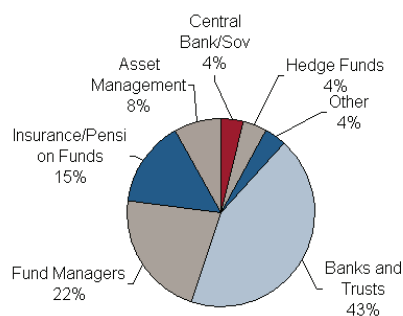
The Greek debt management agency provides two Greek bond ownership numbers on a geographical and investor type basis. These numbers are based on initial bond allocation but we think they are a good approximation of the current ownership structure. The data are shown in Exhibits 6 and 7.

**Exhibit 6: Greek government bond ownership by region**



Source: Credit Suisse

**Exhibit 7: Greek government bond ownership by types of investor**



Source: Credit Suisse

Exhibit 6 illustrates that the Greek debt problem is essentially a European one, with 90% of Greek government bonds held within Europe. This perhaps explains why the Greek story has had less of an impact on global risk markets than it has had in Europe. When one also considers that euro area governments have a further €38.5 billion of bilateral loans to Greece (at the end of Q12011) the total (non-ECB) European exposure to Greece amounts to around €294 billion (€83 billion in Greece, €172 billion to European investors and €38.5 billion in loans).

Exhibit 7 shows the breakdown by investor type. Banks are the biggest owners of Greek bonds at 43% equating to around €124 billion. Banks aside, Greek debt is relatively well split between other investor groups. According to ECB data, euro area monetary financial institutions have total assets of €31,697 billion. Therefore it is important to put in context the size of the Greek problem. If Greek debt were to be written down it is likely individual names and funds would suffer, but the overall impact is relatively contained.

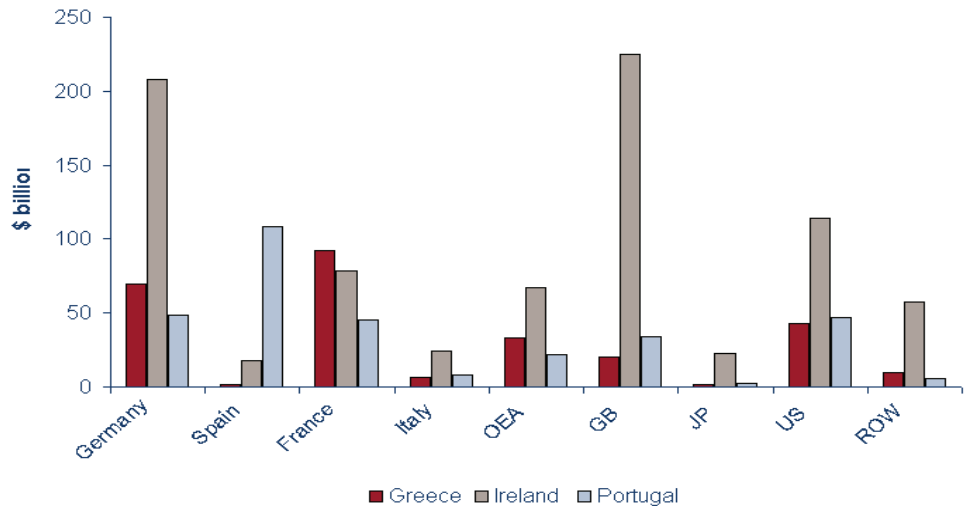
That is not to downplay the issue. There is contagion risk to other sovereigns, particularly relevant are Ireland and potential follow through risk to the banking sector. While the economics might work, the impact on market confidence is difficult to assess and therefore may be a risk not worth taking at this point.

### Bank Ownership of Greek Government Debt

Exhibit 7 shows that banks own a significant proportion of Greek government debt and from Exhibit 6 we know that this is concentrated in the European banks. The risk to the banking sector is driving the ECB's opposition to a restructuring of Greek debt, in our opinion. The BIS provides a breakdown of bank exposure to the peripherals by country. We include the full chart in the Appendix; key data are highlighted in Exhibit 8.

### Exhibit 8: Foreign exposures to peripheral debt by bank nationality

Greece, Ireland and Portugal



Source: Credit Suisse, Bank of International Settlements

This chart captures nicely the idea that the Greek crisis is manageable from the point of view of the European banking sector but that potential contagion risk to Ireland multiplies the issue significantly. Although Ireland has less government debt outstanding (€90 billion) the interlinkages between the Irish state and the government mean that a default or restructuring event in Ireland would have serious ramifications for their banking sector.

The other point this chart clarifies is the positions of the different countries involved. French banks, according to these data have the highest expose to the Greek crisis but if Ireland were also to restructure, German and UK banks would face the biggest losses. On the contrary, Spanish and Italian banks have very little exposure to the Greek or to the Irish banking sector.

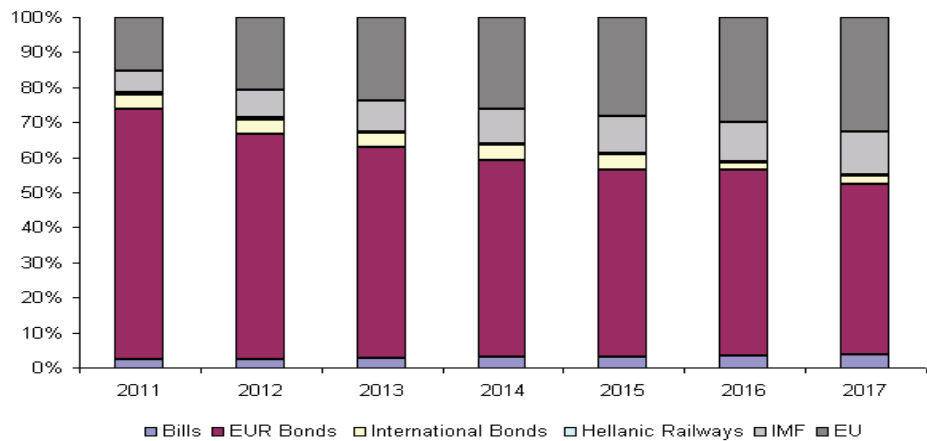
So different countries have different cost benefits involved in the outcome. From a German perspective the “cheapest” outcome may be to continue to lend to Greece to avoid funding a banking sector recapitalisation at this stage. On the other hand the Spanish or Italian governments may find it is in their interest to suffer the cost in the banking sector rather than the cost of increasing loans. The sensitivity of the European banking sector to any restructuring is clearly of paramount importance, although to some extent it maybe just a question of where the costs are borne. This again highlights the point that the political dimensions make the Greek crisis difficult to resolve.

Our economics team have also written on this topic in [Go compare, 21 April 2011](#).

## The debt composition

When considering the potential options for Greece the current debt composition and its evolution play an important role. We illustrate the evolution in Exhibit 9 on the assumptions that the T-bills are maintained at current levels and rolled and that bonds roll off at maturity. We have also assumed the IMF and EU debt is not repaid until 2018.

**Exhibit 9: Evolution of the Greek government creditor composition**



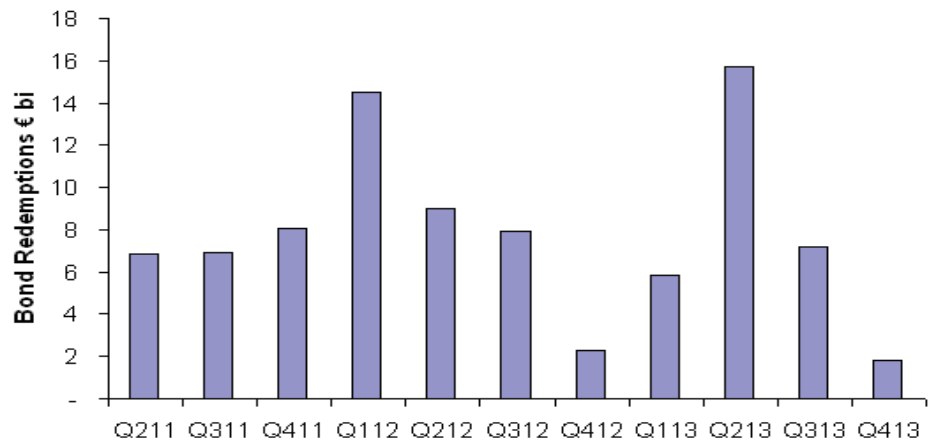
Source: Credit Suisse, the BLOOMBERG PROFESSIONAL™ service

### Who should take losses – the official or private sector lenders?

Since the aim of a restructuring is to bring the debt to a sustainable level, the composition of debt becomes important in the event of a restructuring as it determines what debt is available to take losses. . In the case of Greece there are two main groups of creditors – the official lenders (the IMF and the EU) and the private sector lenders. If it is considered that the private sector investors should take a loss on Greek debt then it may make sense to have the restructuring sooner rather than later. The longer the restructuring is deferred, the more subordinated the private sector lenders and therefore the greater the haircut necessary to achieve a given debt reduction. Alternatively, if losses are to be borne by the official lender, there is less pressure to carry out a restructuring immediately, if at all.

Exhibit 10 shows the quarterly redemption payments until 2013. The next big pressure point in terms of debt repayments is in the first quarter of 2012 when the 4.3% March 2012 redeems for €14.5 billion.

**Exhibit 10: Redemption payments to 2013**



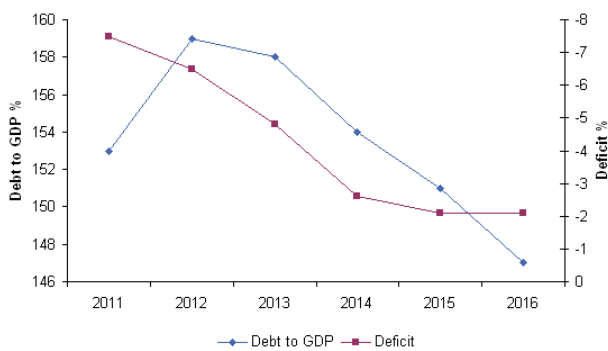
Source: Credit Suisse, the BLOOMBERG PROFESSIONAL™ service



## Levels of debt sustainability

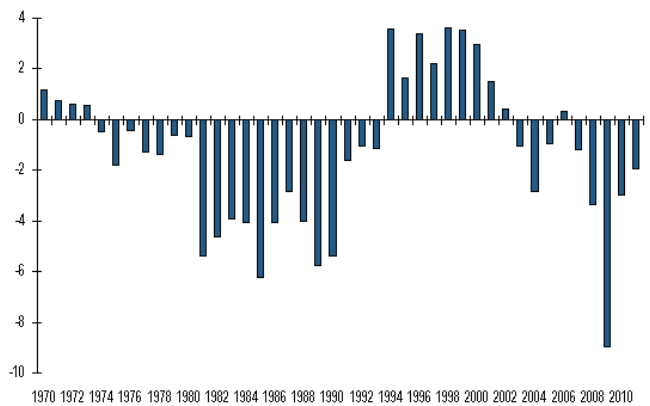
Under current assumptions from the IMF (in the process of being updated) the ratio of Greek government debt to GDP will peak in 2012 at 159% as shown in Exhibit 11. However, two numbers behind this estimate concern us. The first is the assumption that the primary balance will become positive in 2012 and rise to 6% of GDP by 2014. The other assumption is that Greece will achieve real GDP growth of 2.9% by 2013 and in excess of 3% from 2014 onwards. Any slippage in the growth numbers puts upward pressure on the already high debt-to-GDP ratio. Exhibit 12 shows the historical primary balance for Greece over the past 40 years. Greece has had a negative primary balance since 2002. The last period of sustained primary surplus was 1994 to 2001 and even in this period it only reached just over 4% of GDP.

**Exhibit 11: IMF debt and deficit forecasts**



Source: IMF

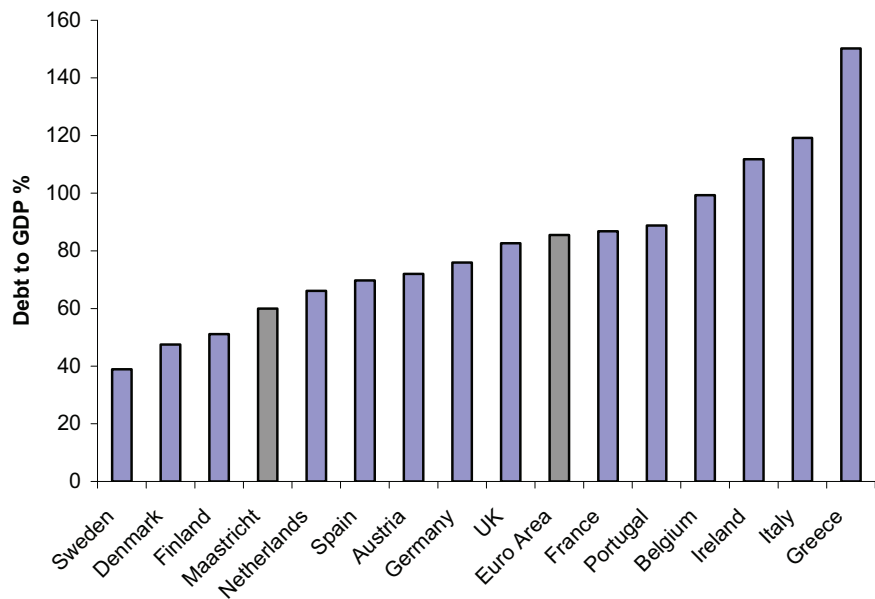
**Exhibit 12: Primary balance data**



Source: OECD

The correct level of debt for the Greek government is a difficult question and really boils down to the number that will give the market confidence that Greece is then on a sustainable path. We have argued throughout that the number will also be as high as is credibly possible, due to the involvement of the EU. The Maastricht Treaty stipulates as a target a debt-to-GDP ratio of 60%. But the only one euro area country estimated to be below that level in 2011 is Finland. The average euro area ratio of debt to GDP is around 85%. A debt-to-GDP ratio of around 100% may not even be a problem; Italy has survived for many years on this basis as it continues to have market confidence. Here also a balancing act needs to be drawn between an acceptable level of debt versus the severity of the loss in a restructuring and the negative impact that could potentially have. We believe a number of between 60% and 85% post-restructuring debt-to-GDP ratio seems realistic especially if Greece does return to a primary surplus as forecast.

**Exhibit 13: What level of debt is sustainable – 60-85% of GDP**

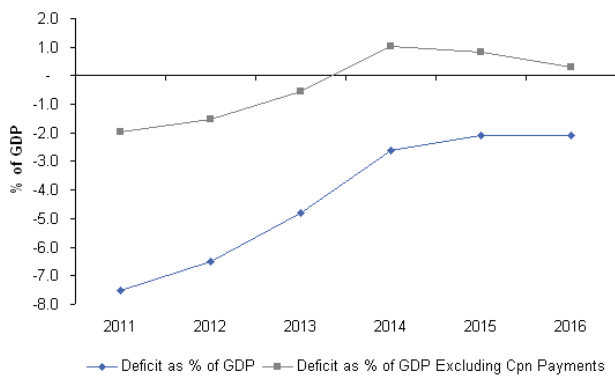


Source: Credit Suisse

As we discuss in the section on voluntary restructuring one potential option for Greece is to take a coupon holiday. As there is potential to trigger the CDS with such an action the Greek government would seek this only on the basis of a significant saving for Greece. In Exhibit 14 we show the deficit as a percentage of GDP (as per the IMF forecasts). We then recalculated the deficit by excluding the coupons payable on the domestic, international and Hellenic Railway bonds. The graph shows the deficit would shrink below 3% as early as 2012 and would turn to a surplus in 2014.

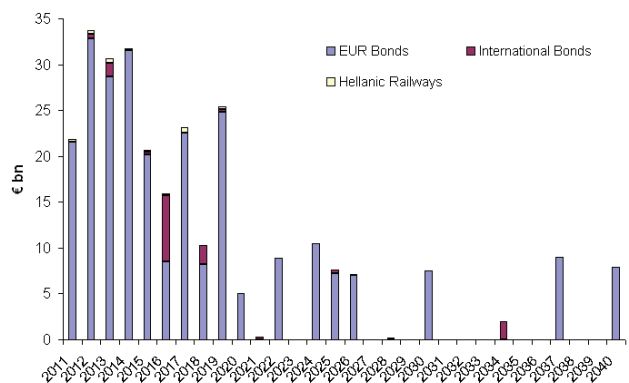
However, reducing the coupon payments alone doesn't reduce the flow of redemptions. As with most European countries, Greece has front loaded its debt and over the next five years needs to pay €138 billion in redemption payments, excluding repayments to the IMF and the EU. In order to relieve the redemption burden this debt would either need to be haircut or extended. We analyse the impact of the various restructuring options below.

**Exhibit 14: Deficit shrinks after excluding the coupon payments**



Source: Credit Suisse, IMF

**Exhibit 15: Maturity profile for Greek debt**



Source: Credit Suisse

## The route ahead

We believe that the most likely outcome of the Ecofin meeting of 16-17 May and the subsequent IMF review is the availability of further financial support to cover Greece's 2012 funding shortfall, possibly combined with a further extension of the maturity of existing support. Although there is an argument to be made to the contrary, we view the potential for immediate private-sector involvement to be low.

Our base case is for some form of voluntary debt restructuring over the next two years ahead of the introduction of the European Stability Mechanism (ESM) in July 2013. The main issue is when rather than if in our opinion. The alternative scenarios are that Europe continues to muddle through or that circumstances escalate a hard restructuring event. We view the former more likely than the latter pre-ESM.

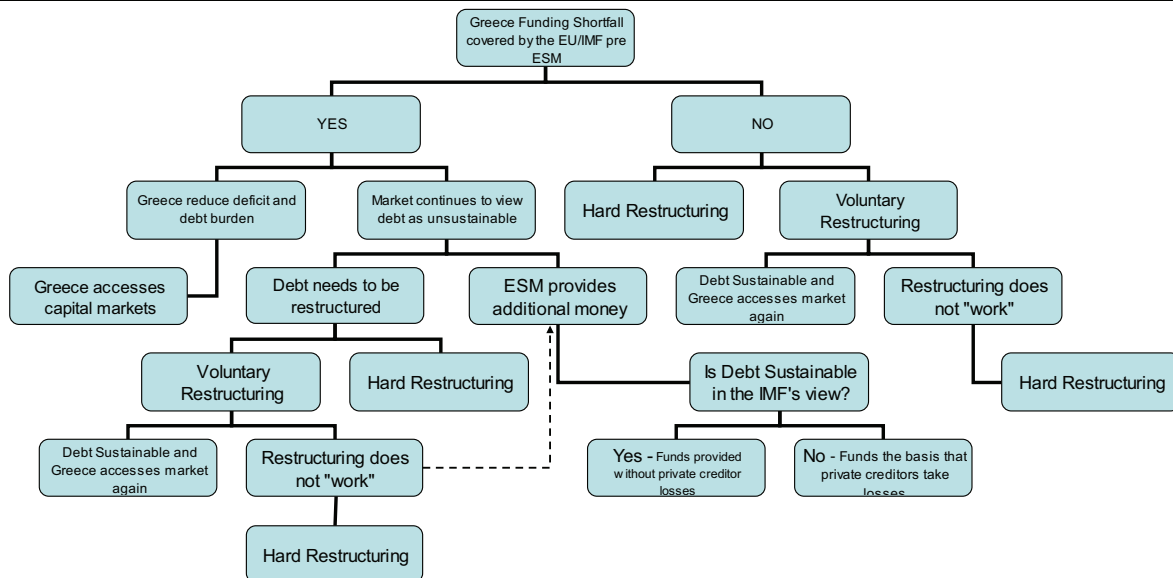
Since the terms of the ESM stipulate that private creditor involvement is required if a country's public debt is not considered to be sustainable, we believe the probability of a hard private-creditor restructuring increases significantly leading into mid-2013.

There are three broad restructuring scenarios:

- No restructuring
- Voluntary restructuring
- Hard restructuring of private creditors

The sequence of events leading to each scenario we think can be best illustrated by a decision tree as illustrated in Exhibit 16.

**Exhibit 16: The route to a restructuring**



Source: Credit Suisse

Displaying the process in this way helps outline how the situation is likely to evolve in the context of the events outlined in Exhibit 3. As we analyse in the next section, unless the EU and/or IMF are willing and able to provide increased levels of support to Greece for the long haul, we believe that a principal writedown will be required at some stage to get Greece's debt load onto a sustainable footing. However, for the reasons we discuss below, we think this outcome is likely to be arrived at as an evolutionary process in the context of European sovereign and financial stability.

## The role of the IMF

We view the role of the IMF as distinct and important in this process. We understand its involvement in the bailout for three primary reasons: funding, credibility and expertise. The result is that while the IMF is somewhat caught up in European politics, the situation cannot be considered purely in the context of intra-European politics.

**We would not expect the IMF to take a principal loss**

**Funding:** The IMF is a material source of funding. It has extended a €30 billion standby agreement to Greece of which €14.6 billion has been disbursed, in addition to providing support to Ireland and Portugal. Traditionally the IMF is a “preferred creditor” which gives it informal seniority; the confusion over the seniority of sovereign loans to Greece and of EFSF loans stems to some extent from the fact the IMF is operating in a number of non-traditional ways. We would expect no change in its traditional position with regards a restructuring of its loans, and do not see a situation in which the IMF would take a principal loss.

**Credibility:** The involvement of the IMF in the Greek bailout was highly controversial at the time but was desired (with the active co-operation of IMF Managing Director, Dominique Strauss-Kahn) for credibility and to show the solid resources “defending the euro”. We think the IMF is going to be unwilling to fund a situation that it finds unsustainable, so the credibility has been bought in a Faustian bargain. Our view of the price of credibility is discipline: the IMF cannot be institutionally captured and will give a relatively independent assessment of the situation in Greece.

**Expertise:** The IMF, despite some controversies, is in our view uniquely well placed to opine on the sustainability of the current situation and we believe has an incentive to say if it sees the situation as unsustainable. And in doing so it will provide political cover for any who need it as well, as we are possibly starting to see with Germany’s Chancellor Angela Merkel at present.

With the fourth progress report due imminently, we note the three most recent staff reports dated September 2010, December 2010 and February 2011. These said, respectively, “Overall, the program is off to an impressive start ...”, “In conclusion, the program is up to a very good start ...” and “In conclusion, the program is slowly gaining traction ...”. We expect a further deterioration in the tone of the fourth report.

## Restructuring scenarios

Having stated our conclusion up front, we now explain our rationale by discussing the characteristics of each type of restructuring scenario in turn. The fact that decisions are driven by political as well as economic considerations makes the timing of a given outcome very hard to anticipate, but we find Exhibit 16 useful in this regard. In particular, it highlights the sensitivity of different outcomes to the development of the market, political, economic and social environment in Europe over the next two years. We look to the progress reports for the earliest indication of the likely path, if not the time-frame.

### No restructuring

One scenario that is not often discussed is that Greece pulls through without the need for a private investor debt restructuring. This would of course necessitate additional support from the IMF and Europe. We think it is important not to underestimate the political support for the European project. Although the concept of bailing countries out may not be palatable to the general public, the stability of the euro area may be a bigger threat to the EU’s political establishment. From a political standpoint an expansion of the Greek bailout programme may in fact be the cheapest option in the short term. The downside is the rising public-sector cost as the private sector rolls out at par.

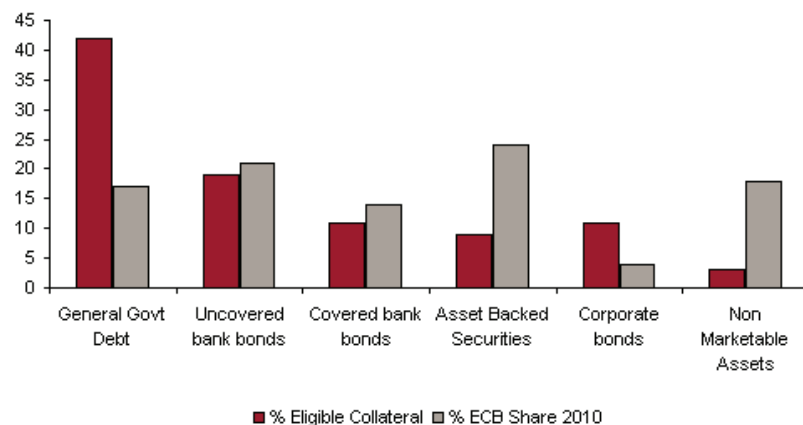
Why would the EU/IMF agree to this? We believe the EU has two motives for not wanting Greece to restructure its bonds.

- A wish to curb contagion risk
- A wish to maintain oversight and influence in Greece

First is the risk of contagion – to Ireland, Portugal, the European banking sector and potentially on via Spain from there. The worst case scenario is that the combined impact of such an event could have Lehman like ramifications and put the European banking system back into crisis. Our earlier analysis in Exhibit 8 shows the exposure to the Greek government sector of the banking sector by country.

The ECB also appears to be strongly against a restructuring event in Greece. The ECB owns €76 billion in peripheral bonds through the government bond purchase programme. In addition, the ECB holds €2,010 billion assets put forward by counterparties as collateral in the euro system. Exhibit 17 shows that relative to the total eligible collateral available the ECB is overweight bank credit with almost 60% of its portfolio exposed to bank risk (bank bonds, covered bonds and asset-backed securities). The Irish bailout process shows that the ECB was opposed to senior bank bonds taking haircuts. We believe its unwillingness to let Greece restructure lies in its concern for the impact on the banking sector. So until the ECB is convinced that the banking sector can cope with potential restructuring losses it will be opposed.

**Exhibit 17: ECB's share of eligible collateral in the Eurosystem**



Source: European Central Bank

If the private sector is not going to take losses then the EU and the IMF will be forced to increase their funding for Greece. By doing so, they are also extending their influence there and the ability to define the terms of structural reform. One aspect is the privatization plan. Greece has already announced a privatization plan of €50 billion. Borges who is head of the IMF's European department has said "Greece is a special case because it's a real outlier, it's a government that has extraordinary portfolio of assets". The Greek government has real estate assets of around €280 billion. Further monetization of these assets could be a tool in reducing the debt burden.

On the other side of the equation, why would Greece agree an increase in the IMF and EU loans? There are many reasons<sup>1</sup> why governments generally pay their debt service payments when they fall due ranging from "pride and morals" to clear economic benefits. In the case of Greece, the government is currently running a primary budget deficit which it

<sup>1</sup> See Chapter 10, *Debt servicing, Russian style of The Wild East*, Westin 2001 for a detailed discussion.

can finance only on account of the assistance it is receiving from the IMF and the EU. The EU is providing its part of the assistance on the condition that the Greek government continues to service its debt (in addition to implemented agreed reforms). Another reason for the Greek government to try hard to remain current is the wish to defend the country's respectability and political influence in the EU.

Since we believe Greece's current debt load is unsustainable, permanent avoidance of a restructuring would require long-term EU/IMF support and the means for the Greek government to return to the market at dramatically reduced rates. One option would be EU-backed financing, through a Eurobond issuance programme or equivalent, but we see no indication at present that the appetite exists for such a solution.

**No incentive for either Greece or Europe to precipitate events in the immediate future**

Consistent with recent rhetoric from the IMF, our view is therefore that there is no incentive for either Greece or the EU to precipitate a debt restructuring in the immediate future. Providing Greece with an additional €25-30 billion to cover the funding gap in 2012 is affordable for the EU and the IMF. Greece would have another year to continue with the reforms and the EU and the IMF would have more leverage. In a best case scenario, Greece would then be in a position to come back to the market in 2013. In a worst case scenario it would give the European banking sector another year to recapitalize.

Of course what we should also consider is the willingness of the EU and the IMF to shoulder losses. As we have mentioned in the section on the IMF, we do not believe that the IMF would take a principal loss. The EU wouldn't be keen either but may need to weigh the cost against the potential recapitalization cost to the banking sector. We think there would be less opposition to other measures such as extending the maturity of the loans or lowering the interest payment and believe there could be flexibility on this – indeed Europe has already agreed to an extension in the repayment terms on Greece's loans from 3.5 to 7.5 years. In addition, the interest rate will be lowered by 100bp. The IMF are also looking at the possibility of extending their loans.

**EFSF vs. an increase in bilateral loans**

A side point here is how any additional funds to Greece could be raised. Greece is already receiving bilateral loans from the EU and so these loans could be extended. Alternatively, Greece could be folded into the EFSF funding mechanism. An extension of the bilateral loans is potentially the easiest solution from a mechanical perspective as the programme is already in place.

A significant advantage of the EFSF is that it would not imply any additional funding costs at a country level. This may be attractive to some of the smaller countries. However, perhaps the most important consideration is the size of any additional funding programme. The most immediate need is the funding shortfall for 2012 which is €27 billion, according to IMF forecasts. If the EU were to decide this were the extent of the funding needed, then an increase in the bilateral loans is the most likely. A longer funding programme is, however, a possibility, bringing support beyond the 2013 ESM inauguration. If this were the case, then the EFSF would seem the mostly likely vehicle. We see this as a less likely scenario and believe it is unlikely that Greece could avoid the ESM and the sustainability test should a longer-term funding programme be required.

Of course, if the EU and IMF refuse to extend funding to Greece for 2012 then as shown in Exhibit 16 a voluntary or hard restructuring could happen sooner.

Another idea to secure new financing that appears to be gaining traction is to create a new tranche of securitized privatization proceeds (explicitly senior but not sufficiently senior to trigger CDS, in our view). The Greek government is due to propose a new package of measures to Parliament on 19 May so this could be passed very fast but may prove highly controversial within Greece. Alternatively, such securities could be used to incentivize voluntary maturity deferrals (e.g., defer your GGB maturity by five years and get a securitized position).

## Voluntary restructuring

**We believe the voluntary route is the most likely one taken**

Should the Greek government be forced to seek a restructuring of its debt, in order for Greece to return to the market as quickly as possible, the restructuring must be drastic enough for the market to believe that the post-restructuring debt stock is serviceable.

The question is whether the government can convince a sufficiently large share of the bondholders to agree in an orderly process. Emerging market precedent would suggest that bondholders are typically only willing to agree to onerous restructuring terms once there has been a default, or at least when it is clear that a restructuring is a less-bad alternative from a creditor perspective to an imminent default, as priced by the market. While Greek government bonds are now priced for a restructuring, the appetite for enforced losses on private creditors continues to be extremely low within the ECB and euro zone governments particularly.

There are four broad categories of action that we believe fall under the “voluntary restructuring” umbrella:

- Voluntary market-based debt exchange
- Voluntary debt exchange with net present value (NPV) reduction
- Coercive voluntary debt exchange or debt reprofiling
- Debt buyback

A (voluntary) debt exchange typically involves a tender offer in which bondholders can opt to exchange their current bonds for new ones with different characteristics. Usually this would include some combination of maturity extension and/or coupon reduction or “holiday” to solve a near-term funding shortfall. Since funding costs are always elevated at the time of an exchange, a market-based exchange actually increases the overall debt load and is unlikely to achieve much but defer the end game as outlined by the IMF in their [review of lessons learned from the Argentine crisis](#):

*“Financial engineering in the form of voluntary, market-based debt restructuring is costly and unlikely to improve debt sustainability if it is undertaken under crisis conditions and without a credible, comprehensive economic strategy. Only a form of debt restructuring that leads to a reduction of the net present value (NPV) of debt payments or, if the debt is believed to be sustainable, a large financing package by the official sector has a chance to reverse unfavorable debt dynamics.”*

A coercive voluntary debt exchange sounds like an oxymoron but is a scenario where conditions are set such that it is more attractive for the debt holder to tender their debt than not. However, in contrast to a hard restructuring, it does not imply that all of the debt is restructured.

As evident from Exhibit 15, at a minimum a successful Greek restructuring would require large-scale cash-flow relief in the coming three or four years. We conclude from our analysis below on the implications of different types of restructuring scenarios for debt sustainability that it is also likely to require a “major” principal haircut. This would also help by improving the ratio of government debt to GDP even though this is mainly of symbolic importance relative the more substantially important improvement in the long-term debt-servicing cash flow schedule.

Unless it is coercive, bondholders are only likely to agree to a restructuring if it is relatively light. This, in turn, reduces the likelihood that the bond-market will find the restructuring sufficient to make the government’s post-restructuring debt burden sustainable, raising the potential for continued distress followed by a further, harder restructuring.

As was seen in Uruguay’s voluntary debt restructuring of 2003, governments have means to encourage participation from domestic banks and institutions. For example, if old debt is no longer eligible at the ECB, “regulatory incentives” are introduced to make it onerous for banks and Pension funds to hold it and/or the proposed debt exchange is structured such



that holdings are minimally impaired under hold-to-maturity accounting treatment, it is possible that a significant proportion of the 58% of debt held at banks, trusts, insurance companies and pension funds outlined in Exhibit 7 would participate. An alternative means to encourage participation would be for credit enhancement of the new debt, possibly through the ESM or a Eurobond. Yet another way would be to offer regulatory forbearance that would allow the banks to carry the post restructuring claims on the Greek government at prices that would be far above the mark-to-market prices.

**A voluntary restructuring may need to be coercive to succeed**

Non-bank creditors are likely to hold out in this situation – they have every incentive to be free-riders and hope that sufficient other debt holders agree to the new terms for the government to service their claims. The only way for the government to force holdout creditors to the negotiating table, in the absence of Collective Action Clauses (CACs), is to default on their claims.

To increase participation in a voluntary restructuring, the government could change the law to include CACs in domestic law debt. While this would potentially enable the government to reduce the number of holdouts, the ramifications of such a law, as with any law affecting creditors' rights, would be widespread – both within Greece and in other European countries. Many of Greece's €18 billion of international law bonds already contain CACs, and so the maturity, principal or coupon of these bonds could be changed with sufficient investor backing.

A softer alternative to a debt exchange would be for Greece to buy back its debt, presumably financed via the EFSF. This raises the question of who has an incentive to sell, and we doubt it likely that a meaningful debt reduction could be realized in this way. Those investors holding debt in hold-to-maturity accounts more likely to support a maturity extension than a debt buyback that crystallizes their loss. While it would help on the margin, we do not view a debt buyback as sufficient in isolation.

### **Hard restructuring**

Of course, particularly from the Greek government's perspective, an alternative to a negotiated settlement is a forced restructuring, which would be treated by the market as a combined default and restructuring. We use the term "hard restructuring" for a forced rather than voluntary restructuring of private-creditor debt.

**A hard restructuring requires the government to change the terms of the debt**

From a legal perspective, it would be a lot easier for the Greek government to do this than it was, for example, for the Argentine government in 2001 since the vast majority of Greek government debt is subject to local Greek law. The government can, possibly with the assistance of the Greek parliament, change the terms on this debt without much risk of subsequent successful legal action on the part of the creditors. If the government were to go down this route, then it would arguably make sense for it to continue to service the relatively small stock of government debt that is subject to international law, so as to avoid having to deal with irritating international lawsuits and threats of seizure of international payment flows – a threat that for multiple years prevented the Argentine government from international bond issuance in the wake of its debt default in 2001 and debt restructuring in 2005.

The ESM can currently be activated from July 2013. It is clear from the ESM term sheet that any provision of ESM support to a country whose debt is viewed as unsustainable will require private creditor involvement. We therefore view the probability of a hard restructuring to increase significantly at this point. It is possible that the IMF views such an outcome as inevitable prior to this date, or for the market to force the issue as a result of an insufficiently drastic voluntary restructuring so we do not rule out the possibility of a hard event prior to July 2013.

The other risk to our core premise is that the Greek population fails to recognize the benefits of the bailout and reform measures and becomes unwilling to pay, expressed through the political process. Moreover, as the government's primary deficit shrinks, which it is meant to do over time according to the IMF programme, the government's cash-flow incentive to remain current shrinks as well.



## Bond price sensitivity to a restructuring

In this section we analyse the sensitivity of the Greek government bond curve to restructuring scenarios involving maturity extensions, coupon reductions and principal haircuts. We look at each in isolation and combined. Our goal is to identify the type of restructuring most likely to result in a debt load the market would view as sustainable.

**A combination of a maturity extension and coupon reduction are unlikely to be sufficient**

We conclude that a combination of a maturity extension and coupon reduction is unlikely to be sufficient. In the absence of long-term EU/IMF support, we believe a principal writedown is likely to be necessary. In this scenario, our analysis suggests that the belly of the curve is the most attractive.

We restrict ourselves to the universe of Greek government bonds issued under Greek law and exclude the international bonds. We believe that a restructuring of the latter is less likely as it would likely prolong the time that Greece would be unable to fund itself externally. We further exclude T-bills and inflation linked bonds from this analysis.

The current stock of GGBs has notional of €262 billion, or €246 billion after excluding inflation linkers. The market value is currently €160 billion, i.e., 65% of face value. The notional-weighted average price of the GGB market is therefore 65%.

### Coupon reduction

A restructuring involving a reduction in coupons, either by a fixed amount or a fixed percentage would reduce the present value of any bond; however, short-dated bonds would be a lot less affected than long-dated ones. This is because the price of a short-dated bond is largely made up of the discounted principal whereas the price of a long-dated bond consists mainly of the sum of the discounted coupon payments.

### Maturity extension

In contrast to a coupon reduction, a maturity extension would penalise short-dated bonds more than long-dated ones. This is because the principal would be discounted more heavily than before and constitutes a greater proportion of the value of short-dated bonds. This relationship actually inverts if the coupon of the short-dated bond is higher than the discounting yield. In such a case the price of the bond would actually increase under a maturity extension!

### Principal haircut

For the same reasons, a principal writedown of a fixed percentage, e.g., 50% of notional value would negatively impact the price of a short-maturity bond a lot more than a long-maturity bond.

Any combination of the above, however, would be unlikely to occur in isolation: a repricing of the yield curve would likely follow, expressing the market's view as to the success or otherwise of the restructuring in putting Greece onto a sustainable debt path.

### What is a sustainable restructuring

Sustainability can arguably be measured in several ways, but two key dimensions are the cost of servicing debt measured by the yield and the pressure of the debt burden, i.e., the PV of outstanding debt. The two are clearly functions of one another. Currently, the market is telling us that based on GGB yields, the outstanding debt is too expensive to service and therefore is deemed unsustainable.

Turning this around, market prices are a useful measure for estimating how much outstanding debt needs to be reduced to get to a sustainable level. In the current environment, the market is telling us that a debt load of 65% of that currently outstanding would be sustainable.

In order to assess sustainability and hence the likelihood of different types of restructuring, the task therefore becomes: assuming a suitable discount curve, what type of restructuring would be needed in order to achieve a PV of outstanding debt that is equal to 65% of current outstanding debt? Results for each scenario are given in Exhibit 18.

The discount curve we use for all scenarios is the Spanish yield curve. Clearly a tighter yield curve, for example France's, would be better, but less achievable so we use the Spanish curve as the widest curve that we believe represents a market view of debt sustainability.

A fact that gives us confidence that we are on the right track is that the PV of Greek government debt as it is (i.e., without any type of restructuring) discounted with the Spanish yield curve would be 103% of face value. In other words, if the Greek yield curve was currently trading in line with that of Spain, on aggregate, Greek debt would be valued at roughly par.

First, we observe that a five-year maturity extension on its own is most likely not sufficient as the PV of the debt is only reduced by 4% to 99% of debt outstanding (remember, we start with 103% of outstanding debt for the base case of a Spanish yield curve).

Second, a coupon reduction by 2.5% (in absolute, not relative terms) achieves a reduction of the PV to 90% of outstanding debt, a fall by 13%, but still not significant enough.

A combination of the above, i.e., a coupon reduction and maturity extension reduce the PV to 79% of total debt outstanding, a substantial reduction, but still short of the 38% fall we are looking for. By way of comparison, a more measured four-year maturity extension and 2% coupon reduction leads to a PV of 85%. A greater maturity extension or larger reduction in coupon would have a greater impact, but unless these are extreme, we conclude that a principal writedown needs to be part of the solution.

**Exhibit 18: Restructuring scenarios**

	Description	Risk premium	PV in % of outstanding debt
1	No restructuring, Spanish yield curve	0.00%	103%
2	5 year maturity extension	0.00%	99%
3	coupon reduced by 2.5%	0.00%	90%
4	coupon reduced by 2.5%, 5y maturity extension	0.00%	79%
5	Notional reduced by 20%	0.00%	82%
6	Notional reduced by 20%, 5 year extension	0.00%	79%
7	Notional reduced by 20%, coupon reduced by 2.5%	0.00%	72%
8	Notional reduced by 20%, coupon reduced by 2.5%, 5y matu	0.00%	63%
9	5 year maturity extension	6.00%	65%
10	coupon reduced by 2.5%	9.00%	65%
11	coupon reduced by 2.5%, 5y maturity extension	2.40%	65%
12	Notional reduced by 20%	6.00%	65%
13	Notional reduced by 20%, 5 year extension	2.75%	65%
14	Notional reduced by 20%, coupon reduced by 2.5%	2.50%	65%

Source: Credit Suisse

While a principal writedown of 20% on its own only leads to a fall of the PV to 82% and therefore is not sufficient, in combination with a 2.5% coupon reduction or a five-year maturity extension it leads to PVs of 79% and 72%, respectively.

**Coupon reduction  
maturity extension  
and principal haircut  
may all be required**

Finally, a combination of all three: a 2.5% coupon reduction, a five-year maturity extension and a 20% principal haircut, together achieve a reduction of the PV to 63% of total outstanding debt. While slightly different combinations can be thought of, we believe we have established a base case scenario that is sustainable from a yield, total debt load and funding perspective. The third being the case as there won't be any redemptions in the next five years and the coupon payments will have been minimized to a large extent. (The notional weighted coupon, excluding floating rate notes and inflation linked bonds, is currently 4.7%.)

This analysis is clearly based on our assumption that restructuring risk is already largely reflected in market prices. To the extent the market is over or underpricing this risk, the severity of the restructuring measures required to put Greece's debt on a sustainable footing would be lower or higher.

### **The price of unsustainable solutions**

Using the same approach, we illustrate how solutions falling short of the envisaged base case would be recognized by the market as such and therefore penalized through wider yield curves.

The methodology is simple: by how much does the Spanish yield curve need to be bumped upwards in order for the previously described scenarios to achieve a PV of 65% of the outstanding debt. Another way of interpreting this is: how much will the market discount solutions that are only going some but not the full way to achieving debt sustainability.

Again, starting with the five-year maturity extension scenario, this would result in a additional spread of 600bp above the Spanish yield curve, similar to where Portugal is trading at the moment.

A coupon removal of 2.5% on its own would be penalized even more by the market in demanding a 900bp risk premium, not much of a reduction from current Greek yields.

Reducing the notional by 20% would not be seen favorably by the market either, also requiring a 600bp risk premium.

Finally, combinations of pairs, i.e., coupon reduction plus maturity extension, notional haircut plus maturity extension and notional haircut plus coupon reduction would all be assessed similarly by the market, requiring risk premiums of 240bp, 275bp and 250bp, respectively. Levels that probably would still be unsustainable in our opinion. We reach the same conclusion as before: only a combination of the three restructuring types would lead to a sustainable solution that the market would recognize as such.

### **The belly looks attractive**

Having established what we think likely scenarios might entail, we analyse the impact these would have on different bonds.

**Exhibit 19: Attractiveness of Greek bonds split by maturity**

Restructuring scenario: five-year maturity extension + 2.5% coupon reduction + 20% principal writedown

ISIN	Outstanding	Price	Maturity	Type	Currency	Coupon	Price change after restructuring
GR0124015497	6,404,000,000	99.99	18-May-11	Fixed	EUR	Fixed 5.3500% annual	#N/A
GR0124017519	417,231,000	99.92	31-May-11	Fixed	EUR	Fixed 5.3500% annual	(19.3)
GR0114019442	6,610,000,000	99.16	20-Aug-11	Fixed	EUR	Fixed 3.9000% annual	(25.1)
GR0110020220	1,172,000,000	96.97	19-Dec-11	Fixed	EUR	Fixed 4.4000% annual	(21.4)
GR0326041242	973,313,678	94.42	22-Dec-11	Fixed	EUR	Fixed 0.0000% annual	(26.5)
GR0326039220	5,231,000,000	93.99	29-Dec-11	Fixed	EUR	Fixed 0.0000% irregular	(26.2)
GR0106002786	714,741,533	96.74	30-Dec-11	Fixed	EUR	Fixed 5.0000% annual	(18.5)
GR0124019531	16,037,000	94.34	11-Jan-12	Fixed	EUR	Fixed 2.0000% annual	(27.4)
GR0110021236	14,500,000,000	85.63	20-Mar-12	Fixed	EUR	Fixed 4.3000% annual	(11.0)
GR0124018525	8,000,000,000	83.45	18-May-12	Fixed	EUR	Fixed 5.2500% annual	(4.5)
GR0124020547	413,700,000	86.12	20-Jun-12	Fixed	EUR	Fixed 5.2500% annual	(9.8)
GR0106003792	139,430,090	81.70	30-Jun-12	Fixed	EUR	Fixed 1.0000% irregular	(16.9)
GR0114020457	7,719,000,000	77.89	20-Aug-12	Fixed	EUR	Fixed 4.1000% annual	(7.4)
GR0326042257	2,012,823,399	71.85	22-Dec-12	Fixed	EUR	Fixed 0.0000% irregular	(9.3)
GR0512001356	5,820,000,000	71.13	20-Feb-13	Floating	EUR	Floating semi-annual	2.7
GR0110022242	48,571,430	73.39	31-Mar-13	Fixed	EUR	Fixed 4.5060% annual	(1.8)
GR0326040236	2,716,000,000	65.62	19-Apr-13	Fixed	EUR	Fixed 0.0000% irregular	(4.7)
GR0124021552	9,079,000,000	71.44	20-May-13	Fixed	EUR	Fixed 4.6000% annual	(2.0)
GR0128001584	2,497,559,206	75.23	20-May-13	Fixed	EUR	Fixed 7.5000% annual	10.0
GR0124022568	410,329,000	68.44	03-Jul-13	Fixed	EUR	Fixed 3.9000% annual	(3.0)
GR0114021463	5,850,000,000	66.21	20-Aug-13	Fixed	EUR	Fixed 4.0000% annual	(0.4)
GR0124023574	299,360,000	66.86	30-Sep-13	Fixed	EUR	Fixed 4.5200% annual	1.7
GR0326043263	1,832,534,132	56.34	22-Dec-13	Fixed	EUR	Fixed 0.0000% irregular	1.4
GR0128002590	4,552,000,000	66.90	11-Jan-14	Fixed	EUR	Fixed 6.5000% annual	12.8
GR0124024580	8,523,000,000	61.63	20-May-14	Fixed	EUR	Fixed 4.5000% annual	3.6
GR0124025595	423,967,000	60.13	01-Jul-14	Fixed	EUR	Fixed 4.5000% annual	5.0
GR0114022479	12,500,000,000	61.58	20-Aug-14	Fixed	EUR	Fixed 5.5000% annual	9.5
GR0124026601	9,583,536,000	58.07	20-Jul-15	Fixed	EUR	Fixed 3.7000% annual	(1.7)
GR0114023485	8,000,000,000	61.57	20-Aug-15	Fixed	EUR	Fixed 6.1000% annual	9.2
GR0124027617	374,967,000	56.76	10-Nov-15	Fixed	EUR	Fixed 3.7000% annual	(0.8)
GR0124028623	7,750,000,000	58.96	20-Jul-16	Fixed	EUR	Fixed 3.6000% annual	(7.0)
GR0116002875	171,428,571	57.10	13-Sep-16	Fixed	EUR	Fixed 4.0195% annual	(1.6)
GR0326038214	383,740,000	43.09	27-Dec-16	Fixed	EUR	Fixed 0.0000% irregular	1.5
GR0118014621	342,857,156	55.72	01-Mar-17	Fixed	EUR	Fixed 4.2250% annual	0.2
GR0528002315	4,985,000,000	50.80	04-Apr-17	Floating	EUR	Floating semi-annual	(0.9)
GR0118012609	5,000,000,000	58.81	20-Apr-17	Fixed	EUR	Fixed 5.9000% annual	9.4
GR0124029639	11,440,000,000	57.23	20-Jul-17	Fixed	EUR	Fixed 4.3000% annual	(3.5)
GR0118013615	249,999,999	54.80	09-Oct-17	Fixed	EUR	Fixed 4.6750% annual	2.3
GR0120003141	444,000,000	52.66	03-Apr-18	Fixed	EUR	Fixed 4.5900% annual	3.0
GR0124030645	7,732,000,000	57.02	20-Jul-18	Fixed	EUR	Fixed 4.6000% annual	(3.8)
GR0122002737	112,000,000	52.04	27-Feb-19	Fixed	EUR	Fixed 5.0140% annual	4.4
GR0122003743	425,000,000	55.67	04-Mar-19	Fixed	EUR	Fixed 5.9590% annual	8.4
GR0124031650	15,500,000,000	55.96	19-Jul-19	Fixed	EUR	Fixed 6.0000% annual	6.0
GR0120002135	350,000,000	51.70	17-Sep-19	Fixed	EUR	Fixed 5.1610% annual	4.2
GR0133001140	8,192,000,000	57.40	22-Oct-19	Fixed	EUR	Fixed 6.5000% annual	8.8
GR0124032666	5,000,000,000	56.95	19-Jun-20	Fixed	EUR	Fixed 6.2500% annual	4.4
GR0133002155	8,929,864,000	54.66	22-Oct-22	Fixed	EUR	Fixed 5.9000% annual	1.0
GR0133003161	10,462,000,000	51.03	20-Mar-24	Fixed	EUR	Fixed 4.7000% annual	(7.7)
GR0133004177	7,000,000,000	50.78	20-Mar-26	Fixed	EUR	Fixed 5.3000% annual	(4.2)
GR0138001673	9,000,000,000	48.20	20-Sep-37	Fixed	EUR	Fixed 4.5000% annual	(19.7)
GR0138002689	7,920,000,000	48.22	20-Sep-40	Fixed	EUR	Fixed 4.6000% annual	(19.8)

Source: Credit Suisse

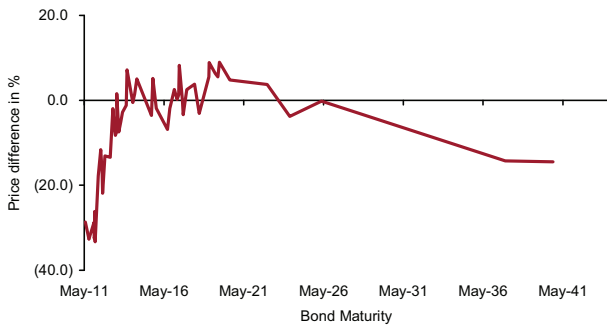
First of all it seems rather obvious, but also worth mentioning, that bonds that are excluded from a restructuring exercise would benefit under these scenarios. In other words, it makes sense to free-load in a NPV-reducing restructuring wherever possible.

As shown in Exhibit 19, we find that the belly of the curve looks most attractive on a relative basis, starting with the May 2013 bonds and ending with the June 2020 bonds. We find this makes sense as it indicates the market is already pricing in a higher probability for some sort of credit event after the ESM kicks-in in July 2013. Bonds with maturities longer than this date should therefore look cheap in comparison to shorter-maturity bonds. Furthermore, since the cash and CDS markets are pricing in a high probability of a credit event, it should not come as a surprise that the market is already looking for the cheapest-to-deliver bond in case a CDS event is triggered. Since the cheapest deliverable bonds are likely to be long dated, it should be expected that the market is already pricing these at a premium, making the long end of the curve less attractive as illustrated in our analysis.

In Exhibits 20 to 22, we illustrate what the curve would look like in each of the discussed scenarios.

**Exhibit 20: Change in bond prices under base scenario**

Notional reduced by 20%, coupon reduced by 2.5%, 5yr maturity extension



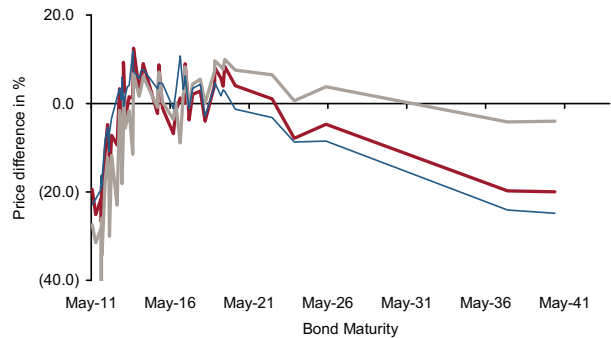
Source: Credit Suisse

**Exhibit 21: Change in Bond Prices Under Intermediate Restructuring Scenarios**

Red line: coupon reduced by 2.5%, 5yr maturity extension, 240bp risk premium

Blue line: Notional reduced by 20%, coupon reduced by 2.5%, 250bp risk premium

Grey line: Notional reduced by 20%, 5yr extension, 275bp risk premium



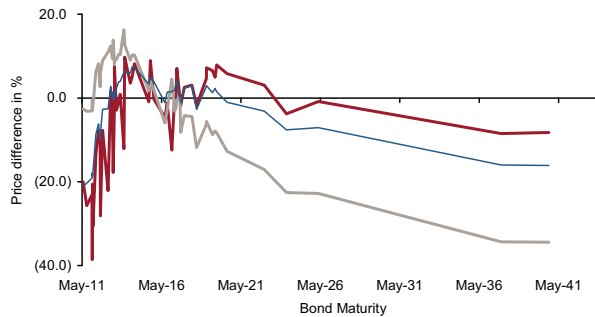
Source: Credit Suisse

**Exhibit 22: Change in Bond Prices Under Insufficient Restructuring Scenarios**

Red line: 5yr maturity extension, 600bp risk premium

Grey line: coupon reduced by 2.5%, 900bp risk premium

Blue line: Notional reduced by 20%, 600bp risk premium



Source: Credit Suisse

## The quant perspective: Greek CDS after a restructuring

Having evaluated the implications of various restructuring scenarios on debt sustainability, we now lever our credit-equity model, CUSP®, to estimate where Greek CDS should trade following the restructuring.

### CUSP Methodology

CUSP is Credit Suisse's forward-looking model for credit spread risk. It uses current market data within a proprietary framework to derive measures of single-name spread risk. In [Trading with CUSP®, 16 April 2010](#), we fully backtest the model for US and European corporates, demonstrating its value as a powerful tool to select longs and shorts in the corporate credit space.

The model's application can be extended to the sovereign space as we describe in [Quantitative Credit Strategist: CUSP on Sovereigns, 19 February 2010](#) and [Quantitative Credit Strategist: CUSP on Sovereigns II, 07 May 2010](#). As illustrated in [European Credit Views: Greece, 26 April 2010](#) CUSP highlighted that CDS spreads should be structurally wider after last year's bailout due to the implicit subordination of existing public debt after the initial relief rally.

As detailed in these publications, the main input parameters to calibrate CUSP are the leverage and the CDS curve. The former we approximate for sovereigns via the current public debt-to-GDP ratio, the latter is traded in the market.

Being a structural or Merton type model, CUSP expresses the riskiness of an issuer via its asset volatility and skew. These in turn describe the width and skew of the forward looking asset value distribution of the respective obligor. The higher these parameters are, the higher the chance of a default. The current CDS and leverage numbers for Greece imply huge asset volatility and skew levels. When calibrating Portugal and Spain, these parameters are lower, respectively, expressing current market views of lower credit risk.

### Implications for the Greek CDS curve

We start by calibrating the model to the current debt-to-GDP ratio (140%) and the current CDS curve (1489bp and 1276bp for the 5- and 10-year CDS).

We then simulate how a debt restructuring including a principal writedown would impact the CDS post restructuring. We analyse this impact under three scenarios.

1. The debt is haircut, however there are no changes to coupon or maturity that would reduce the immediate funding risk. This is modeled in CUSP via an unchanged asset volatility and skew.
2. In addition to the haircut, there are coupon reductions and maturity extensions that marginally improve the funding profile to a level similar to Portugal. We model this via an asset volatility and skew that are the same as those for Portugal.
3. In addition to the haircut, there are significant other measures including coupon reductions and maturity extensions that significantly improve the liquidity profile to a level similar to Spain. We model this via an asset volatility and skew that are the same as those for Spain.

Exhibits 23 to 25 show what the CDS curves would look like after each of these scenarios.

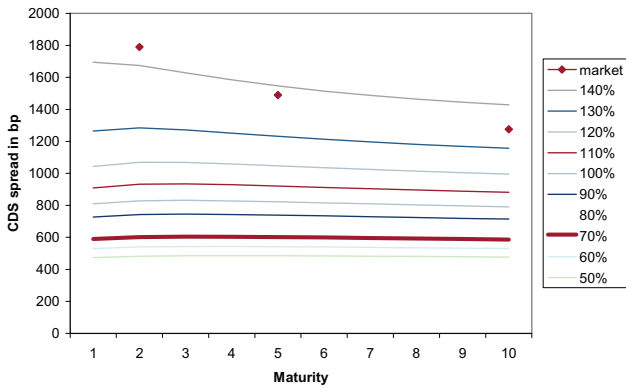
Clearly, the higher the haircut, the lower the leverage after a restructuring and the tighter the CDS curve will be. For example for a 50% haircut, the leverage ratio will come down to 70%, on par with other European nations, with a resulting CDS curve that is anchored around the 600bp level for 5-year CDS.

The same debt reduction in scenario 2 leads to a CDS curve that is steeper and tighter than in scenario 1, with 5-year CDS trading at 445bp.

The final scenario would be the most beneficial from a Greek perspective, with the CDS curve again steeper and tighter and a 5-year CDS level of 313bp.

**Exhibit 23: Scenario 1: debt load reduction, unchanged funding profile**

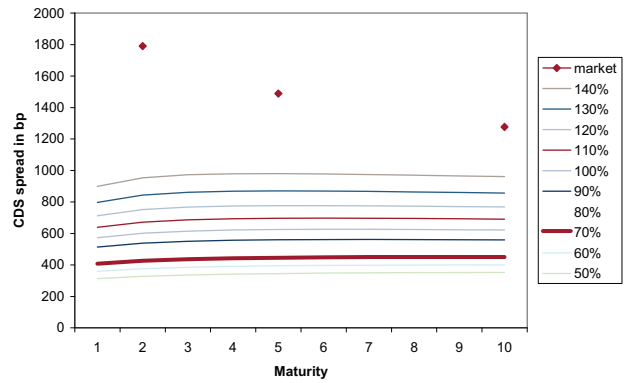
Greek CDS curve after a potential restructuring; curves for a given end level of debt/GDP



Source: Credit Suisse

**Exhibit 24: Scenario 2: debt load reduction, slightly improved funding profile**

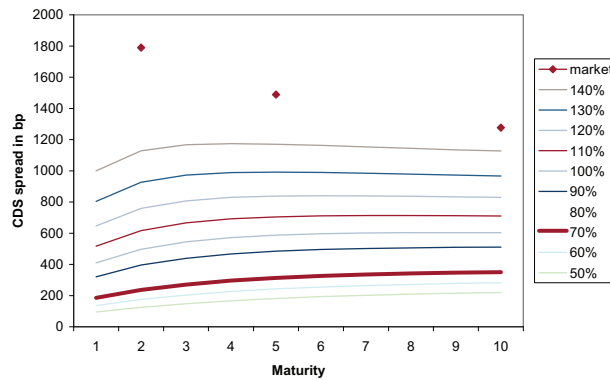
Greek CDS curve after a potential restructuring; curves for a given end level of debt/GDP



Source: Credit Suisse

**Exhibit 25: Scenario 3: debt load reduction, significantly improved funding profile**

Greek CDS curve after a potential restructuring; curves for a given end level of debt/GDP



Source: Credit Suisse

## Cash market implications

We have outlined the potential scenarios for Greece and in this section we focus on the implications for the cash market. In particular we focus on the cash market beyond Greece. We have, in our research talked about three main groupings within the European cash market and we use these three groups – the triple As, the non-triple As and the triple Bs as a framework for our analysis.

### No immediate restructuring and loans extended

This scenario is based on the assumption that the EU and the IMF extend loans to cover Greece's funding gap in 2012. We expect confirmation on this in the coming weeks. By extending the loans to Greece, Europe would be sending the market a strong message that it is willing to pay up to support the union.

#### Curve steepening in Ireland and Portugal

The continued support for Greece should be positive for the very front end of the yield curves in Greece Ireland and Portugal. By increasing loans, reducing the interest rate or extending the maturity of the loans Europe would be allowing these countries time to get their books in order. Given the severity of the fiscal adjustment required it is not unreasonable to think the plans for all three countries will take time. One might argue that the Q1 GDP number of 0.8% for Greece validates this assumption. However, additional support at this junction does not remove the need for further support or restructuring further down the line. We believe it will take a lot to convince the market that the debt burden of all three countries is sustainable. Therefore we expect yields to remain at distressed levels but we would expect the front end of the curve to outperform so the curve could steepen.

### Exhibit 26: Ireland Portugal 1s5s Curves

Irish 3.9 Mar 2012 v Irish 4.6% Apr 2016 PGB 5% Jun 2012 vs. PGB 4.2% Oct 2016



Source: Credit Suisse Locus

#### Upward pressure on core country yields

The core market has rallied over the past month. Ten-year Bund yields are around 35bp lower. However, we don't attribute the rally in the bond market as entirely a flight to quality move. Rather we believe the market has rallied on a fall in commodity markets and a lowering of inflation expectations. Hence we would not expect an immediate reversal in the rally. Further funds for Greece does however imply an increase in the fiscal transfers from core to periphery. If bilateral loans were increased this may mean an increase in supply. Overall this should put an upward pressure on yields.



**Positive for Spain and keeps 10-year yields below 5.5%**

We believe the contagion risk from the triple Bs to the non-triple As has fallen. We think that additional support for Greece would be positive for countries like Italy and Spain as it removes uncertainty, but we don't see it driving spreads significantly tighter. The Spain Italy spread has remained in a 25-100bp range since Greece was first bailed out. We think the spread remains in that range. A strong show of support for the European project is however more positive for Spain and keeps the 10-year yield below 5.5% in our view.

### Voluntary Restructuring

The impact of a voluntary restructuring is very difficult to assess given the various types of restructuring.

**A restructuring needs to convince the market the debt will be sustainable**

As we have said throughout the piece the aim of a restructuring is to change the debt profile so that the market believes it is sustainable. We think the immediate risk with a light voluntary restructuring is that it doesn't convince the market that the problem of Greece has been resolved. This means that the probability of a future hard restructuring or loss for private creditors (under the ESM programme for example) would remain priced into the market. However, we do not believe that a voluntary restructuring would increase systemic risks and therefore the impact is contained within the triple Bs.

We don't believe that the non-triple As would escape completely though. If a restructuring happens in the case of Greece it means it is also possible in other countries. We think Spain would underperform Italy in this case.

**The higher the cost of a structuring to private sector creditors the greater the systemic risk**

The greater the impact of a voluntary restructuring the more likely it is to have systemic risk implications, particularly if it were coercive. We believe that a principal writedown needs to be part of the solution for Greece. This is likely to put more pressure on German yields than on Spain or Italy due to the exposure of the Germany banking system to Greece, and more importantly Ireland.

### Hard Restructuring

We think a hard restructuring would be negative for the core countries, in particular Germany. The timing of a hard restructuring is relevant but in general would imply private sector losses. We think the market would also perceive of a risk to a similar event in Ireland and Portugal. As the German banks are highly exposed to Irish debt there may be a need for the German government to step in and provide a programme to recapitalize the banks.

**Negative for Germany, Spain to underperform Italy**

Countries like Italy and Spain have limited exposure to the periphery through their banks so private credit losses on Greek debt would be more manageable. However, give this would be a risk-off event we would expect Spain to underperform Italy.

### Exhibit 27: Cash Market Impact Summary

	Systemic Risk Event	Triple AAA			Non-Triple AAA			Triple Bs	
		Germany	France	Netherlands Austria Finland	Spain	Italy	Belgium	Ireland	Portugal
Increase Loans to Greece	No	Upward pressure on yields			Positive for Spain, Spain Italy to tighten but remain in current range			Steeper Curve	
Voluntary Restructuring	Yes with imposed losses	Germany to underperform rest of core if losses imposed			Spreads remain elevated			Further inversion curve	
Hard Restructuring	Yes	Germany to underperform rest of core			Spain to underperform Italy			Further inversion curve	

Source: Credit Suisse

## CDS market implications

As we outlined in Exhibits 1 and 2, the Greek CDS spread is now near its all-time highs and is currently pricing in a 50% risk-neutral probability of default over the next two years. In this section, we provide basic background on the Greek Sovereign CDS contract, illustrating the volumes and notional involved. We then consider in detail the implications the various restructuring scenarios have for CDS – notably whether or not it would trigger. For the sake of this section and the Appendix only, we capitalize terms that have strict ISDA definitions. The main distinction being between a restructuring (as discussed throughout this publication) and a Restructuring (a CDS Credit Event).

For further details on Credit Events, auctions and Sovereign CDS generally we refer the reader to our publications [A guide to Credit Events and Auctions, 12 January 2011](#) and [Sovereign CDS Primer, 12 February 2010](#).

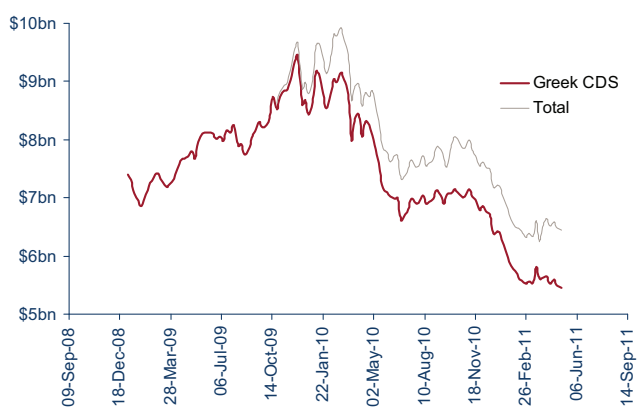
N.B. The views expressed here are not based on legal opinion. They cannot and should not replace the full 2003 ISDA Credit Derivatives Definitions and supplements to which the reader is referred. Readers should be further aware that settlement details may differ for non-standard trades and are advised to seek legal advice for further clarification of the documents or for implications regarding their positions.

### Background on the Hellenic Republic CDS

Standard Greek CDS contracts (Reference Entity: the Hellenic Republic) follow Standard Western European CDS conventions which mean they trade with what is known as full Restructuring. This means that bonds with maturity of up to 30 years are Deliverable into Greek CDS contracts in all types of Credit Event, including a Restructuring. There is not the maturity bucketing on Restructuring seen in the case of European corporate CDS.

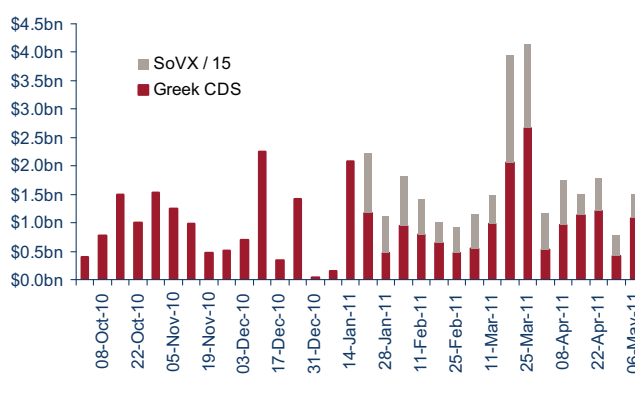
Contracts trade in both USD and EUR, with the former the most liquid. The difference in spread between the two, referred to as the quanto, has typically traded in the region of 20-60bp. It is driven by market perceptions of the likely dependency between a Greek CDS event and euro weakness.

**Exhibit 28: Net notional outstanding has declined**



Source: Credit Suisse, DTCC

**Exhibit 29: Weekly CDS volumes are healthy**



Note: SovX volume data is only available from 21 January 2011.  
Source: Credit Suisse, DTCC

Greece is one of the 15 constituents of the iTraxx SovX index, an equally weighted sovereign CDS index that began trading in September 2009. Any credit event on Greece would therefore also impact the SovX. Investors tend to either trade the CDS contract outright, as part of or relative to the index, or as part of a basis package in which the investor buys an underlying bond and buys CDS protection.

Exhibits 28 and 29 show the evolution of net notional outstanding on Greece and weekly volumes traded. We illustrate both those for Greece alone and adjusted for the Greek proportion of SovX. It is clear that investors have been closing their Greek positions over the past year, offset to some extent by index positions. There is currently \$5.5 billion net notional outstanding on Greece, and a further \$1 billion from the Greek component of the SovX indices. The net notional is the relevant notional for considering how much would change hands if a Credit Event occurred – the netted payment would be  $(1-\text{recovery}) \times \text{net notional outstanding}$ . Current net notional outstanding represents just 1.9% of cash bonds outstanding. Gross notional outstanding is \$78 billion, or 26% of bonds outstanding. This is the total outstanding in the market before offsetting positions are netted, and is less relevant as a measure.

## Types of Credit Event

There are three types of Credit Event for Sovereign CDS: Failure-to-Pay, Repudiation/Moratorium and Restructuring. The first two are what are referred to as “hard” Credit Events: if they occur, all CDS contracts are triggered and settle through an auction process. A Restructuring is what is referred to as a “soft” Credit Event: if a Restructuring Credit Event occurs, both the protection buyer and protection seller have the right to trigger the CDS contract within a predefined window. If neither does so, the CDS continues until maturity or a future Credit Event.

Detailed definitions of each type of Credit Event are in the Appendix. In brief:

- **Failure-to-Pay:** a coupon or principal payment is not made when due. We view this as highly unlikely in the case of Greece since the ramifications would be too great.
- **Repudiation/Moratorium:** Greece says it isn't honouring its debt for one reason or another. Again, we view this as unlikely but slightly more plausible than a Failure-to-Pay.
- **Restructuring:** Greece restructures one or more of its Obligations in a way that is binding on all holders and detrimental to their value. We view this as the most likely Credit Event of the three.

To assess whether or not Greek CDS is likely to trigger, and its value if it does so, we believe the key is to understand Sovereign Restructuring Credit Events. Particularly the distinction between a restructuring and a Restructuring.

## How to identify a Restructuring Credit Event

While there is no substitute for a full understanding of the ISDA CDS Definitions, the following are the most pertinent points related to Restructuring Credit Events for Sovereigns:

- There must be a reduction in principal or coupon, a change in maturity, a change in the currency of payments or a Subordination.
- This must be done in way that is **binding on all holders** – there is no element of choice. This can occur in two ways:
  - Through agreement with sufficient bondholders to bind remaining bondholders.
  - Decreed by the Government.
- Subordination is legal subordination to another Obligation in terms of its priority ranking in the payment structure on default. Pure structural subordination does not count.
- The existence of preferred creditors arising by operation of law is treated as Subordination for Sovereigns.

- The change in payment currency must be to a non-G7 or non-AAA rated OECD currency.
- The restructured Obligation must be held by more than three holders, and if a loan, more than two thirds of holders must be required to consent to the event (Multiple Holder Obligation).
- If an event is not a Credit Event as a result of a change in the law or if there is a defence to it based on an applicable law, it is still a Credit Event (Section 4.1 of the Definitions).
- The assessment of whether or not an Obligation is Deliverable into the CDS contract is done based on its characteristics immediately before the Restructuring Credit Event.
- Deliverable Obligations can have any maturity up to 30 years, must be denominated in EUR, USD, GBP, JPY, CHF or CAD and their principal payment must not be contingent.
- An ISDA Determinations Committee (DC) decides, based on a set of rules, whether or not a Credit Event has occurred and if so, which Obligations are Deliverable
- CDS contracts are settled through a predefined auction process. They can be cash settled or physically settled by delivery/receipt of an appropriate Obligation.

## To trigger or not to trigger

With reference to the above, we now discuss the CDS implications for the various options facing Greece. Whether or not Greek CDS contracts are triggered depends very much on the route taken through Exhibit 16.

### **The provision of support by the IMF/EU does not (to date) trigger CDS**

To the best of our knowledge, the provision of IMF support to a country has never triggered CDS contracts. The question was raised for the first time to the DC in the case of Ireland in March 2011. Based on the information given, the DC ruled in this case that it was not a Restructuring Credit Event, an outcome we support as outlined in [European Credit Flash: No Irish Restructuring Credit Event, 16 March 2011](#). IMF support is intended to help a country and should be beneficial for creditors, at least in the short run. We do not believe, therefore, that it makes sense for it to trigger CDS contracts.

That said, by the letter of the ISDA CDS Definitions, since the existence of preferred creditors (the IMF is a preferred creditor) by operation of law can constitute Subordination, there is the potential for such support to trigger CDS in certain scenarios. The question is whether the IMF's preferred creditor status is just understood as such or enshrined in law. We believe the former, indicating that IMF loans are unlikely to trigger CDS.

Since the EU support doesn't have explicit preferred creditor status, there is no clear Subordination and therefore no potential Credit Event.

### **A change in the terms of IMF/EU support does not trigger CDS**

Since the support is by way of bilateral loans with the IMF and euro area sovereigns, any renegotiation of the terms between Greece and the lender should not constitute a CDS event since the loans fail the Multiple Holder Obligation characteristic.

### **Accessing the ESM could trigger CDS**

The European Stability Mechanism (ESM), like the IMF, has explicit preferred creditor status. The [press release](#) states: "In order to protect taxpayers' money, and to send a clear signal to private creditors that their claims are subordinated to those of the official sector, an ESM loan will enjoy preferred creditor status, junior only to the IMF loan". Since a Restructuring Credit Event can be triggered by "a change in priority ranking of any Obligation causing Subordination to another Obligation", this begs the question: can the preferred creditor status of the ESM trigger sovereign CDS?

Exactly as in the case of the IMF, this boils down to whether the ESM's preferred creditor status is generally understood to be such, or whether it is enshrined in law. The former is very unlikely to result in the CDS triggering, whereas the latter would make it hard for it not to. To date there is no clarity in the case of the ESM, and it would seem at least possible (if not probable) that the status would be very similar to that of the IMF.

If Greece accesses the ESM in mid-2013, in our opinion the implications for CDS depend on whether Greece's debt load is viewed as sustainable or not at that point. If it is, there is no clear reason for CDS to trigger unless the ESM's preferred creditor status is enshrined in law. If it is not deemed sustainable, the ESM term-sheet makes it very clear that the provision of support in this case would require private sector involvement. Again, it would depend on how this is done, but if done in a way that is binding on all holders of one or more bonds, this would trigger a Restructuring Credit Event. Since there would seem to be little rationale for making the private creditor involvement voluntary at this stage, we believe it is likely that Greek CDS would trigger at that point.

### **A voluntary restructuring does not trigger CDS unless bondholders are bound by the restructuring in some way.**

A voluntary debt restructuring would not count as a Restructuring unless

1. The change in terms of restructured Obligations involves a change in the maturity, coupon, principal, currency or seniority as specified in the definition of a Restructuring.
2. In the process all holders of one or more restructured Obligations are bound by the restructuring.

The main way this could happen is if the terms of the restructured Obligation contained a Collective Action Clause (CAC). CACs exist to allow a specified supermajority (usually 75%) of bondholders to agree to a change in key details of the Obligation (maturity date, coupon rate, principal haircut) in such a way as to be binding on all holders. So if more than the threshold vote to extend the maturity date, for example, this change is enforced on all bondholders, which therefore triggers CDS contracts.

Whether or not a coercive voluntary restructuring triggers CDS would depend on the nature of the coercion and the DC's interpretation of events. If the nature of the coercion satisfies the definition of a Restructuring Credit Event and becomes binding in some way, it triggers the CDS. Anglo Irish provides an interesting example. As described in the Appendix, bondholders were given the opportunity to participate in a voluntary debt exchange (no Credit Event) but in doing so, voted to make the debt callable by Anglo Irish for close to zero. Since more than 75% of bondholders participated in the exchange, the change in terms of the existing debt became binding on all holders, which triggered the CDS.

If the nature of the coercion is onerous enough that the restructuring is to all intents and purposes binding, it is possible that the DC takes a broader view and rules it as such. This would clearly have the potential to be highly controversial.

### **Debt exchanges do not satisfy the terms of a Restructuring Credit Event**

Since debt exchanges involve no change in the terms of existing debt, they are not specifically covered by the definition of a Restructuring. Unless they are combined with another action that does satisfy the requirements of a Restructuring (such as seen in the case of Anglo Irish), they should therefore not trigger CDS.

While we agree with this interpretation for voluntary debt exchanges, we believe the situation is less clear cut if the debt exchange is essentially mandatory and involves an exchange into debt that is clearly less attractive to the bondholder. Two possible ways this could occur would be:

- Through a CAC that stipulates that a debt exchange becomes binding on all holders once a certain threshold (usually 75%) of bondholders have agreed. CACs with this type of provision were recommended in the 2002 report of the G10 working group on contractual clauses, however we are not aware of their existence in existing international law Greek bonds and they would obviously need to be introduced into domestic law bonds if they were to be used in this manner.
- Through a change in Greek law mandating the exchange of existing domestic law obligations.

In both cases, since the ultimate result is identical to a binding restructuring, it may be that the DC take a broader view and rule that it constitutes a Restructuring Credit Event. We also believe that there are reasonable grounds to argue that a mandatory exchange would constitute a Repudiation/Moratorium Credit Event.

If the Greek government were to enact a law exchanging one or more domestic law Obligations into one or more new, less attractive, Obligations, then it could be argued that they would effectively be repudiating the existing bonds, which by Section 4.1 of the ISDA Definitions should classify as a Potential Repudiation/Moratorium Credit Event. If there were then to be a Failure-to-Pay of an originally-due coupon or interest payment on the original bonds, or if there were to be a further Restructuring of them, this could therefore constitute a Repudiation/Moratorium Credit Event.

### **A hard private-creditor restructuring should trigger CDS**

A hard restructuring as we've defined it involves the forced participation of private creditors in a debt restructuring. Since by its nature, this must be done in a way that is binding on all holders of one or more Obligation, it should therefore trigger CDS contracts. In particular, if the bondholder has no choice, the scenarios we discussed above would trigger CDS:

- A coupon reduction
- A maturity extension
- A principal haircut

Bondholders are likely to be bound in one of two ways – by a change in Greek law or by the existence of a CAC. The former is only possible for domestic law debt, and the most likely way that a hard restructuring would be implemented would be for the Greek government to introduce a law changing the characteristics of domestic debt, or the rights of domestic law bondholders.

The government has no jurisdiction over the €18 billion of international law bonds, the majority of which fall under English law. Since many of these bonds contain CACs, the most likely way one of these bonds would trigger the CDS would be for the required super-majority of holders of one or more of the bonds to agree to a restructuring, binding remaining holders by the terms of the CAC.

Another possibility that has been discussed in the literature would be for Greece to create a law introducing CACs into domestic law debt. In itself, this action should not trigger CDS contracts since it doesn't fulfill any of the requirements for a Restructuring set out above. A subsequent (coerced) voluntary restructuring would then be much more likely to trigger CDS due to the presence of the CAC.

### **Leaving the euro in and of itself would not trigger CDS**

If a country decides to leave the euro, in and of itself, this would not trigger a Credit Event on the sovereign CDS since none of the conditions necessary for a Failure-to-Pay, Repudiation/Moratorium or Restructuring would have occurred. In our opinion, this is not the right question to be asking. Leaving the euro is not a viable or attractive option for either Europe as a whole or the leaving country in our opinion, as outlined in our publication [\*Leaving EMU' is just an expensive way to default.\*](#)



If, however, for the sake of argument, Greece were to redenominate its debt, a change in principal or interest payments to a currency that is not that of a G7 or AAA-rated OECD country has the potential to trigger a Restructuring Credit Event. In particular, redenominating payments to a new drachma would be a CDS trigger. Greece would not, however, be able to change the currency of its international law bonds.

Assuming that a redenomination did occur, triggering a Restructuring Credit Event, there is then a question of what is deliverable. As explained earlier, since the characteristics of the debt prior to the Restructuring are what count for sovereigns, anything that was deliverable prior to the Restructuring Date would be deliverable, even if now denominated in something other than EUR, USD, GBP, JPY, CHF or CAD.

## The implications for CDS

The Greek sovereign CDS market has, to a large extent, been driven by the activity of basis players, particularly since it began trading at elevated levels. This means that many of the cash market implications outlined above translate more or less directly into the CDS space.

There is, however, one important difference between the two markets: There is little political support for sovereign CDS in Europe. With the continued discussion around a potential ban of so called naked short positions in sovereign CDS, the market is pricing the possibility that a Greek Credit Event happens without the CDS contract triggering. This is particularly evident in the shape of the CDS curve: we believe that any non-sovereign issuer trading at Greece's CDS levels would have a much more inverted CDS curve.

While we find it hard to imagine a long-term solution that puts Greece's debt load on a sustainable footing without triggering CDS, the political environment should not be underestimated and it is easy to envisage voluntary solutions that do not result in the CDS triggering. This combination makes it challenging to assess the real probability and timing of a Credit Event and hence the structuring of CDS curve trades.

Furthermore, with spreads near record wide levels we see little value in buying protection outright on Greece. A short position in iTraxx SovX would additionally benefit from any potential contagion to Ireland and Portugal, but is also fairly expensive at the current level of 177.5bp.

We find that short positions in iTraxx Financial Senior (1) are less politically exposed, (2) are a lot cheaper to buy following the recent rally from 210bp to currently 136bp and (3) would effectively hedge against a contagion driven systemic widening.

## Systemic Risk Hedges

One of the concerns one might have under some of the scenarios discussed above is that systemic risk could flare up again.

Various measures of systemic risk have significantly eased since the height of the financial crisis, expressing a market consensus that the probability and/or severity of a catastrophic domino or snowball effect is a lot lower than previously.

While a return to markets primarily driven by systemic concerns as experienced during the recent crisis (risk-on risk-off trades) is far from being our central scenario, we think it's worth keeping in mind what we have learned from the crisis and how markets would react in such a case. The goal of such an analysis is to identify cheap hedges against a severe blow to the system.

A credible solution to the Greek sovereign crisis, be it in the form of a restructuring or any form of putting Greece onto a sustainable debt path would even be a strong "long risk" signal in our opinion. Under this or other scenarios, the key to systemic risk clearly is the existence or non-existence of a contagion effect to other sovereigns and potentially worse, into the financial sector. Areas that seem particularly exposed to such contagion are the Irish sovereign, its banks and as a result the German banking sector, since this is heavily exposed to the latter. A lot will therefore depend on whether the Greek "solution" will be allowed by the "Troika" (ECB, EC, IMF) to be followed by other European countries and to a lesser extent if these intend to follow. Such a move could have substantial implications for the domestic financial sector and could therefore transmit into other European banks thanks to Europe's great interconnectivity.

We list below the ten factors we think are the best hedges against systemic risk. We intentionally venture out into other asset classes and particularly currencies as we consider these highly relevant. The intention is to summarise systemic hedges beyond asset class boundaries.

### What history tells us

As we can see in the below Exhibits 31 - 34, several risk measures have reacted with varying magnitude, but often simultaneously to a heightened sense of stress in financial markets – regardless of asset class. The key point is, the more systemic a threat was deemed – be it the advent of the financial crisis as seen by the subprime mortgage demise in the middle of 2007, the collapse of Lehman at the end of 2008 or the European sovereign crisis starting with Greece in May 2010 and its spillover into Ireland and Portugal recently – the more reactive the measures listed in Exhibit 30 have been.

#### Exhibit 30: Systemic risk measures

1	Libor-OIS spread
2	EUR basis swap
3	EUR/USD: 3 month ATM implied volatility
4	10y swaps: 3 month ATM implied volatility
5	EUR/USD: 3 month Risk Reversal
6	EUR/USD
7	iTraxx Financial Senior
8	iTraxx Europe
9	iTraxx Europe: 3 month ATM implied volatility
10	iTraxx Europe: Senior tranche correlation (12%-22%)

Source: Credit Suisse

We find that there are currently several disadvantages with currency plays. First, the openly differing monetary stances of the ECB and the FED would suggest a "negative drift" of any short EUR currency plays. Second, some of these measures, for example the implied ATM volatility and the 25 delta three-month Risk Reversal stand at elevated levels. Nevertheless, the latter two are still substantially far away from "full blown crisis" mode and the EUR itself is not too far off its highs of the summer of 2008. We hence find the entry levels in comparison to some of the other risk measures not particularly enticing. The most interesting purely from an entry point of view seems to be the basis swap.



The interest rate complex seems to offer better opportunities. The three-month Libor-OIS spread is far from its crisis peak and the three-month ATM implied volatility of the ten-year swaps also seems relatively low. It therefore seems relatively attractive to buy interest rate volatility via straddles or strangles.

In the credit space we have keenly observed how the iTraxx Main index recently has decoupled to some extent from the more crisis driven iTraxx Financial Senior and SovX. Nevertheless, the fact that (1) iTraxx Main is the most liquid instrument in the credit derivatives market, (2) it is cheaper to hedge with than iTraxx Financial Senior and SovX and (3) it contains iTraxx Financial Senior as a sub-index will ensure that a “return to crisis” mode will leave iTraxx Main very exposed.

While it seems attractive to buy protection on Financial Senior or Main, there are levered solutions that are a more cost efficient way to short the iTraxx Main index. One of these is via OTM payer swaptions, which seem cheap at current low implied volatility levels. They can also be financed by selling receiver swaptions on the same index.

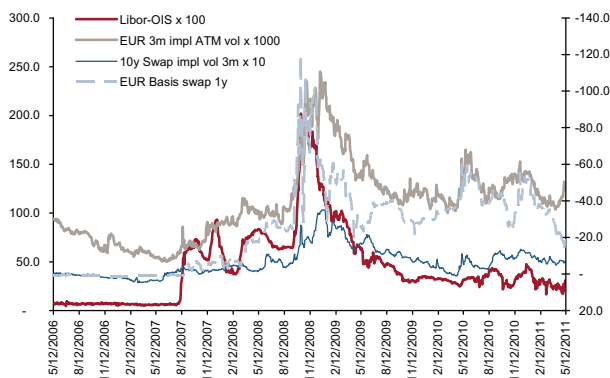
One of the drawbacks of any options strategy is that the desired event does not happen in time and that the option expires worthless. This can be elegantly circumvented by buying protection on senior tranches of the iTraxx index. The recent roll to series 15 of iTraxx Main has also seen the “resurrection” of the tranche market, as it also rolled to this new index in contrast to the previous rolls, in which the tranches did not participate.

An additional advantage of option and tranche strategies is their positive convexity, which allows them to outperform the underlying index in a stress scenario. For options this is further enhanced by the positive correlation between the implied volatility and the level of the underlying index, similar to the tendency of the tranche implied correlation to increase in wider spread markets. A comparison by cost, hedging efficiency and liquidity between iTraxx indices, swaptions and tranches can be found in the last chapter of [European Credit Views: Analysing and hedging the market impact of Solvency, 17 December 2010](#).

Probably the most direct way of hedging against systemic risks in the euro area is to short European banks. While shorts on peripheral European banks will be expensive, shorts in heavily exposed German banks might be more efficient.

**Exhibit 31: Money market spreads, currency , interest rate and basis swaps**

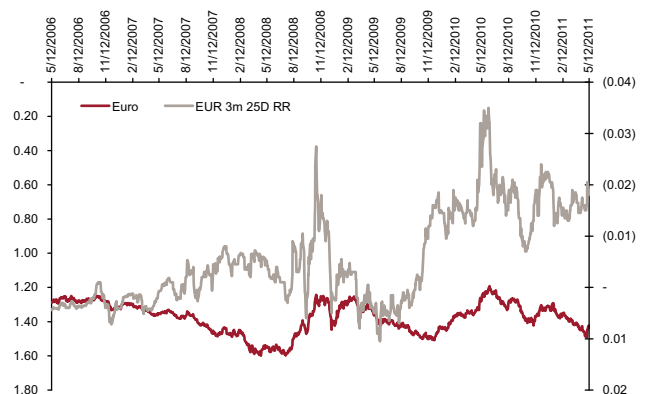
Right hand side is inverted. To fit all into one chart some measures are multiplied by factors 10,100 and 1000.



Source: Credit Suisse

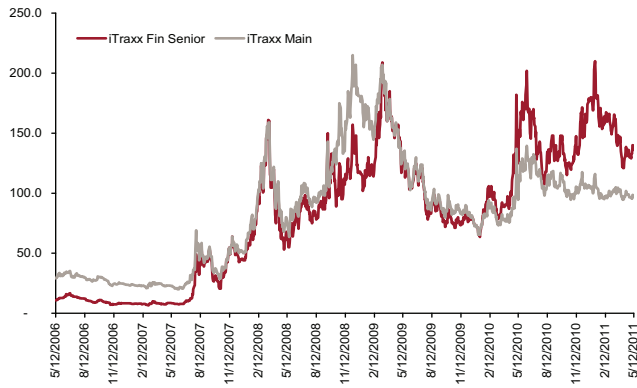
**Exhibit 32: Currency spot rate and risk reversal**

Both scales are inverted.



Source: Credit Suisse

**Exhibit 33: iTraxx Main and Financial Senior OTR**



Source: Credit Suisse

**Exhibit 34: iTraxx Europe implied volatility and correlation**

The implied correlation of the 12-22% tranche on the most liquidly traded underlying index iTraxx Europe series 9 only exists since March 2008, the inception of the index.



Source: Credit Suisse

## Appendix: Credit Events

For standard Western European Sovereigns, there are three types of Credit Event:

1. Repudiation/Moratorium
2. Failure-to-Pay
3. Restructuring

For a detailed summary of Sovereign CDS, the reader is referred to our [Sovereign CDS Primer](#).

### Hard vs. soft Credit Events

Failure-to-Pay and Repudiation/Moratorium are hard Credit Events: once they have been determined to have occurred, all outstanding CDS contracts on the entity are automatically triggered, with settlement between the protection buyer and seller.

Restructuring differs in that there is no automatic trigger of the CDS contract once a Restructuring occurs. It is up to the protection buyer or protection seller to decide whether or not to trigger (with only one required to trigger for the contract to be triggered). If neither party triggers by a specified deadline, the CDS continues until maturity or a future Credit Event.

### Failure-to-Pay

This event is exactly as it says: if a Reference Entity fails to make a payment when and where due on one or more of its Obligations in an amount at least as large as the *Payment Requirement* (usually \$1 million equivalent), then once any applicable grace period has passed, a Failure-to-Pay event occurs.

### Repudiation/Moratorium

1. For an aggregate amount of at least the *Default Requirement* (usually \$10 million equivalent), an authorized officer of the Reference Entity either a) disclaims, repudiates, rejects or challenges the validity of one or more Obligations or b) imposes a moratorium, standstill, roll over or deferral with respect to one or more Obligations.
2. A Failure to Pay (determined without regard to the *Payment Requirement*) or a Restructuring (determined without regard to the *Default Requirement*) occurs with respect to any such Obligation on or prior to the Repudiation/Moratorium Evaluation Date.

The occurrence of 1. is referred to as a Potential Repudiation/Moratorium and if it occurs on or prior to the CDS maturity date, the Repudiation/Moratorium Evaluation Date that determines 2. is effectively the later of:

- The date 60 days following the Potential Repudiation/Moratorium date.
- The first payment date after the Potential Repudiation/Moratorium date of one of the bonds impacted by the Repudiation/Moratorium (if the impacted Obligations include bonds).

If a Potential Repudiation/Moratorium occurs but 2. above does not occur prior to the CDS maturity date, then the CDS maturity can be extended to the Repudiation/Moratorium Evaluation Date by delivery of a Repudiation/Moratorium Extension Notice from one party to the other.

Effectively, what this means is that if a Potential Repudiation/Moratorium occurs in the period covered by the CDS contract, if this subsequently becomes a full Repudiation/Moratorium, it will be covered by the CDS contract even if part 2. above only happened after the CDS had matured.

## Restructuring

To qualify as a Restructuring Credit Event, one of the following must occur in a form that **binds all holders** to one or more Obligations in an amount of at least the *Default Requirement*:

- A reduction, postponement or deferral of Obligation principal or contractually agreed interest payments
- A change in priority ranking causing subordination to another Obligation
- A change in currency or composition of interest or principal payments to any currency which is not a *Permitted Currency*

The event must not have been expressly provided for in the terms of the Obligation and must further:

- Arise directly or indirectly from a deterioration in the creditworthiness or financial condition of the Reference Entity.
- Unless specified otherwise, satisfy the *Multiple Holder Obligation*: the Obligation that triggers the Restructuring Credit Event must be held by more than three holders and at least two thirds of holders must be required to consent to the event. Bonds are deemed to automatically satisfy the two thirds requirement but must be held by more than three holders.
- Not be due to an accounting or tax adjustment incurred in the normal course of business.

*Permitted Currencies* are the legal tender of either any G7 country or any country that is a member of the Organisation for Economic Cooperation and Development (OECD) and has a local currency long-term triple A debt rating by S&P, Moody's or Fitch.

It is a key requirement for a Restructuring that one of the above changes occurs in a form that is binding on all holders. This can arise directly as a result of the restructuring process:

- Through agreement between the Reference Entity or Government Authority and a sufficient number of holders to bind all holders, or
- As the result of an announcement or decree by a Reference Entity or Government Authority.

## Lessons from the Anglo Irish Credit Event, 2010

A Restructuring Credit Event was triggered by the change in the terms and conditions of Anglo Irish's 2017 subordinated notes on 23 November 2010. Bondholders were given the right to exchange their bonds for 20% face value of a one-year government guaranteed floating rate note. By doing so, they agreed to change the terms and conditions of outstanding notes to give the issuer the right to call all outstanding notes for €0.01 for every €1,000 face value. Because the change represented a reduction in the principal and enough bondholders tendered their bonds to make the change in terms and conditions binding on all holders, this triggered the Restructuring Credit Event.

There is an important distinction between the voluntary debt exchange, which would not trigger a Credit Event, and the binding change in the terms and conditions reducing the principal, which did. This is a useful illustration of the type of detail that must be borne in mind when thinking about potential voluntary Greek restructuring scenarios.

## Appendix – BIS data

### Exhibit 35: BIS Data – Foreign Exposure to Greece, Ireland Portugal and Spain by bank nationality

End-Q3 2010 in billions of US dollars

Exposures to	Type of exposure	Bank nationality									
		DE <sup>1</sup>	ES <sup>2</sup>	FR <sup>3</sup>	IT	OEA <sup>2</sup>	GB	JP	US	ROW	Total
Greece	Public sector	26.3	0.6	19.8	2.6	15.7	3.2	0.5	1.8	1.5	72.0
	+ Banks	3.9	0.0	1.4	0.3	1.3	4.3	0.5	0.5	1.3	13.6
	+ Non-bank private	10.1	0.5	42.1	1.9	13.3	7.5	0.9	4.7	4.2	85.0
	+ Unallocated sector	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
	- Foreign claims	40.3	1.1	63.3	4.7	30.4	15.1	1.9	6.9	7.1	170.7
	+ Other exposures <sup>4</sup>	29.2	0.4	28.7	1.7	3.1	5.3	0.1	36.2	2.4	107.2
	- Total exposures	69.4	1.5	92.0	6.5	33.5	20.4	2.0	43.1	9.5	277.9
Ireland	Public sector	3.4	0.3	6.6	0.8	3.7	6.6	1.5	1.5	0.7	25.1
	+ Banks	57.8	3.3	16.8	3.3	7.3	37.4	1.8	17.9	10.6	156.3
	+ Non-bank private	92.8	9.4	21.2	10.9	47.4	116.1	17.7	40.3	25.0	381.0
	+ Unallocated sector	0.0	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.8	1.3
	- Foreign claims	154.1	13.0	44.7	15.3	58.6	160.2	21.0	59.7	37.1	563.7
	+ Other exposures <sup>4</sup>	54.3	4.5	33.4	9.1	8.6	64.4	1.5	54.2	20.2	250.1
	- Total exposures	208.3	17.5	78.1	24.4	67.2	224.6	22.5	113.9	57.3	813.7
Portugal	Public sector	8.4	8.8	16.1	0.9	7.8	2.6	1.3	1.6	1.5	49.0
	+ Banks	18.1	6.1	6.5	2.3	4.6	6.2	0.3	1.4	0.9	46.2
	+ Non-bank private	13.6	70.3	14.8	1.5	7.5	16.5	0.8	1.5	1.8	128.3
	+ Unallocated sector	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	- Foreign claims	40.0	85.2	37.4	4.7	19.8	25.3	2.4	4.5	4.2	223.5
	+ Other exposures <sup>4</sup>	8.5	23.4	8.1	3.2	2.1	8.5	0.4	42.6	1.5	98.3
	- Total exposures	48.5	108.6	45.6	7.9	22.0	33.7	2.8	47.1	5.8	321.8
Spain	Public sector	29.4	.	46.0	3.3	16.9	10.0	9.7	4.7	3.0	123.0
	+ Banks	85.8	.	55.8	9.0	49.1	34.0	4.5	20.6	11.0	269.7
	+ Non-bank private	85.7	.	81.3	16.2	98.5	72.4	10.2	26.3	14.7	405.3
	+ Unallocated sector	0.0	.	0.0	0.2	0.0	0.0	0.0	0.0	0.2	0.4
	- Foreign claims	200.9	.	183.1	28.7	164.6	116.3	24.4	51.6	28.9	798.5
	+ Other exposures <sup>4</sup>	41.4	.	41.6	13.1	15.0	36.1	4.8	136.0	12.4	300.3
	- Total exposures	242.4	.	224.7	41.8	179.6	152.4	29.2	187.5	41.3	1,098.8

DE = Germany; ES = Spain; FR = France; IT = Italy; OEA = other euro area; GB = United Kingdom; JP = Japan; US = United States; ROW = rest of the world.

<sup>1</sup> Claims of German banks on the four countries are on an immediate borrower basis. <sup>2</sup> Exposures of banks headquartered in the respective country are not included, as these are not foreign exposures. <sup>3</sup> Claims of French banks on the four countries are currently under review and are subject to revisions. <sup>4</sup> Positive market value of derivatives contracts, guarantees extended and credit commitments.

Source: BIS consolidated banking statistics (ultimate risk basis).

Table 1

Source: Bank of International Settlements

## Credit Strategy and Quantitative Research

**William Porter, Managing Director**

---

**Group Head**

+44 20 7888 1207

[william.porter@credit-suisse.com](mailto:william.porter@credit-suisse.com)

**Helen Haworth, CFA, Director**

---

+44 20 7888 0757

[helen.haworth@credit-suisse.com](mailto:helen.haworth@credit-suisse.com)

**Christian Schwarz, Vice President**

---

+44 20 7888 3161

[christian.schwarz.2@credit-suisse.com](mailto:christian.schwarz.2@credit-suisse.com)

**Chiraag Somaia, Associate**

---

+44 20 7888 2776

[chiraag.somaia@credit-suisse.com](mailto:chiraag.somaia@credit-suisse.com)

**Joachim Edery, Analyst**

---

+44 20 7888 7382

[joachim.edery@credit-suisse.com](mailto:joachim.edery@credit-suisse.com)

## Disclosure Appendix

---

### Analyst Certification

The analysts identified in this report each certify, with respect to the companies or securities that the individual analyzes, that (1) the views expressed in this report accurately reflect his or her personal views about all of the subject companies and securities and (2) no part of his or her compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this report.

---

### Important Disclosures

Credit Suisse's policy is only to publish investment research that is impartial, independent, clear, fair and not misleading. For more detail, please refer to Credit Suisse's Policies for Managing Conflicts of Interest in connection with Investment Research: [http://www.csfb.com/research-and-analytics/disclaimer/managing\\_conflicts\\_disclaimer.html](http://www.csfb.com/research-and-analytics/disclaimer/managing_conflicts_disclaimer.html)

Credit Suisse's policy is to publish research reports as it deems appropriate, based on developments with the subject issuer, the sector or the market that may have a material impact on the research views or opinions stated herein.

The analyst(s) involved in the preparation of this research report received compensation that is based upon various factors, including Credit Suisse's total revenues, a portion of which are generated by Credit Suisse's Investment Banking and Fixed Income Divisions.

Credit Suisse may trade as principal in the securities or derivatives of the issuers that are the subject of this report.

At any point in time, Credit Suisse is likely to have significant holdings in the securities mentioned in this report.

As at the date of this report, Credit Suisse acts as a market maker or liquidity provider in the debt securities of the subject issuer(s) mentioned in this report.

For important disclosure information on securities recommended in this report, please visit the website at <https://firesearchdisclosure.credit-suisse.com> or call +1-212-538-7625.

For the history of any relative value trade ideas suggested by the Fixed Income research department as well as fundamental recommendations provided by the Emerging Markets Sovereign Strategy Group over the previous 12 months, please view the document at [http://research-and-analytics.csfb.com/docpopup.asp?ctbdocid=330703\\_1\\_en](http://research-and-analytics.csfb.com/docpopup.asp?ctbdocid=330703_1_en). Credit Suisse clients with access to the Locus website may refer to <http://www.credit-suisse.com/locus>.

For the history of recommendations provided by Technical Analysis, please visit the website at <http://www.credit-suisse.com/techanalysis>.

Credit Suisse does not provide any tax advice. Any statement herein regarding any US federal tax is not intended or written to be used, and cannot be used, by any taxpayer for the purposes of avoiding any penalties.

---

### Emerging Markets Bond Recommendation Definitions

**Buy:** Indicates a recommended buy on our expectation that the issue will deliver a return higher than the risk-free rate.

**Sell:** Indicates a recommended sell on our expectation that the issue will deliver a return lower than the risk-free rate.

---

### Corporate Bond Fundamental Recommendation Definitions

**Buy:** Indicates a recommended buy on our expectation that the issue will be a top performer in its sector.

**Outperform:** Indicates an above-average total return performer within its sector. Bonds in this category have stable or improving credit profiles and are undervalued, or they may be weaker credits that, we believe, are cheap relative to the sector and are expected to outperform on a total-return basis. These bonds may possess price risk in a volatile environment.

**Market Perform:** Indicates a bond that is expected to return average performance in its sector.

**Underperform:** Indicates a below-average total-return performer within its sector. Bonds in this category have weak or worsening credit trends, or they may be stable credits that, we believe, are overvalued or rich relative to the sector.

**Sell:** Indicates a recommended sell on the expectation that the issue will be among the poor performers in its sector.

**Restricted:** In certain circumstances, Credit Suisse policy and/or applicable law and regulations preclude certain types of communications, including an investment recommendation, during the course of Credit Suisse's engagement in an investment banking transaction and in certain other circumstances.

**Not Rated:** Credit Suisse Global Credit Research or Global Leveraged Finance Research covers the issuer but currently does not offer an investment view on the subject issue.

**Not Covered:** Neither Credit Suisse Global Credit Research nor Global Leveraged Finance Research covers the issuer or offers an investment view on the issuer or any securities related to it. Any communication from Research on securities or companies that Credit Suisse does not cover is factual or a reasonable, non-material deduction based on an analysis of publicly available information.

---

### Corporate Bond Risk Category Definitions

In addition to the recommendation, each issue may have a risk category indicating that it is an appropriate holding for an "average" high yield investor, designated as **Market**, or that it has a higher or lower risk profile, designated as **Speculative** and **Conservative**, respectively.

---

### Credit Suisse Credit Rating Definitions

Credit Suisse may assign rating opinions to investment-grade and crossover issuers. Ratings are based on our assessment of a company's creditworthiness and are not recommendations to buy or sell a security. The ratings scale (AAA, AA, A, BBB, BB, B) is dependent on our assessment of an issuer's ability to meet its financial commitments in a timely manner. Within each category, creditworthiness is further detailed with a scale of High, Mid, or Low – with High being the strongest sub-category rating: **High AAA, Mid AAA, Low AAA** – obligor's capacity to meet its financial commitments is extremely strong; **High AA, Mid AA, Low AA** – obligor's capacity to meet its financial commitments is very strong; **High A, Mid A, Low A** – obligor's capacity to meet its financial commitments is strong; **High BBB, Mid BBB, Low BBB** – obligor's capacity to meet its financial commitments is adequate, but adverse economic/operating/financial circumstances are more likely to lead to a weakened capacity to meet its obligations; **High BB, Mid BB, Low BB** – obligations have speculative characteristics and are subject to substantial credit risk; **High B, Mid B, Low B** – obligor's capacity to meet its financial commitments is very weak and highly vulnerable to adverse economic, operating, and financial circumstances; **High CCC, Mid CCC, Low CCC** – obligor's capacity to meet its financial commitments is extremely weak and is dependent on favorable economic, operating, and financial circumstances. Credit Suisse's rating opinions do not necessarily correlate with those of the rating agencies.





