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Valuing the upcoming exchanges

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Bradys come to Europe

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The EU Council resolution of July 2011 has moved the eurozone forward in terms of the notion of private sector involvement, irrespective of whether it helps Greece in its move towards sustainability. Although we were initially negative ahead of the Council meeting (see *Europe's Unpalatable Policy Options*), we noted the relative generosity in an initial assessment of the exchanges (see *EU Council Surprises*).

In this paper, we reassess the package because we believe this restructuring and introduction of the new Greek *Brady bonds* are likely to be followed by a further restructuring. Differentiating between the various bonds offered in exchange depends very much on how any future restructuring takes shape and the subsequent recovery values on risky Greek cashflows. We attempt to guide participants into which bonds offer better value, as well to look at the possibility of whether banks that hold bonds on their banking books may benefit from exchanges into the more accounting-friendly bonds on offer. Finally, we look at possible trades to benefit from the various proposed exchanges.

Auctions /switches

The Council resolution made reference to GGB bond exchanges, but with little detail. Instead the detail was for four bond exchanges, have been given as alternatives in a paper by the IIF released at the same time as the Council itself(see link). The exchanges include the following:

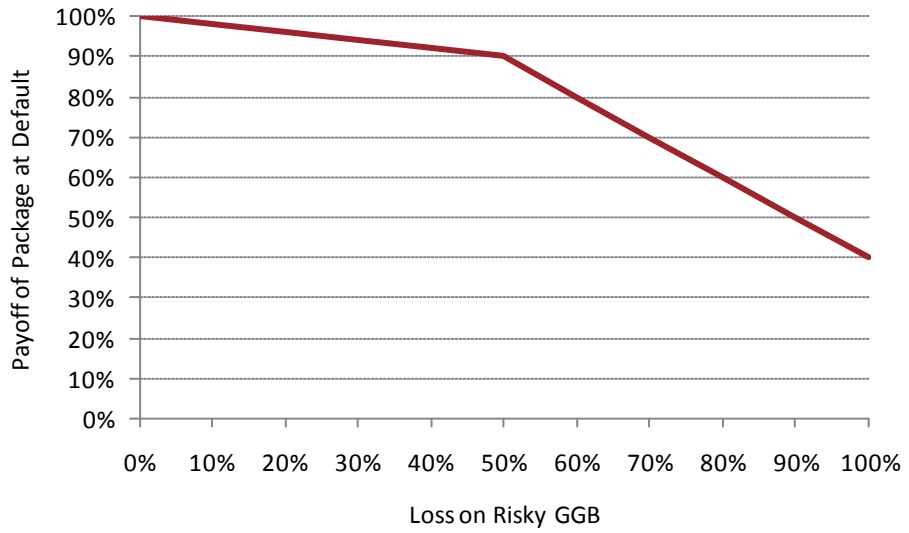
1. Switch into a 30Y 100% principal-guaranteed bond with (low) step-up coupons of 4.0% for years 1-5, 4.5% for years 6-10 and 5% thereafter. (This equates to a 4.5% fixed coupon throughout using the 9% flat discount rate).
2. Commit to roll into a similar (but new) 30Y 100% principal guaranteed bond with (low) step-up coupons. We would presume the investor maintains pure Greece risk until the rollover time when the risk becomes collateralized.
3. Take a 20% notional haircut with a subsequent switch into a new fully principal-guaranteed 30Y bond with (high) step-up coupons of 6% for years 1-5, 6.5% for years 6-10, and 6.8% thereafter. (This equates to a 6.42% fixed coupon throughout using the 9% flat discount rate.)
4. Take a 20% notional haircut with a subsequent switch into a partly principal-guaranteed 15Y bond. This bond is collateralized by AAA funds in escrow for 40% of 80% or 32% of the remaining notional (or, the funds represent 80%*80%*40% or 25.6% of the original notional) and the interest earned on this escrow account is used to service the EFSF loan (i.e., the escrow account does not grow). Investors continue to receive the Greek risky bond until possible default, at which time the escrow account pays on the losses sustained on the Greek bond. The escrow account pays the min(80% *losses, 40%) as a percent of the new notional. So for instance, if we assume 40% losses, i.e. a 60% recovery, the escrow account will pay the investor min(80%*40, 40%), 32%, in terms of the new notional. If we assume 60% losses, the escrow account will pay the investor min(80%*60,40%)=40% in terms of the new notional. The combined payoff of the escrow account and recovery of the risky GGB is plotted in Figure 1. The rolling guarantee structure of option 4 is similar to the Argentina PBG bonds and Columbia PBG bonds (see link).

Eligible bonds include those out to 2020, but there is a proposal to include bonds out to 2024.

All four options are equated by discounting the risky cashflows at 9% flat and the risk-free cashflows essentially at swaps flat to give a 21% NPV loss (i.e., they price at 79). This is *an accounting methodology for equating the coupons* and has no bearing on subsequent market valuation. However, should market valuations change prior to the debt-exchanges (due to take place in late August/early-September) and prior to any scheduled roll, this accounting identity will likely be re-invoked to alter coupons. Again, the equivalent fixed coupon rates are only to do with accounting equivalency, and the bonds with the fixed coupon rates mentioned above (as per the IIF bond exchange documents) would have entirely different market values. We note that to price in the 21% NPV loss at 9% discounting, AAA collateral must price at or close to swaps flat. In reality, EFSF AAA zeros are likely to trade at a reasonable spread to swaps. We note that French banks have already taken a 21% impairment charge on all GGBs maturing before 2020 (but none greater than that), likely to be in preparation for the upcoming exchange. This is only our expectation that the final impairment charge will be 21%, as final charges are likely to be above or below this initial figure.

The EU documents assumed a minimum 90% participation rate in the exchanges. We note that even in the restructuring most market participants view Uruguay as an ideal situation, bonds were trading close to recovery values prior to the exchange and elements of coercion were used to ensure participation remained high. We think the implicit threat are highly plausible including questioning the viability of future support should bailouts ever be needed. With EU leaders' concerns about not triggering CDS at this time, we do not expect the threats to become sufficiently explicit to require assessment by ISDA at this juncture.

Figure 1. Payoff of Package 4 (Risky Bond + Escrow) upon Default



Source: Nomura Research

Valuations-Methodology

In each of the four options, the valuation is entirely different from any accounting identity. But actual valuations are not altogether straightforward and depend on numerous assumptions, in particular recovery on risky bonds.

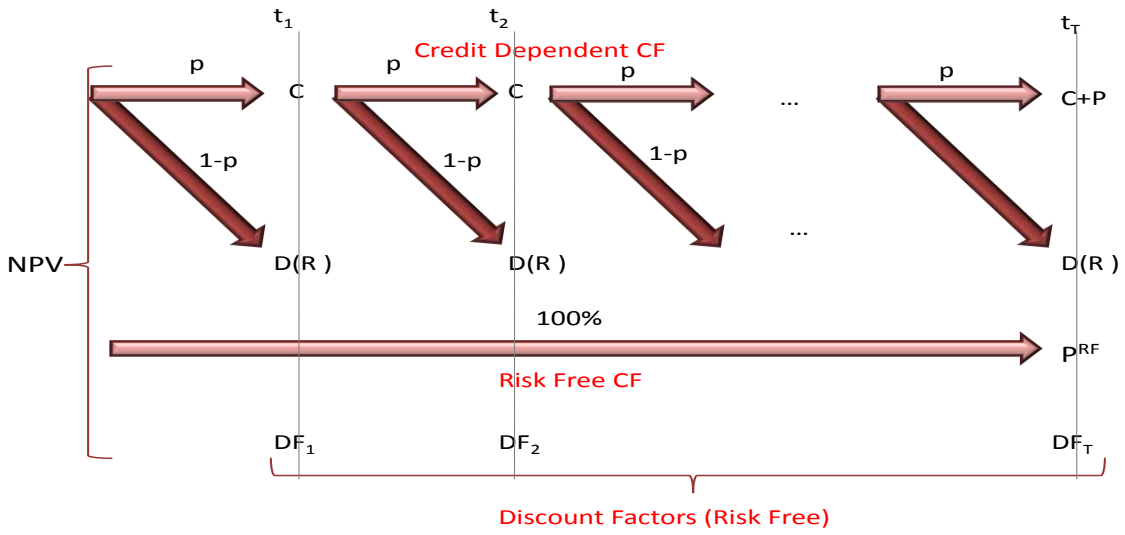
We use the CDS curve (and recovery locks which are now traded at 35/40) for our valuation method to infer default probabilities. We also consider CDS together with

differing recovery assumptions (from which we would infer differing default probabilities) to value each of the bonds under a range of scenarios.

Although it is possible to value each of the bonds given a GGB curve rather than the CDS curve, together with a recovery assumption on the underlying GGBs, we found the practice challenging in particular due to the inadequacy of the data. This methodology works well enough for options 1-3, but where the valuations of the risky Greek cashflows are not completely sensitive to the underlying curves, this method failed on option 4, owing to its need for consistency in risk-free and risky discount factors.

The method to value the new GGBs is based on a branching (or collapsing) tree, which we should recall from the valuation methodology for Brady bonds and in particular rolling-interest-guarantees (RIGs). We depict the valuation process in Figure 2, where we note that p is the conditional survival probability (e.g., the probability of survival until period 2, conditioned on having survived to period 1), C are the (risky) coupons, P is the (risky) principal if it exists (some of the options have no risky principal), D(R) is the payoff if default, which depends on the recovery rate (explicitly for option 4 and we provide some detail on various recovery assumptions and their impact on valuations), and P^{RF} is the risk-free principal strip (in several of the exchange options). After a probability weighting of the various cashflows, we discount by the appropriate risk-free discount factor (DF_1 to DF_T) to obtain an NPV.

Figure 2. Valuations depend on branching trees.



Source: Nomura Research

In spite of the relatively straightforward methodology, which should be familiar to those with a credit derivatives background (or by extension to those who have priced Brady bonds), there are a number of subtleties. These subtleties involve the notion of recovery values.

Typically in credit derivative pricing, recovery value is something that applies to the principal. And typically, the pricing of credit derivatives is based on the assumption that there is no post-default recovery on coupons. This allows recovery to be a fraction of the principal.

At the same time, for most credit derivatives, there is little differentiation between the principal and coupons.

Valuations-Scenarios

Figure 3. Valuations—Options 1 depends on coupon recovery*

Option 1

Coupon Recovery	PV	dv01	Spread dv01	Duration	Spread Duration
0%	**51.85**	**-0.135**	**-0.011**	**26.035**	**2.080**
10%	59.23	-0.144	-0.010	24.369	1.639
20%	66.60	-0.154	-0.009	23.072	1.295
30%	73.97	-0.163	-0.008	22.033	1.020
40%	81.34	-0.172	-0.006	21.183	0.795
50%	88.72	-0.182	-0.005	20.474	0.608
60%	96.09	-0.191	-0.004	19.874	0.449
70%	103.46	-0.200	-0.003	19.359	0.313
80%	110.83	-0.210	-0.002	18.913	0.195

Source: Nomura Research. All valuations as of 4-Aug-2011

Historical comparisons may be more meaningful. We note that many Brady bonds (which like the GGB options 1, 2, and 3, had principal protection and risky or partly-risky coupons) were restructured and in spite of the fact that only coupons were risky, there was generally recovery on coupon streams (in virtually every Brady restructuring, while the principal was secured by a US Treasury Strip, the coupons retained a recovery value).

Figure 4. Valuations—Options 3 also depends on coupon recovery†

Option 3

Coupon Recovery	PV	dv01	Spread dv01	Duration	Spread Duration
0%	**46.51**	**-0.116**	**-0.012**	**24.901**	**2.665**
10%	54.78	-0.126	-0.011	23.012	2.036
20%	63.06	-0.136	-0.010	21.618	1.572
30%	71.33	-0.147	-0.009	20.548	1.216
40%	79.61	-0.157	-0.007	19.700	0.934
50%	87.89	-0.167	-0.006	19.012	0.705
60%	96.16	-0.177	-0.005	18.443	0.516
70%	104.44	-0.188	-0.004	17.964	0.356
80%	112.72	-0.198	-0.002	17.555	0.220

Source: Nomura Research. All valuations as of 4-Aug-2011

In Figures 3 and 4 we show pvs, dv01s and spread dv01s, duration and spread duration for Options 1 and 3 respectively. We do not cover Option 2 independently, as it is merely a form of Option 1, effectively delayed, with added Greek risk prior to the future exchange. All values are a fraction of the **original** notional. Although we bold the coupon recovery at 0% in the table, (which gives low prices for the two

* We note that our assumption of 40% recovery is used together with CDS to derive default probabilities, treating coupon recoveries entirely separately in the calculations.

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options), expectations of higher recovery rates on coupons are warranted. And with recovery on coupons close to those priced into that of the principal in recovery locks, prices are in the 70-80 range.

In particular we note that the although the third option, taking a haircut upfront, does result in mostly lower valuations, as risky coupons are higher than in option 1, the sensitivity to Greek risk (or recovery) is higher. Consequently, in the high coupon-recovery scenarios, option 3 outperforms option 1.

Moreover we note that the duration is exceptionally long on these 30-year coupon-bearing bonds. This is due to the extremely high default probability built into the curve, which at 0% coupon recovery makes both bonds essentially 30-year risk-free zero coupon bonds. In higher recovery scenarios, there is an assumed increased likelihood that coupons will be paid and thus the cashflows shorten in duration considerably.

Figure 5. Valuations—Options 4 depends on the recovery of risky Greek bonds ‡

Option 4

Recovery (on Principal)	PV	dv01	Spread dv01	Duration	Spread Duration
0%	67.78	-0.061	-0.007	8.988	1.002
10%	68.99	-0.056	-0.007	8.139	0.965
20%	70.42	-0.050	-0.007	7.134	0.924
30%	72.19	-0.043	-0.006	5.919	0.877
40%	**74.42**	**-0.033**	**-0.006**	**4.415**	**0.824**
50%	77.98	-0.019	-0.004	2.403	0.562
60%	77.36	-0.011	-0.002	1.391	0.283
70%	77.68	-0.007	-0.001	0.853	0.121
80%	78.16	-0.004	0.000	0.571	0.001
90%	79.64	0.000	0.000	0.041	0.001

Source: Nomura Research, All valuations as of 4-Aug-2011

Option 4 is a more interesting structure, with the escrow account having a similar purpose to the Rolling-interest-guarantees (RIGs) in most LatAm Brady bonds. Because of the significant allocation, valuations in Figure 5 are far more stable with regard to recovery, with ranges from 67-80 as a percentage of original notional. As this is a 15-year bond, dv01s and durations are considerably lower than is typical of a 15-year bond. This is indicative of the high default probability and the fact that at the time of default a large cashflow (escrow account plus risky bond recovery) is paid. Consequently, probabilistically speaking, much more cash is upfront. We note that the higher the recovery, the larger this (short-term) cashflow is paid, thereby shortening the duration. Meanwhile, spread durations are also much lower than in options 1-3, because of the considerable amount of recovery on the package in the event of default.

We note that alternative valuation methods exist for options 1-3, including using GGBs and GGB-Principal Only (PO) strips. Simply enough the procedure would be to take a 30Y GGB, strip off the PO to find a single coupon stream, do the same for a 10Y and a 5Y GGB, and together this can form risky Greek step-up coupons. Collateral of course would be discounted at swaps flat or at a modest spread, depending.

Equating these various valuation methodologies and taking a view on coupon recovery can drive RV trading, post exchange, and we would expect a more active

‡ In the analysis of option 4, we derive default probabilities assuming a (principal) recovery that is consistent with the recovery assumptions used to derive payoffs for the bond, with CDS as the consistent input.

market trading principal protected 30Y bonds vs like maturity risky GGBs. For instance, current market pricing of GGB 4.5% 2037 is 46.55, and current market pricing of the GGB-09/20/37-32Y 9 Sep-37 PO is 9.11, yielding a price for a 4.5% risky coupon stream of 37.44. Ignoring the step-up component of exchange 1 (as it corresponds to an average coupon of 4.5%) our calculations indicate the GGB – GGB PO pair is commensurate with a coupon recovery rate of 32.6%.

Accounting treatment

Many GGBs are held to maturity (HTM) in banking books, while some may be booked as available for sale (AFS). Decisions on impairments for HTM accounts (based on IAS 39) and provisioning are ultimately with auditors, and any bond switch may result in impairment depending on both qualitative and quantitative measures. Although we cannot comment on the likelihood of auditors accepting that rolling or exchanging into options 1 or 2 results in an instrument that is 'substantially different', but we comment on the application of the '10% rule', though some auditors would argue this rule only applies to liabilities and not assets, while others would argue it applies to both. The 10% rule states essentially a loss must be recognised and provisioning takes place (and the new bond booked at 'fair value', either market value or some theoretical value if there is no market) if the yield corresponding to the original bond's booking price (we will assume the bonds were booked at par so the yield is the coupon) can be used to calculate the NPV of the new structure, and should this structure's NPV be more than 10% different from the original booking price, the bond must be derecognized.

We only consider exchanges into par instruments, as the discounts would almost surely result in more than 10% losses. Of the EUR56.9bn notional of eligible securities, 13% of the instruments are either a step-up, variable-rate, zero or floater, and we were unable to analyse their eligibility for favourable accounting treatment.

The results show that any instrument that has a coupon above 5% would result in an NPV below 90 and result in the need for realising losses. This amounts to approximately 29.3% of the eligible EUR56.9bn notional. The instruments with coupons at 4.0195% or below will result in NPVs above 110 and will also be subject to revaluation, (which unfortunately, may not be a gain) and would also need to take provisions. The remaining 39% of the eligible securities would result in no NPV change, and could remain booked at par with no need to book impairment charges.

In addition, should any of these bonds require impairment charges under exchange 1, rolling into the new bond, as per option 2, would never result in impairment charges according to our understanding.

Buybacks

The IIF document states that EUR20bn will be spent on providing debt relief of EUR12.6bn. This implies an average buying price of 61.3% on a total face value of EUR32.6bn

We note:

- The ECB cannot sell EUR32.6bn face value at 61.3% as it will be forced to book a loss. Consequently, the buybacks must come from the market.
- All bonds maturing before 2020 will be eligible to participate in the exchange/rollover, so only the post-2020 will be targeted for buybacks. (In this note we do not consider the proposal to extend maturities on the exchange to 2024).
- The EFSF will have to buy 54% of everything after 2020 at a premium of 10c to save EUR12.6bn from a EUR20bn intervention.

- EFSF CEO Klaus Regling issued a statement on 27 July, which said that the buybacks may not be limited to the initially stated EUR20bn and that they will be handled by the EFSF rather than through front-loaded disbursements to Greece. This would require a change to the framework agreement and passage by all parliaments concerned.
- Because the EFSF would be targeting paper as long as 30Y, it makes sense for the EFSF to exchange these for 30Y EFSF paper. We note that there are no natural buyers of SSA paper longer than about 10-15 years. Consequently, we believe the buybacks will be handled via a reverse auction in exchange for 30Y EFSF paper. We look to BTP switches as possible examples.
- The mechanics of buybacks and the likely premium are covered in Nomura Economics team's piece *Is Greece Solvent Now?* (figure A3) where a premium of 19% to traded market prices for all bonds to be bought back and proportional targeting of each issue is assumed.

We note that buybacks, unlike the exchange contain an element of political risk. In particular, as the buybacks are meant to be implemented directly by the EFSF rather than via frontloading disbursements, this requires approval of all parliaments concerned as a change to the framework agreement. Although we believe approval will happen (e.g., Ms Merkel has sufficient votes counting opposition SPD/Greens), the debate will most likely be heated.

Trading

Although many of the possible trading strategies for these exchanges are only likely to emerge after exchange, (i.e., trading one bond vs another on possible coupon recoveries and principal recoveries, or trading new GGB Bradys vs old GGBs on the pricing of risky cashflows), there are some immediately obvious opportunities. In particular, we recommend going long cheapest participating bonds (e.g., the 2020 maturities, or 2022-24 should the extension be allowed). Given the likelihood that this exchange takes place and is purely voluntary, there is the holdout option (which official estimates in the Council Statement put at 10%). Because of our own view that this is likely to be only the first of several restructurings, holdouts only make sense for the first few years (where prices are well in excess of the valuations we derive in this paper) and in particular for institutional investors that have no strong European ties. In fact, holdouts would be an important defence against triggering CDS, which appears to be a concern for EU leaders.

We also note that the exchange without a CDS trigger will probably cause Greek CDS to collapse and with it other peripheral CDS. This was probably policymakers' aim when they planned not to trigger. As we have mentioned previously, resulting lower risk levels in BTPs will likely cause CVA desks to shed duration that they have been accumulating, causing 10s-30s to steepen once again (see *Europe's Unpalatable Policy Options* for a discussion of this trade). Another steepening impetus could be due to the great extension of duration that would result in takeup of options 1-3, given that eligible bonds have much shorter durations.

Finally, we expect the emergence of premia for longer-dated bonds participating in buybacks, once political uncertainty is finally resolved, but because of the probable lively debates in European parliaments in September, we would expect more volatility in longer-dated instruments before any final resolution.

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