

Darvas, Zsolt

Research Report

The Greek debt trap: An escape plan

Bruegel Policy Contribution, No. 2012/19

Provided in Cooperation with:

Bruegel, Brussels

Suggested Citation: Darvas, Zsolt (2012) : The Greek debt trap: An escape plan, Bruegel Policy Contribution, No. 2012/19, Bruegel, Brussels

This Version is available at:

<https://hdl.handle.net/10419/72139>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

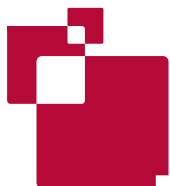
THE GREEK DEBT TRAP: AN ESCAPE PLAN

ZSOLT DARVAS

Highlights

- Without corrective measures, Greek public debt will exceed 190 percent of GDP, instead of peaking at the anyway too-high target ratio of 167 percent of GDP of the March 2012 financial assistance programme. The rise is largely due to a negative feedback loop between high public debt and the collapse in GDP, and endangers Greek membership of the euro area. But a Greek exit would have devastating impacts both inside and outside Greece.
- A small reduction in the interest rate on bilateral loans, the exchange of European Central Bank holdings, buy-back of privately-held debt, and frontloading of some privatisation receipts are unlikely to be sufficient.
- A credible resolution should involve the reduction of the official lending rate to zero until 2020, an extension of the maturity of all official lending, and indexing the notional amount of all official loans to Greek GDP. Thereby, the debt ratio would fall below 100 percent of GDP by 2020, even if the economy deteriorates further. But if growth is better than expected, official creditors will also benefit.
- In exchange for such help, the fiscal sovereignty of Greece should be curtailed further. An extended privatisation plan and future budget surpluses may also be used to pay back the debt relief.
- The Greek fiscal tragedy also highlights the need for a formal debt restructuring mechanism.

Zsolt Darvas (zsolt.darvas@bruegel.org) is a Research Fellow at Bruegel. Thanks are due to Jean Pisani-Ferry, André Sapir and Guntram B. Wolff for excellent comments and suggestions and Li Savelin for research assistance.



THE GREEK DEBT TRAP: AN ESCAPE PLAN

ZSOLT DARVAS, NOVEMBER 2012

1 INTRODUCTION

The European policy stance toward the Greek public debt tragedy can be summarised as three refusals:

- No additional funding beyond what has already been committed so far;
- No restructuring of official loans;
- No default and exit from the euro area.

Instead, discussion of debt relief for Greece has focused on stronger external enforcement of fiscal targets, some further interest rate cuts on bilateral loans to Greece, exchanging the European Central Bank's Greek bond holdings (which were acquired through the Securities Market Programme in 2010), buying-back traded Greek bonds at their current low price, or extending official loan maturities. However, these options are insufficient, as we demonstrate in this Policy Contribution.

Without corrective measures, the Greek public debt ratio will exceed 190 percent of GDP in the years to come, despite the success of the Greek

debt exchange in March/April 2012 (Appendix 1)¹. Such a debt ratio is more than three-times the 60 percent of GDP Maastricht limit and it is generally thought that Greece would not be able to borrow from the market at a reasonable interest rate until the ratio falls well below 100 percent of GDP. While policy slippages have also contributed to the skyrocketing debt ratio, the ever-worsening economic outlook has had a decisive role. Figure 1 shows that the Greek outlook has worsened substantially in every update of the International Monetary Fund's World Economic Outlook (WEO) since April 2008, including the most recent update from April to October 2012. Greece's cumulative real GDP decline is expected to be 22 percent relative to the pre-crisis peak, while the cumulative employment fall is 21 percent: really dramatic figures². The number of employed people in 2013 will be lower than any time since 1980.

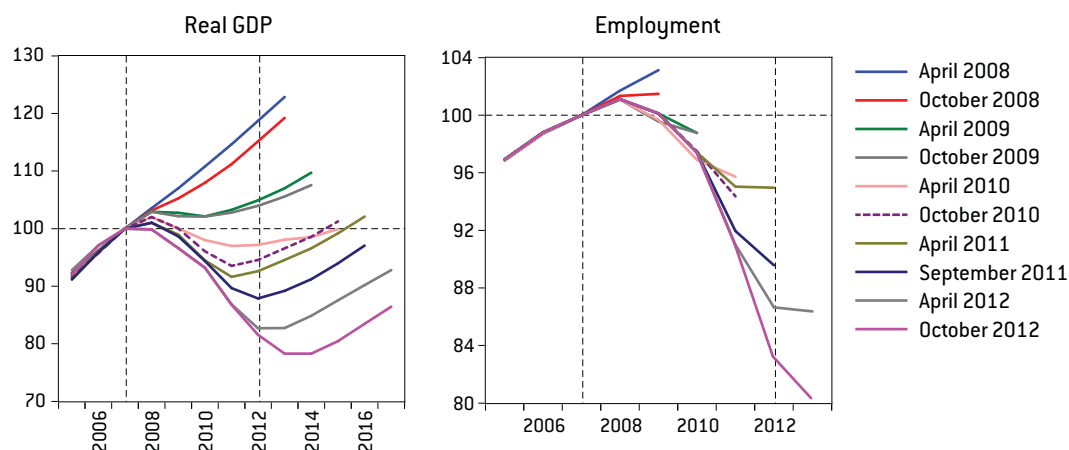
The high public debt ratio and the deep economic contraction feed off each other, especially when there are widespread expectations of a Greek euro exit. With an increasing debt ratio, more fiscal consolidation is needed which in the short term

1. The IMF October 2012 World Economic Outlook foresees a peak in the Greek debt/GDP ratio of 182 percent of GDP in 2013, but this projection quickly became outdated because of the 22 October 2012 Eurostat data revision, which revised upward the 2011 debt ratio by 5.2 percentage points of GDP (as the consequence of a downward revision of GDP).

The March 2012 fiscal adjustment and privatisation targets of the second financial assistance programme are unlikely to be met, increasing the debt ratio further.

2. The October 2012 version of the WEO does not yet consider the recent data revision: chaining IMF growth forecasts to the revised data, the contraction in real output would reach 24 percent from 2007 to 2013.

Figure 1: GDP and employment outlooks for Greece, changing IMF forecasts (2007=100)



Source: IMF World Economic Outlook published on the dates indicated in the legend. Note: IMF publishes GDP projections five years ahead, while employment projections are published only for two years ahead. The two vertical lines indicate 2007 and 2012, respectively. GDP is measured in constant prices.

has a negative impact on output. But more importantly, when several consolidation packages follow each other, the government and the parliament may be unable or unwilling to pass new measures, perhaps due to social pressure and unrest. That can lead to a collapse of the government, domestic political paralysis and the stopping of external financial assistance. Without external financial assistance, the Greek state may default, which could culminate in an accelerated and possibly uncontrolled exit from the euro area, with devastating consequences both inside and outside Greece. The prospect of euro exit discourages private investments and increases incentives for tax evasion and capital flight, thereby dragging growth down further and worsening the fiscal situation (Darvas, 2012). Restoring public debt sustainability, and thereby resisting euro exit speculation, is a necessary (though not sufficient) condition for stopping further economic contraction.

This Policy Contribution analyses various options for bringing down Greek public debt to a sustainable level and concludes that the three refusals of no new funding, no restructuring of official loans, and no default and exit from the euro area are inconsistent. There are no easy solutions. One or more of these refusals needs to be given up. We make a proposal on how the Greek public debt overhang can be addressed for the benefit of both Greece and its official lenders.

2 GREEK PUBLIC DEBT BEFORE AND AFTER THE DEBT EXCHANGE

Unfortunately, it is very difficult to get accurate data on the composition of Greek public debt according to both creditors and instruments, because national and Eurostat statistics differ. The latest comprehensive reviews, European Commission (2012) and IMF (2012a), were published in March 2012. For total public debt, we used the Eurostat general government gross debt statistics for 2011 (which are also used by the Commission and the IMF in designing the financial assistance programme). For the 2012 figure we use the October 2012 WEO projection. Using available information, our estimates for the composition of debt are indicated in Table 1.

As Table 1 indicates, there is only a small expected decline in public debt of €11.9 billion in 2012. As a percent of GDP, there is even an increase of 5.5 percent. Why has the debt ratio not declined, despite the sizeable debt restructuring?

We were not able to reconcile all the elements of the increase, but the major items are:

- €29.7 billion was given to investors in the form of European Financial Stability Facility (EFSF) securities, ie PSI (private-sector involvement) Payment Notes, as part of the debt exchange

Table 1: Estimated composition of Greek public debt at end 2011 and 2012

(€bns)	2011	2012	Change
Restructured old bonds/new bonds	199.2	62.8	-136.5
Hold-outs	6.4	5.5	-0.9
ECB/NCBs holdings	56.5	45.1	-11.4
Short-term securities	15.1	15.1	0
IMF loans	20.7	27.2	6.5
Bilateral EU loans	53.1	53.1	0
EFSF loans (PSI Payment Notes and Accrued Interest Notes)	0	34.5	34.5
EFSF loans (2nd programme)	0	96.5	96.5
Others	4.7	4	-0.6
Total	355.7	343.8	-11.9
Total (% GDP)	170.6	176.1	5.5

Sources and notes: without a single consistent database, we are obliged to use data from different sources. 2011 data: total (both in € billions and as % of GDP) is from Eurostat (2012); see Appendix 1 for the amount of restructured bonds and hold-outs; data on ECB/NCBs holdings are from the invitation memorandum for the debt exchange; data on short-term securities are from Ministry of Finance of the Hellenic Republic (2012a); IMF loans and Bilateral EU loans are from IMF (2012a); 'Others' were calculated as residual. 2012 data: total (in € billions) is from the IMF (2012b); new Greek bonds after the restructuring are 31.5 percent of the face amount of restructured bonds (see Appendix 1); for the change in holdouts see Appendix 1; the decline in ECB/NCBs holdings is from Table 19 of European Commission (2012); the March 2012 programme envisioned a €6 billion reduction in short-term borrowing, yet due to the delay in the disbursement of official loans, we do not assume any reduction; IMF loans are from IMF (2012a); EFSF loans for PSI sweetener and accrued interest is from the EFSF website³; the decline in 'Others' was calculated using block 'C. Maturing debt' of the table on page 30 of European Commission; and 'EFSF loans (2nd programme)' was derived as residual, ie we assumed that EFSF will fill up all financing gap in 2012. Total as % of GDP was calculated using an estimated GDP for 2012, which is based on the 22 October 2012 release of the 2011 GDP by Eurostat and the annual percent change in GDP in 2012 forecast by IMF (2012b).

3. See <http://www.efsf.europa.eu/about/operations/index.htm>

4. See Eurogroup statement, 21 February 2012, for the commitments (retroactive reduction of the spread to 150 basis points of the bilateral loans to Greece, and the transfer of central bank profits on the Greek portfolio to Greece) and the table on page 30 of European Commission (2012) for the quantification of these commitments.

5. Our baseline projection of the debt ratio is almost identical to the projection submitted to the Greek parliament on 31 October 2012 for 2013 (189 percent) and 2014 (192 percent), according to the *Financial Times*: <http://www.ft.com/intl/cms/s/0/a048894c-234e-11e2-a46b-00144feabdc0.html#axzz2AsTedKzC>.

6. Note that currently, Greece continues to roll-over some short-maturity treasury bills (see Table 1 for the outstanding amounts), held largely by Greek banks.

7. The first programme, concluded on 2 May 2010, committed the provision of bilateral loans to Greece for a total amount of €80 billion for the period May 2010 - June 2013, but this amount was reduced by €2.7 billion, because Slovakia decided not to participate in this lending, while Ireland and Portugal stepped down from the facility as they requested financial assistance themselves. The second programme, concluded on 14 March 2012, committed the undisbursed amounts of the first programme plus an additional €130 billion for the years 2012-14. See: http://ec.europa.eu/economy_finance/eu_borrower/european_stabilisation_actions/greek_loan_facility/index_en.htm.

(see Appendix 1);

- €4.8 billion was given to investors to compensate for the accrued interest up to the debt exchange in the form of EFSF securities, ie PSI Accrued Interest Notes (see Appendix 1);
- €44.8 billion is needed to recapitalise Greek banks, of which about €25 billion covered the losses that the banks assumed as a consequence of the PSI (source: the table on page 30 of European Commission, 2012);
- Greece still expected to have a sizeable budget deficit in 2012 amounting to €15.1 billion; of this, only €3.4 billion is the primary deficit and the rest are interest payments (source: IMF, 2012b);
- There are some additional items amounting to €6.9 billion in total, such as technical differences between accrual and cash accounting, the settlement of arrears to suppliers, and the Greek contribution to the capital of the European Stability Mechanism (ESM) (source: the table on page 30 of European Commission, 2012).

These factors, combined with €3.2 billion in planned privatisation revenues in 2012 and the €1.2 billion 'official sector involvement'⁴ agreed in February 2012, are about €35 billion short of the projected increase in debt. The cash buffer of the Greek government is also expected to be increased during 2012, but that cannot explain in full the discrepancy.

The debt ratio also increases due to the expected 6.4 percent fall in nominal GDP in 2012.

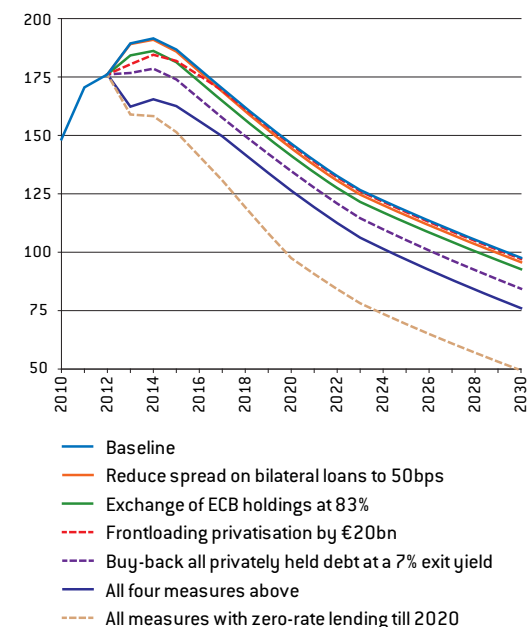
3 PUBLIC DEBT TRAJECTORIES

3.1 Baseline results

Figure 2 shows the baseline scenario, with others. The main assumptions of the baseline scenario and a sensitivity analysis are detailed in Appendix 2. In the baseline scenario, public debt increases to 189.4 percent of GDP in 2013 and peaks at 191.5 percent of GDP in 2014⁵. It then declines to 146 percent in 2020 and to 97 percent by 2030. Clearly, market access beyond very short-term treasury bills is extremely unlikely to resume⁶. As a consequence, official assistance from the EU should increase to close to €300 billion by 2030,

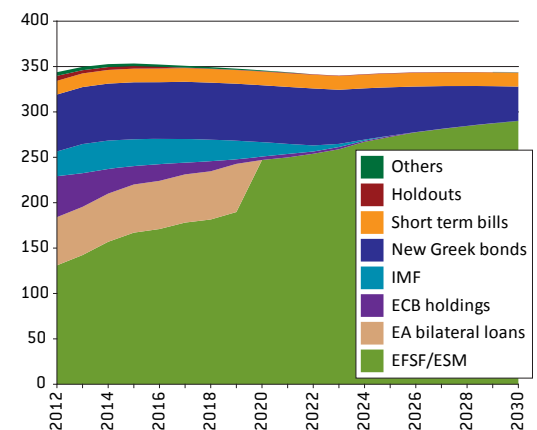
as indicated by Figure 3. Considering the total of €207.3 billion commitments from European partners⁷ and assuming full disbursement (peaking at €32 billion in 2013) and scheduled repayment by 2025 of IMF loans, the full repayment of bonds held by the ECB and no decline in the stock of short-term treasury bills, an additional €40 billion will be needed by 2020 and a further €43 billion for 2021-30. Clearly, these financing gaps are so high that they cannot be covered by Greece, even if outside enforcement of budgetary targets reaches an extreme level.

Figure 2: Greek public debt trajectories (% GDP), 2010-30



Source: author's calculations.

Figure 3: Composition of Greek public debt under the baseline scenario (€ billions), 2012-30



Source: author's calculations.

3.2 Debt reduction without a direct loss to official lenders⁸

As an acknowledgement of the unsustainability of the Greek public debt trajectory, IMF Managing Director Christine Lagarde in September 2012 suggested considering the writing off some European loans to Greece, according to Bloomberg (2012). This proposal has been resisted by European lenders so far. The current position of some major European policymakers is no debt write-off, no new lending, but also no default and exit from the euro. Instead, they are considering proposals such as lengthening the maturity and reducing the interest rate on current bilateral loans, passing to Greece the capital gain from the current Greek bond holdings of the European Central Bank, or buying-back privately held bonds at their current low market prices.

Among these suggestions, lengthening the maturity of bilateral loans does not lead to debt reduction. Without market access, this just changes the composition of official lending, since all new borrowing has to be provided by European partners in any case. Yet lengthening the maturity of bilateral loans would help from a public relations perspective, because in this case the additional commitment from the EFSF/ESM would be less. Also, a case can be made for lengthening the maturity of IMF lending to keep the IMF involved for as long as euro-area partners are involved, thereby reducing the future financing need from euro-area partners.

The three other options could lead to a reduction in the nominal value of Greek public debt without causing direct losses to euro-area partners. Reducing the lending rate of bilateral loans to close to actual borrowing costs, and exchanging the ECB holding with new bonds worth as much as the actual purchase value by the ECB, would just eliminate the profits European partners would make from Greek rescue operations. Therefore, in our calculations we assess these options, plus the frontloading of privatisation receipts:

- a) Reducing the lending rate on bilateral loans to 50 basis points over the 3-month Euribor;
- b) Exchange ECB/national central bank (NCB) holdings at the purchase price, which we

- assume to be 83 percent of the notional;
- c) Buy-back of all privately-held debt at a 7 percent exit yield (financed from an EFSF/ESM loan);
- d) Purchase of state assets by an internationally-controlled (eg EU or EBRD-EIB-WB (European Bank for Reconstruction and Development-European Investment Bank-World Bank)) holding company mandated to restructure and sell them, which we consider as front-loading €20 billion in privatisation receipts;
- e) The combination of these four measures.

Reducing the spread on bilateral loans

The EFSF lending rates to Greece are based on the actual borrowing cost of the EFSF with a minuscule surcharge to cover the operational costs of the EFSF. A reduction of the EFSF lending rate to Greece would involve a direct loss for euro-area partners and therefore we only consider a reduction of the lending rate on bilateral loans.

Initially, the interest rate charged on bilateral loans from euro-area partners was 3-month Euribor plus 300 basis points spread in the first three years and 400 basis points afterwards (plus an up-front service charge of 50 basis points). The spread was cut to 150 basis points on 21 February 2011, retroactively as well. The spread could be reduced further, though the resulting lending rate could be below the actual 3-month borrowing of, for example, Spain and Italy, since the 3-month Euribor is 0.20 percent per year now. We therefore assume a 50 basis point spread in our calculations, which could allow for the compensation of countries with actual borrowing rates above the new lending rate to Greece and therefore no country would face a direct loss. This is an easily implementable option because it requires only the consent of euro-area lenders.

Exchange ECB/NCBs holdings at the purchase price

In Darvas, Gouardo, Pisani-Ferry and Sapir (2011), using market information and investment bank assessments, we estimated that the ECB holdings through the Securities Markets Programme amounted to €49.5 billion at face value and €40 billion at market value. This implies an average

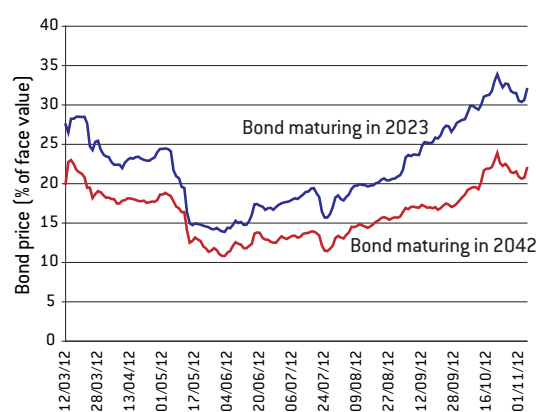
8. We do not consider a default on the remaining private sector holdings. The New Greek bonds are safeguarded through a co-financing clause with the EFSF, ie any Greek government debt service arrears have to be distributed *pro rata* by the New Greek bonds and the service of the EFSF loans which were granted to finance the PSI Payment Notes and Accrued Interest Notes (See Zettelmeyer, Trebesch and Gulati, 2012). Also, since the holders of the New Greek bonds already suffered massive losses during the debt exchange of March/April 2012, it would not be fair to burden them further. There would be a case for restructuring the holdouts, even if their magnitude is small (Table 1) and therefore would not change the picture much.

purchase price of 81 percent. But the ECB and other national central banks also held Greek securities before the SMP operations. As the total face amount of ECB/NCBs holdings was €56.5 billion before the debt exchange (Table 1), we assume that this remaining €7 billion was purchased at face value before the crisis, leading to an average 83 percent purchase price for the total €56.5 billion stock. The difference between the face value and the actual purchase value of such holdings should have been passed on to Greece in early 2011, as we proposed in Darvas, Pisani-Ferry and Sapir (2011), and it is high time to do this at last. It would exempt the ECB from making significant profits, but would not lead to a loss. In our calculations we assume that the exchange will be retroactive in effect, and therefore the capital gains on already matured bonds will be also passed on to Greece⁹. Such an exchange is just a matter of agreement between euro-area countries and the ECB/NCBs.

Buy-back of all privately-held debt

In principle, Greece could buy-back its sovereign bonds, which are trading well below face value (Figure 4), with the purchase financed by an ESM loan¹⁰. This is a controversial proposal, because a massive buy-back operation would likely increase the market price, thereby reducing the gain in terms of debt reduction. Also, not all market participants would sell their bond holdings, especially if the possibility of default is strictly excluded by the accompanying communication.

Figure 4: Secondary market price of the shortest and longest maturity New Greek bonds, 12 Mar 2012 – 6 Nov 2012



Source: Datastream.

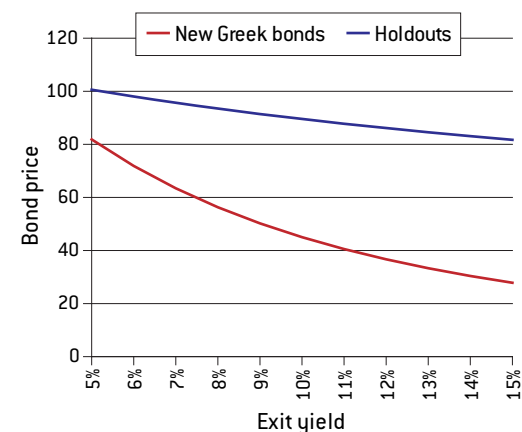
How can the market price at which bonds could be repurchased be approximated? Instead of forming an assumption about the price itself, we made an assumption about the 'exit yield' at which investors would sell their bonds. That is, as the bond price increases, the yield on holding the bonds to maturity declines. Figure 5 depicts this relationship considering the average price of the New Greek bonds (which are rather sensitive to the exit yield, because they are long-maturity bonds) and the average price of the holdout bonds (which are less sensitive, due to their shorter maturity and generally higher coupon yields).

Investors would most likely sell their long-maturity Greek bond holdings if their yield would fall to about 6 percent per year, as they would be better off by buying, for example, Spanish bonds at such yields. So the exit yield could be somewhat higher and we assume 7 percent per year, leading to a 63 percent price for New Greek bonds and 96 percent for holdouts. We assume that the category 'others' (see Table 1) could be purchased back at the same price as the holdouts. Therefore, the combined €72.3 billion face-value of privately-held debt could be bought back for €49 billion, with a reduction in the face value of debt of €23.4 billion.

Frontloading privatisation receipted by donors

Inspired by the EURECA plan of Roland Berger (2011), another proposal is the purchase of state assets by an internationally controlled (eg EU or

Figure 5: Buy-back: average price of bonds as a function of the exit yield



Source: author's calculations.

9. In fact, the 21 February 2012 Eurogroup Statement said that: "The Eurogroup has agreed that certain government revenues that emanate from the SMP profits disbursed by NCBs may be allocated by Member States to further improving the sustainability of Greece's public debt." Some of these profits may have been returned to Greece by now, but as we do not know the precise amount, we assume that all profits will be passed to Greece considering the total initial €56.5 billion stock.

10. The recent increase in the market price of New Greek bonds could be related either to the reiterated commitment by major euro-area politicians of keeping Greece inside the euro area, or to the start of a secret buy-back programme.

EBRD-EIB-WB) holding company mandated to restructure and sell them. Berger (2011) proposed bundling state assets worth €125 billion into a holding company and selling it to the EU. €125 billion is approximately 64 percent of 2012 Greek GDP. Certainly, such a gigantic transaction would reduce Greek public debt by more than one-third, no more official funding would be needed and Greece could even promptly pay back a significant portion of its debt to official lenders. The major problems with this proposal, which may explain why it has so far been neglected, are whether Greece has sufficient assets suitable for privatisation, uncertainties concerning the fair value of these assets, uncertainties about the time and costs involved in preparing these assets for sale, and the willingness of the EU or development banks to spend such a large amount purchasing Greek state assets. The figure on page 31 of IMF (2012a) compares major historical privatisation programmes and concludes that the €50 billion privatisation plan of the March 2012 financial assistance programme for Greece is ambitious, but in line with the experience of other countries as a percent of GDP, including former socialist countries and Portugal in the 1990s. But a 64 percent of GDP plan for Greece would be clearly exceptional.

Therefore, in our calculations we considered a more realistic target, namely frontloading €20 billion of privatisation revenues, which is approximately equal the 2013-17 privatisation receipts scenario. We assume that the rest of the privatisation receipts will be collected as indicated in Table 6 of Appendix 2. We also assume that the total amount of privatisation receipts is not affected by the transaction, nor do we consider secondary effects such as improved productivity, because of the difficulties in quantifying such effects¹¹.

Results

The results of these four options, and their aggregate impact, are also shown in Figure 2. The reduction in the interest rate on bilateral loans could reduce the debt ratio by 2 percent of GDP by 2020. The exchange of ECB holding would achieve an approximately 5 percent of GDP debt reduction. The buy-back at a 7 percent exit yield would

reduce the debt by about 12 percent of GDP. Finally, frontloading privatisation receipts would have a 9 percent of GDP short-run effect, but the long-run effect would be only about 0.5 percent of GDP. The latter result is the consequence of our assumption that the frontloading of privatisation just brings forward privatisation revenues, which would have been collected in later years, and therefore the long-run impact results from the interest rate saving from borrowing less in the coming years.

The combined impact of these measures would help to reduce public debt from €343.8bn in 2012 to €299.6bn in 2013: the debt buy-back reduces the face value of debt by €23.4 billion, the exchange of ECB holdings by €9.5 billion, the privatisation revenues by €20 billion. Together the measures would greatly overcompensate for the impact of the €8.7 billion budget deficit.

However, despite the €44.2 billion debt reduction, additional official financing is required, because the buy-back costs €49 billion and about €6.5 billion in maturing debt repayments is due to the ECB in 2013. IMF funding is expected to increase by €5 billion from 2012 to 2013, implying that the total European funding (bilateral and EFSF loans) would need to increase to €222 billion by 2013, which exceeds the total current commitment of €207 billion by €15 billion. Assuming repayment of IMF loans and ECB bond holdings on schedule, the European contribution would need to increase to €266 billion by 2020, and then €269 billion by 2024, after which the stock of European lending starts to fall (Figure 6 on the next page). Certainly, if the maturity of the IMF loans can be extended, then the European funding need would be reduced, but this would not eliminate the additional European funding need beyond the current commitments, €15 billion of which would be needed already in 2013 in order to make the buy-back possible.

In terms of the debt ratio (Figure 2), the four measures reduce public debt from the 2013 baseline of 189.4 percent of GDP to 162.4 percent of GDP. After peaking at 165.6 percent in 2014, the debt ratio would decline to 127 percent of GDP by 2020 and to 77 percent by 2030, under the growth, primary balance and interest rate

11. One could make the assumption that the internationally-owned holding company would be more effective in restructuring and privatising and therefore the total amount of privatisation receipts could be higher. A faster privatisation track could also improve the economic growth outlook (by making these companies more efficient earlier) and the budget deficit (by the improved economic outlook and the higher tax revenues from the privatised companies). Unfortunately, it is extremely difficult to make reliable assumptions about these effects.

assumptions of our baseline scenario (see Appendix 2).

4 DISCUSSION

Our analysis confirms that there is a sizable financing gap for Greece even after the reduction of the lending rate on bilateral loans, the exchange of ECB-held bonds, the buy-back of privately-held debt and the frontloading of a significant proportion of privatisation receipts. This leaves three options:

- No further help beyond current commitments but Greece has to find a solution on its own;
- A third financing programme with additional funding;
- Official sector involvement (OSI), ie restructuring official loans.

We propose a combination of the second and third items within a broader plan:

- Implementation of the proposals discussed in Section 3.2: exchange of ECB holdings, buy-back of privately-held debt and frontloading of privatisation revenues;
- OSI in the form of zero interest rate lending until 2020 on all forms of official loans;
- Maturity extension of IMF lending;
- Maturity extension of bilateral loans from euro-area partners;
- New funding in the order of €15 billion (which is

needed only for completing the financing needs of the buy-back and the repayment of maturing ECB bond holdings);

- Indexing official loans to Greek GDP;
- Improving the quality of Greek GDP statistics and the direct and intensive supervision of the Greek national statistical office by Eurostat;
- Curtailing further Greek fiscal sovereignty;
- Beyond the planned €50 billion privatisation plan, all other possible assets should also be considered for privatisation in order to repay as much as possible of the debt relief provided by the zero-interest lending;
- Greece and its official creditors may agree that whenever the debt ratio falls below a certain threshold, Greece will not reduce the debt ratio further, but will gradually pay back the debt relief provided by the zero-interest rate lending;
- Restructuring of the privately-held holdout bonds instead of buying them back from the market¹²;
- Beyond the resolution for Greece, there is a case for setting-up a sovereign debt restructuring mechanism.

We assess these proposals in light of the alternatives.

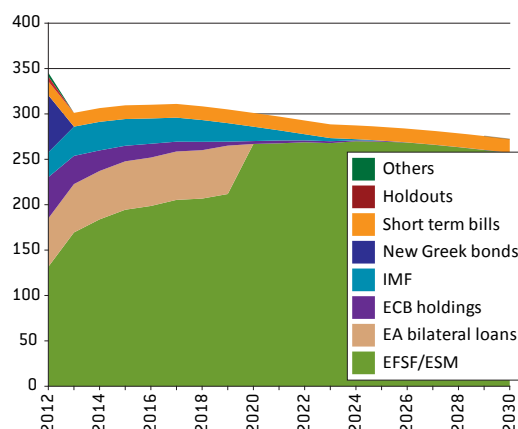
4.1 The consequences of no new lending and no OSI

If Greece does not get support beyond the current commitments and the four measures discussed in the previous section (including additional €15 billion funding needed to complete the buy-back), it will not be able to honour its payments, because the financing gap is so high.

An idea has been floated that any additional funding to Greece could be disbursed into an escrow account, in order to ensure that this money will be used only for servicing and repaying the debt. There are two problems with this proposal.

First, it cannot reach its goal without additional financing. Greece is expected to reach a balanced primary fiscal position in 2013 according to IMF (2012b), implying that all official funding would anyway be used to pay interest and debt amortisation. But the current commitments from

Figure 6: Composition of Greek public debt if the four measures of Section 3.2 are all implemented in full (€ billions), 2012-30



Source: author's calculations.

12. If official debt is also restructured, then non-restructuring of the holdouts would be awkward, even if some of these bonds that already matured in 2012 were paid in full (Appendix 1). Every few € billions matter, even if they bring little, given the estimated €5.5 billion stock at the end of 2012 (Table 1).

European partners are not sufficient for servicing the debt for long: according to our calculations, if the four measures in section 3.2 are implemented, Greece will still need to pay more than €6 billion in interest on official loans in 2013, including the interest on bonds held by the ECB. Even more importantly, Greece will need to pay back €31 billion of IMF loans by 2024 and the approximately €38 billion post-exchange face value of ECB bond holdings in the coming years.

Second, since Greece will not be able to service its debt, it will need to default on its liabilities to official creditors. It is difficult to see how Greece could preserve its euro-area membership after such an event. Yet in anticipation of a Greek exit, a self-fulfilling speculation may even bring the exit forward: most savings would leave the country bringing banks down, investment and output would plummet, unemployment would increase further, taxpayer morale would deteriorate further, which, along with the further deepening contraction, would necessitate even deeper fiscal austerity. It is not very likely that the current coalition government would survive such a chain of events, leading to political paralysis and an accelerated and disorderly exit from the euro area.

An exit would be dramatic for Greece, but also for euro-area partners and countries outside the euro area, and not just because of the direct losses from the defaulted government and private sector debts. In the case of a Greek exit, it would be very difficult to safeguard other economically weaker countries of the euro area; a wave of exits would be even more disastrous for the economically stronger euro-area countries. In our view, such fears have already had an effect on economically stronger euro-area countries and are a major reason behind the worsening of their economic outlook.

Therefore, the 'no further lending and no OSI' option should be excluded.

4.2 Muddling through with the help of additional funding, but without OSI

A third financing programme with additional funding could fill the gap. If all four measures discussed in Section 3.2 are implemented in full

and the maturities of IMF loans are extended, then the additional funding requirement (beyond the €15 billion needed to top the current commitments for funding the buy-back) would amount to approximately €30 billion. This additional funding would be used for paying back the maturing bond holdings of the ECB.

In this scenario, the debt ratio would fall to 127 percent of GDP by 2020, which is not far from the 120 percent target of the March 2012 second financing programme. But there would be major risks in this muddling-through strategy:

- The 120 percent target by 2020 proved to be inadequate for restoring trust and thereby limiting the probability of a Greek euro exit. A reiteration of the same or similar target is unlikely to help.
- Even the debt sustainability analyses of both European Commission (2012) and IMF (2012a) acknowledged that market access at a reasonable interest rate cannot be taken for granted at such a high level of debt.
- Due to the high level of debt, debt ratio projections are rather sensitive to GDP growth, primary balance and interest rate assumptions (see Appendix 2). For example, under the assumptions of the adverse macroeconomic scenario of Table 7, which are not that extreme, the debt ratio would decline only to 160 percent by 2020 and to 146 percent by 2030 if the four measures in section 3.2 are implemented.

A third financing programme with an uncertain outcome might not help to avert expectations of a Greek exit. Thereby, investment could be deterred further, the gradual capital outflow could continue, economic performance could remain weak, employment could fall further, and the social pressure on the government and the parliament could increase. In the wake of a prolonged contraction, the current coalition government may collapse, leading to domestic political paralysis and the chain of events leading to an exit with the consequences discussed above.

Therefore, the risks of a muddling-through strategy with some additional funding would be very high.

4.3 Proposal for addressing the Greek public debt overhang

A strategy leading to a credible resolution of the Greek public debt overhang would benefit both Greece and its lenders. Such a strategy could involve a 100 percent of GDP debt ratio target by 2020 along with a safeguard that would minimise the probability of a similar debt overhang occurring later. Given the macroeconomic outlook, and without a possible grandiose EURECA-type plan, this debt ratio target cannot be reached without a form of OSI (Appendix 2). There are six major questions to be answered:

- 1) What is the best timing?
- 2) How to restructure?
- 3) Which components of official lending should be considered?
- 4) What other provisions should be made to minimise the risk of a similar situation reoccurring and to protect official creditors as much as possible?
- 5) Is it possible to repay the debt relief?
- 6) What are the implications for other countries and the future operations of the ESM?

Timing

As we have argued, the uncertainty over the resolution of the Greek public debt overhang further undermines the Greek economy, since it discourages private investments and increases incentives for tax evasion and capital flight. In the absence of a proper resolution, the Greek government could default, leading to political chaos and a messy and disastrous exit from the euro area. We suspect that the uncertainty over the fate of Greece has also already had a negative impact on other euro-area countries. Therefore, while the muddling-through strategy may delay the need for an ultimate solution for some time, it would be preferable to find the ultimate solution sooner rather than later.

How

There are two main ways to reduce the debt burden: write-off (ie reduction of the notional amount of the debt) and cutting the lending rate below lenders' actual borrowing costs, such as

zero-interest lending. The suitability of the latter option depends on the target debt ratio, but zero-rate lending until 2020 would deliver our more ambitious target of a 100 percent debt ratio by 2020.

While the two ways of restructuring official lending can have the same outcome, from a public relations perspective the message that "Greece won't pay an interest for 8 years, but will pay interest later and will pay back the principle in full," could be preferable to the message: "We write-down one quarter of Greek debt, yet Greece will continue to pay interest and will pay back the rest of the principal later". Therefore, reducing the lending rate to zero could be a preferable option. Since the borrowing costs of euro-area lenders differ, for bilateral loans either a burden-sharing agreement would be needed, or bilateral loans could be replaced by EFSF/ESM lending¹³.

Scope

If the measures discussed in Section 3.2 are implemented in full, there will no longer be any Greek debt in private hands (apart from possibly a small volume of short-term treasury bills), but only various forms of official lending: ECB bond holdings and loans from the IMF, bilateral loans from euro-area member states and EFSF loans. Since the Greek financing programmes were designed by the troika of the European Commission, ECB and the IMF, and were approved by euro-area member states, responsibility for programme failure should be shared between all lenders and the Greek government. Therefore, there should be no reason for excluding any of the official lenders from the debt restructuring.

Due to the strict prohibition by the EU Treaty of monetary financing, the ECB probably cannot participate directly in any form of restructuring. But this is not needed, as we propose zero-interest lending and the complete repayment of the Greek ECB bond holdings. The ECB's interest income from Greek bonds will be ultimately transferred to euro-area member states, which should grant this interest income to Greece.

Regarding the IMF, a way should be found to extend the maturity of IMF loans to the maturity of

13. A burden sharing agreement may consider the GDP per capital level of donors, and in particular, may seek to compensate countries with GDP per capita below Greece. However, in 2012 there were only three such euro-area countries: Slovakia, Portugal and Estonia [Slovakia is expected to overtake Greece in 2013 and Estonia is expected to close the gap]. None of these three countries participated in the bilateral loan facility for Greece and therefore they are involved only in EFSF lending; consequently, they would face a smaller burden (relative to their GDP) than other euro-area countries.

the European commitments and to reduce the lending rate to zero (or alternatively, writing-off part of the IMF claims). Similarly, the legal framework of the EFSF should be amended accordingly, yet the ESM treaty need not be changed, because the remaining financing capacity of the EFSF is sufficient to cover Greece's additional financing needs.

Additional safeguards

By itself, the proposal so far would not necessarily be sufficient for avoiding similar difficulties in the future. There are risks in meeting the primary balance targets, and economic outcomes may also turn out to be worse than currently assumed¹⁴.

- Concerning the fiscal balance, a realistic target should be set for the structural primary balance and then enforced. In exchange for the zero-interest lending, Greece's fiscal sovereignty may need to be curtailed further.
- But economic growth does not depend on policy implementation and enforcement. Therefore, following our earlier proposal in Darvas, Pisani-Ferry and Sapir (2011), when we suggested GDP-indexed bonds for the restructuring of private debt so that investors benefit from a better-than-expected GDP outcome, we propose that the notional amount of official debt be indexed to Greek nominal GDP.

There are various ways for indexing debt to GDP. A rather simple solution is to index the notional amount of debt to the deviation from a baseline scenario for the nominal GDP level. That is, for each year until the loan matures, benchmark levels should be set for nominal GDP. Whenever the actual GDP data deviates by x percent from the benchmark in a given year, the notional amount of debt is automatically changed by x percent¹⁵. In order to reduce short-run volatility, the indexing could be applied to the deviation from, for example, a 3-year moving average of the GDP data published by Eurostat. Certainly, the quality of GDP statistics should be increased to the highest possible standards and the Greek national statistical office may need to be intensively supervised by Eurostat.

Our proposed debt-indexing has several advantages:

- Figure 7 in Appendix 2 indicates that debt trajectories are rather sensitive to growth assumptions. Since it has proved to be extremely difficult to forecast Greek output (Figure 1), any debt resolution without GDP-indexing risks major errors one way or the other.
- Indexing the debt to GDP would help to avoid a repetition of the current situation if growth will disappoint further.
- But it is also possible that because of the collapse in output by almost a quarter, a quick rebound will follow, as deep contractions used to be followed by quick recoveries. This effect would be reinforced if market sentiment improves because of the credible resolution of the Greek public debt overhang. Therefore, indexing to GDP would provide upside risks for official lenders if growth turns out to be faster than currently expected.
- Finally, indexing the debt to GDP can also be regarded as sharing the benefits and costs of unexpected GDP developments. An unexpected contraction would reduce the nominal value of debt (cost to lenders), but would also make the budget deficit higher, which should be addressed by the Greek government (cost to the Greeks). Sharing the benefits in an unexpected upturn would work similarly.

Possible repayment of the debt relief

We do not have specific information on the possible assets that could be privatised beyond the €50 billion target included in the March 2012 financial assistance programme. We assume that this target was designed wisely. However, since the zero-interest lending would lead to direct financial losses of creditors, all efforts should be made to increase privatisation receipts in order to be able to pay back as much as possible of the debt relief provided by the zero-interest lending. For example, bundling assets even of dubious quality and passing the portfolio to a holding company owned by the official creditors would be better than nothing.

Also, according to Figure 2, the debt ratio would fall below 50 percent of GDP by 2030 under our

14. Market interest rates may also increase faster than currently envisioned, which should be addressed by hedging operations and long-maturity borrowing.

15. Note that this proposal is fundamentally different from the current GDP-warrants (see Appendix 1): the current warrants pay an interest premium (capped at 1 percent per year) if GDP targets are met, while we propose indexing the notional of the loans to a nominal GDP baseline.

baseline macroeconomic scenario and the complete concessionary financing of the ESM from 2021 (and zero-rate financing up to 2020). Greece and its official lenders may agree that whenever the debt would fall below a certain threshold, then Greece will not reduce the debt ratio further, but will gradually pay back the debt relief it enjoyed between 2013 and 2020 through the zero-interest rate lending. Calibrating the pace of such repayment is complicated by the uncertainties about when and under what financing conditions will Greece be able to return to market borrowing.

Implications for other countries, PSI and the ESM

Would an OSI for Greece provide disincentives for other countries implementing painful reforms and fiscal adjustments? Should all future ESM lending be indexed to GDP? The answer is clearly no to both questions.

The first question was already raised about the restructuring of Greek privately-held debt, and was considered a major argument against it during 2011. Yet by end-2011 it became clear that the Greek public debt situation is unsustainable. We are not aware of evidence that policymakers in other countries facing financial difficulties, such as Ireland and Portugal, tried to follow the Greek example and request private-sector involvement. In contrast, recent reports on Ireland and Portugal suggest that their programme targets are on track and markets also appreciate the progress these two countries have made, as reflected by the significant decline in their secondary market government bond yields. Similarly, we do not expect adverse incentive effects following an eventual OSI for Greece. OSI would come as a very last resort after GDP has collapsed by about one quarter, privately-held debt has been restructured,

all possible assets have been considered for privatisation, but still the public debt trajectory remains unsustainable.

At any rate, the Greek tragedy underlines that a formal public debt resolution mechanism should be put in place as suggested by Gianviti et al (2010). This should be more effective than the current troika-based setup, since policymakers from the European Commission, the ECB and the IMF, along with euro-area politicians, insisted for too long that no private debt restructuring is needed. By doing so they prolonged the uncertainty of the Greek situation, which has likely contributed to the deeper than expected GDP contraction, and fostered the socialisation of Greek public debt, both of which necessitate OSI now.

On the second question of indexing ESM lending to GDP, zero-rate lending and GDP-indexing of Greek loans should not imply any change in the normal operations of the ESM. Again, these options should be used only when a very last-resort OSI is applied to a country for which growth forecasts will turn out to be as poor as for Greece (Figure 1) and the private sector involvement plus accelerated privatisation efforts did not lead to a sustainable public debt trajectory.

-oOo-

The euro area is at a very critical juncture. Policymakers have to recognise the impossibility of the trilemma of no additional funding, no restructuring of official loans, and no default and exit from the euro. While the choice about which of the three refusals to give up will be ultimately political, our calculations and arguments clearly support a resolution that would benefit both Greece and its official lenders.

REFERENCES

- Bloomberg news [2012] 'Europe Pushed by IMF's Lagarde to Consider Greek Debt Write-Off', 25 September, <http://www.bloomberg.com/news/2012-09-25/europe-pushed-by-imf-s-lagarde-to-consider-greek-debt-write-off.html>
- Darvas, Zsolt, Jean Pisani-Ferry and André Sapir [2011] 'A comprehensive approach to the euro-area debt crisis', *Policy Brief* 2011/02, Bruegel, <http://www.bruegel.org/publications/publication-detail/publication/491-a-comprehensive-approach-to-the-euro-area-debt-crisis/>
- Darvas, Zsolt, Christophe Gouardo, Jean Pisani-Ferry and André Sapir [2011] 'A comprehensive approach to the euro-area debt crisis: background calculations', *Working Paper* 2011/05, Bruegel, <http://www.bruegel.org/publications/publication-detail/publication/499-a-comprehensive-approach-to-the-euro-area-crisis-background-calculations/>
- Darvas, Zsolt [2012] 'The ten roots of the euro crisis', *Policy Contribution* 2012/17, Bruegel, <http://www.bruegel.org/publications/publication-detail/publication/755-the-euro-crisis-ten-roots-but-fewer-solutions/>
- Eurogroup statement [2012] 21 February, http://consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ecofin/128075.pdf
- European Commission [2012] 'The Second Economic Adjustment Programme for Greece', *Occasional Papers* 94, European Economy, http://ec.europa.eu/economy_finance/publications/occasional_paper/2012/pdf/ocp94_en.pdf
- Eurostat [2012] 'Provision of deficit and debt data for 2011 - second notification', *Eurostat News Release* 149/2012, http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/2-22102012-AP/EN/2-22102012-AP-EN.PDF
- Gianviti, Francois, Anne O. Krueger, Jean Pisani-Ferry, André Sapir and Jürgen von Hagen [2010], 'A European mechanism for sovereign debt crisis resolution: a proposal', *Blueprint X*, Bruegel, <http://www.bruegel.org/publications/publication-detail/publication/446-a-european-mechanism-for-sovereign-debt-crisis-resolution-a-proposal/>
- International Monetary Fund [2012a] 'Greece: Request for Extended Arrangement Under the Extended Fund Facility—Staff Report; Staff Supplement; Press Release on the Executive Board Discussion; and Statement by the Executive Director for Greece', *Country Report* No. 12/57, <http://www.imf.org/external/pubs/ft/scr/2012/cr1257.pdf>
- International Monetary Fund [2012b] *World Economic Outlook*, <http://www.imf.org/external/pubs/ft/weo/2012/02/index.htm>
- Ministry of Finance of the Hellenic Republic [2012a] 'HELLENIC REPUBLIC PUBLIC DEBT BULLETIN No 65', March 2012, http://www.minfin.gr/content-api/f/binaryChannel/minfin/datastore/82/62/ed/8262ed96be20c9d40183f35254dfd857212ffad0/application/pdf/Bulletin_No65.pdf
- Ministry of Finance of the Hellenic Republic [2012b] 'Hellenic Republic Public Debt Bulletin No 66', http://www.minfin.gr/content-api/f/binaryChannel/minfin/datastore/bc/59/78/bc5978c928675ca6dd81f60976051281fc797679/application/pdf/Bulletin_No66.pdf
- Roland Berger [2011] *EURECA project: Hellenic Recovery Fund – a solution for Greece and Europe*, Roland Berger Strategy Consultants, Frankfurt, http://www.rolandberger.com/media/publications/2011-09-27-rbsc-pub-EURECA_project.html
- Zettelmeyer, Jeromin, Christoph Trebesch and G. Mitu Gulati [2012] 'The Greek Debt Exchange: An Autopsy', http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2144932

APPENDIX 1: THE GREEK PUBLIC DEBT EXCHANGE

In March and April 2012, the Hellenic Republic exchanged €199.2 billion face value bonds, out of the €205.6 billion offered for exchange, which was the largest debt restructuring in history according to Zettelmeyer, Trebesch and Gulati (2012). Holders of all restructured bonds (ie Greek-law government bonds, Greek-law bonds by state owned enterprises with a state guarantee, foreign-law government and guaranteed bonds) received an identical bundle of four instruments¹⁶:

- 1 'PSI Payment Notes' or 'cash sweetener': 15 percent of the face amount of the exchanged bonds in the form of one and two year maturity EFSF bonds (Greece pays back to EFSF by 2042);
- 2 'New Greek bonds': 31.5 percent of the face amount of the exchanged bonds in the form of 20 new English-law bonds of the Greek government maturing between 2023 and 2042, having a coupon of 2 percent per year in 2013-2015, 3 percent per year in 2016-2020, 3.65 percent per year in 2021, and 4.3 percent per year in 2022 and later;
- 3 'GDP warrants': a set of detachable GDP-linked securities paying at most 1 percent per year of the notional amount of the outstanding new Greek bonds, contingent on reaching pre-specified nominal GDP level targets (increasing from €210 billion in 2014 to €266.5 billion in 2020) and real GDP growth targets (rates between 2.3 and 2.9 percent during 2014-2020 and 2 percent after 2020). The warrants do not pay a principal at the termination date;
- 4 'PSI Accrued Interest Notes': six-month zero-coupon EFSF debt to cover accrued interest from the last interest payment till the debt exchange, which actually amounted to €4.8 billion (Greece pays back to the EFSF by 2037).

16. The only bond-specific instrument was the fourth item, PSI Accrued Interest Notes, which compensated for the unpaid interest of each bond up to the debt exchange.

17. Note that the market price of the new bonds fell to about 15 percent of their face value (see Figure 4). Therefore, compared to the face amount of the restructured bonds, investors received 15 percent of high quality (and easily cashable) EFSF PSI Payment Notes and new bonds with market value less than 5 percent ($15\% \times 31.5\%$) of the face amount of the restructured bonds; in addition to the securities indicated in points 3 and 4 above. For this reason, Zettelmeyer, Trebesch and Gulati (2012) conclude that "the Greek debt restructuring could be more accurately described as a fixed-price debt buy-back with an added 'bond sweetener' rather than as a bond exchange with a cash sweetener" (page 25).

18. In practice, these bonds were swapped to bonds with identical payment characteristics just before the debt exchange and then cancelled.

Consequently, there was a reduction of 53.5 percent in the nominal face amount of eligible bonds and the new bonds carry a slightly lower interest rate than the original bonds, even when considering the GDP warrants. Zettelmeyer, Trebesch and Gulati (2012) estimate that in net present value terms, from the perspective of the Greek government, the debt relief amounted to 60.2 percent of the face amount of bonds, which is about €120 billion, or 54.5 percent of GDP¹⁷.

However, according to IMF (2012a) the restructuring triggered losses of about €25 billion for domestic banks, which are to be covered by the Greek government from official borrowing. From the point of view of the sovereign this lowers the actual debt reduction.

The Greek government bond holdings of the ECB and national central banks (NCBs), which amounted to €56.5 billion according to the invitation memorandum for the debt exchange, were excluded from the debt exchange¹⁸.

Table 2 summarises the results of the debt exchange.

Table 2: Results of the debt exchange

Governing law and type of security	Face value held by the private sector (€ bns)	Holdouts (in percent)
Greek law - government bonds	177.3	0.0
Greek law - guaranteed titles (defense, railway, etc)	6.7	4.3
English law - government and guaranteed	19.9	44.1
Italian and Japanese law - government and guaranteed	1.2	20.6
Swiss law - one government bond	0.5	100.0
Total	205.6	3.1

Source: Table A3 of Zettelmeyer, Trebesch and Gulati (2012). Note on the face value of restructured bonds: Ministry of Finance of the Hellenic Republic (2012a, 2012b) report an aggregate face value of €198.1bn for three phases of the PSI. However, the 25 April 2012 Ministry of Finance press release said that "Following the settlement, the Republic will have restructured

approximately € 199 billion (96.9%) of the total face amount of bonds eligible ... taking into account additional offers relating to approximately € 1.1 billion principle amount of PSI eligible bonds which the Republic intends to accept...". We could not find further information on this €1.1 billion face value bond, yet we treated it analogously to the €198.1 billion restructured bonds, similarly to Zettelmeyer, Trebesch and Gulati (2012).

Among the holdouts, the one maturing on 15 May 2012 with a €435 million face amount was paid in full¹⁹. Presumably, another bond maturing on 13 September 2012 with €184 million holdout was also paid in full. In this year there will be one more bond maturing on 21 December 2012 with €250 million holdout.

APPENDIX 2: DEBT SUSTAINABILITY ANALYSIS

In our baseline calculations we largely follow IMF (2012b), but consider the revised 2011 GDP data by Eurostat. Tables 3, 4 and 5 show the assumptions for the three key variables, nominal GDP growth, the primary budget balance and the interest rate. The debt sustainability analysis of IMF (2012a) assumed a reduction both in the primary surplus and the growth rate from about 2020, and a small increase in interest rates.

For nominal GDP growth, we use IMF (2012b) projections up to 2017 and, similarly to IMF (2012a), a gradual decline, which we calibrate as 0.1 percentage point per year after 2020 until the 3.8 percent long-run level is reached (Table 3).

Table 3: Nominal GDP growth assumptions of the baseline scenario (percent per year)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	...	2030
This Policy Contribution	-3.9	-6.1	-6.4	-5.4	-0.2	2.8	4.3	4.6	4.6	4.6	4.6		3.8
IMF October 2012 WEO	-1.9	-5.4	-6.4	-5.4	-0.2	2.8	4.3	4.6	n.a.	n.a.	n.a.		n.a.
March 2012 programme assumptions	-2.0	-5.3	-5.5	-0.5	2.4	3.9	4.0	4.1	4.2	4.3	4.1		3.3

Source of March 2012 programme assumption: Table A1 of IMF (2012a). The source of 2010-2011 data used in this Policy Contribution is Eurostat.

For the primary budget surplus we assume that the 4.5 percent of GDP target will persist until 2020 and decline by 0.1 percent of GDP until 2030 (Table 4). Note that this path remains very ambitious, because about 1.5 percent of GDP improvement is expected for the next four years in a dramatic economic situation (Figure 1), after a long period of fiscal consolidation.

Table 4: Primary budget balance assumptions of the baseline scenario (percent of GDP)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	...	2030
This Policy Contribution	-4.7	-2.2	-1.7	0.0	1.5	3.0	4.5	4.5	4.5	4.5	4.5		3.5
IMF October 2012 WEO	-4.7	-2.2	-1.7	0.0	1.5	3.0	4.5	4.7	n.a.	n.a.	n.a.		n.a.
March 2012 programme assumptions	-5.0	-2.4	-1.0	1.8	4.5	4.5	4.5	4.5	4.3	4.3	4.3		3.5

Source of March 2012 programme assumption: Table A1 of IMF (2012a).

Unfortunately, European Commission (2012) and IMF (2012a) do not discuss the derivation of their interest rate assumptions and only present an aggregate interest payment figure. In our calculations, we tracked the interest rates of all components of debt:

- New Greek Bonds: see Appendix 1.
- GDP-warrants: we check the benchmarks for nominal GDP levels based on our nominal GDP growth assumptions; and for real GDP growth, we assume that it is equal 60 percent of nominal GDP growth;
- Holdouts: the coupon payment of each bond is known; while some of the holdouts are denominated in Japanese yen (€1.48 billion), Swiss franc (€583 million) and US dollar (€856 million), we assume

19. See the press release: <http://www.minfin.gr/portal/en/resource/contentObject/id/bec9c833-6dd5-46d8-8383-9ade14498e3d>

no exchange rate change.

- ECB holdings: we assume 5 percent per year.
- Short term bills: we assume 5 percent per year, which is very close to the actual borrowing rate during the first half of 2012 according to Ministry of Finance of the Hellenic Republic (2012b).
- IMF lending: Table 21 of IMF (2012a) presents interest and service charges.
- Bilateral loans: they are linked to the 3-month Euribor with a 150 basis points spread. We used the German zero coupon yield curve (source: Bundesbank) to calculate the implied future 1-year yields on German Bunds using the Expectation Hypothesis of the Term Structure (EHTS) with no term premium, and assumed that the 3-month Euribor will be 20 basis points below the 1-year German Bund yield²⁰.
- EFSF/ESM lending: the actual lending rate is linked to the borrowing cost of the EFSF/ESM with some minor surcharges. Applying the EHTS with zero term premium to the German zero coupon yield curve, we calculated the implied future 1-year, 3-year, 5-year, 10-year and 15-year German Bund yields and assumed that each of these five maturities account for one-fifth of the EFSF and the ESM borrowing. We assume the following EFSF/ESM borrowing spreads over German Bunds (which roughly corresponds to current spreads): 10 basis points at 1-year maturity, 30 basis points at 3-year maturity, 50 basis points at 5-year maturity, 65 basis points at 10-year maturity and 70 basis points at 15-year maturity. We assumed that the lending rate to Greece is 15 basis points above the actual EFSF/ESM borrowing costs.
- Others: we assume 5 percent per year.

Table 5 presents the resulting interest rate assumptions of our calculations. The average interest rate is below the March 2012 programme assumption, which is justified by the general decline in interest rates from March to October 2012. Also, for 2030, the IMF assumed market access presumably at a borrowing rate above the rate of ESM lending, thereby the difference between the March 2012 programme and our scenario in 2030 is larger.

Table 5: Interest rate assumptions of the baseline scenario

	2013	2014	2015	2016	2017	2018	2019	2020	...	2030
New Greek bonds	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0		4.3
Holdouts	5.1	4.0	3.9	3.7	4.2	5.5	5.5	5.6		5.2
ECB holdings	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0
Short term bills	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0
IMF lending	3.6	3.9	3.7	3.7	3.7	3.6	3.5	3.3		n.a.
Bilateral loans	1.8	2.1	2.6	3.0	3.5	3.8	4.0	4.1		n.a.
EFSF/ESM lending	2.0	2.3	2.7	3.0	3.2	3.4	3.5	3.5		3.2
Others	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		n.a.
Average interest rate: this Policy Contribution	2.7	2.8	2.9	3.3	3.4	3.5	3.6	3.6		3.4
Av. interest rate: Mar 2012 programme assumption	3.4	3.5	3.6	3.8	3.8	3.8	3.8	3.8		5.0

Source of March 2012 programme assumption: Table A1 of IMF (2012a). Note: the detachable GDP-linked securities related to the new Greek bonds are also considered: in the baseline scenario, both conditions are met from 2023 onward and the extra interest rate to be paid on the outstanding volume of new Greek bonds declines from 0.86 percent per year in 2023 to 0.41 percent by 2030.

Concerning privatisation receipts, we assumed a somewhat delayed schedule compared to the March 2012 programme assumptions, while keeping the total amount in € the same (Table 6)²¹.

Table 6: Privatisation receipts assumptions of the baseline scenario (€ billions)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
This Policy Contribution	2.5	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5
March 2012 programme assumptions	3.2	4.3	4.4	5.7	5.9	6.1	5.1	5.3	5.5	n.a.	n.a.	n.a.

Source of March 2012 programme assumption: the table on page 30 of European Commission (2012).

20. See Darvas *et al* (2011) for the methodology for using the EHTS for deriving expected future interest rates.

21. We also assumed that the primary balance and privatisation assumptions are unrelated. That is, the primary balance targets are met irrespective of the speed of privatisation (ie any loss in revenue from the privatised companies will be compensated through other means).

For covering the resulting gross borrowing needs, we take all but EFSF/ESM financing given, do not assume market access for medium and long-term bonds, but assume that all financing gaps will be provided by the EFSF and ESM. That is, we know the amortisation profile of the new Greek bonds, the holdouts, ECB/NCBs holdings²², IMF loans and bilateral loans. For 'Others' we assume a linear amortisation until 2021. For short-term bills we assume that their stock will remain stable at €15.1 billion, due to the uncertainties of official funding, even though the March 2012 financial assistance programme assumed a sizeable reduction of short-term borrowing²³.

We assume no market access for medium and long term bonds. The reason for this is that market access would be extremely unlikely given the very high level of public debt. Also, the large and further growing share of official lending would make private investors cautious, because in the event of an adverse shock, such as slower growth or budgetary slippages, the official sector may be treated preferentially.

Consequently, the EFSF/ESM financing is derived as residual and determined from the gross borrowing needs of Greece.

To assess the sensitivity to economic growth, the primary balance and interest rate assumptions, Figure 7 shows scenarios in which

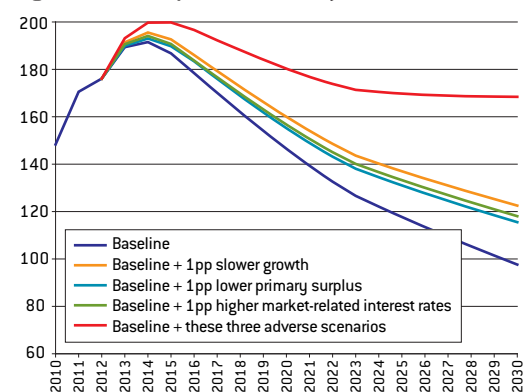
- a) GDP growth will be 1 percentage point per year less in each year between 2013 and 2030 than in the baseline;
- b) The improvements in the primary balance will be only 1 percent of GDP each year during the next five years and the level of primary surplus will be 1 percent of GDP lower;
- c) Interest rates which are related to market developments (ie short term bills, bilateral loans, IMF loans, and EFSM/ESM loans) will be 1 percentage point per year higher than in the baseline;
- d) The combination of these three adverse scenarios.

Table 7: Assumptions of the adverse scenarios

	2013	2014	2015	2016	2017	2018	2019	2020	...	2030
Nominal GDP growth (%/year)	-6.4	-1.2	1.8	3.3	3.6	3.6	3.6	3.6		2.8
Primary balance (% of GDP)	-0.5	0.5	1.5	2.5	3.5	3.5	3.5	3.5		2.5
Average interest rate (%/year)	3.4	3.5	3.7	4.0	4.2	4.3	4.4	4.4		4.3

Table 7 details the numerical assumptions of the adverse scenarios. While none of these assumptions are extreme, their combination would prohibit a long-term decline in the debt ratio and would instead stabilise it at 168 percent of GDP (Figure 7)²⁴. This would imply an ever growing funding requirement to be met by official lenders, because GDP is also growing and the remaining privately-held debt is gradually maturing.

Figure 7: Greek public debt trajectories: sensitivity to assumptions (% of GDP), 2010-2030



Source: author's calculations.

22. The source of the amortisation profile of ECB holdings is the table on page 7 of a March 2012 presentation of Ioannis Sokos, which is available at <http://www.scribd.com/doc/93383297/The-Greek-Psi-10233>.

23. See Hellenic Republic (2012a and 2012b) for the results of recent short-term treasury bill auctions.

24. In addition, if privatisation receipts also fall short of the assumption indicated in Table 6, the debt ratio explodes.