**HELLENIC PARLIAMENT**
**PARLIAMENTARY BUDGET OFFICE**

# THE PUBLIC DEBT AFTER THE END OF THE "MEMORANDUM" (2014)

## Note for the Members of the relevant Parliamentary Committees of the Hellenic Parliament


October 2013

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# PREFACE

The Parliamentary Budget Office under the framework of its competences prepared this note entitled ***"THE PUBLIC DEBT AFTER THE END OF THE MEMORANDUM (2014)"***. The note is primarily addressed to the members of the relevant Parliamentary Committee, especially to the Special Committee on the Financial Statement and the General Balance Sheet of the State and on the Control of the Implementation of the State Budget and the standing Committee on Economic Affairs of the Hellenic Parliament. It aims to support the workings of the two Committees by providing the necessary information and data.

The note was discussed and approved by the Scientific Committee of the Office on September 19, 2013. Apart from its independent publication, it was also decided to be part of the third quarterly report.

For its preparation, the working group was led by Prof. Panos Kazakos (member of the Scientific Committee of the Office) with the co-operation of Dr. Spiros Lapatsioras (member of the Scientific Committee of the Office) and the scientific staff Aleksandros Lyras (Ph.D. candidate) and Michael Stavrakas (Ph.D. candidate).

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# The Public Debt after the end of the "Memorandum" (2014)

## 1. Two different problems: "Fiscal gap" and Public Debt

The current financial assistance agreement with the Troika (as expressed "Memorandum") expires in 2014. Then, the last installment will be disbursed (see Appendix I). From the second half of 2014 onwards, the national resources will not be sufficient to cover the obligations for the interest payments on the loans of the past. In particular, the primary surplus (=the excess of taxes over the expenditures of the State Budget) will not be sufficient for the payout of the interest payments. The difference between interest payments and primary surplus is taken here to be the *«fiscal gap».*

The *«fiscal gap»* is officially calculated according to the current economic policy. If there is a policy with, e.g. if the social spending increases, then, ceteris paribus, the gap becomes larger and as a consequence, the financing needs grow[1]. The same will happen if there is a shortfall in tax revenue. The IMF's forecast includes a *"financing gap"* of € 4.4 bn in late 2014 and € 6.5 bn in 2015, which means a total of € 11 bn.[2] The Greek Government considers that this gap will be smaller, hoping to achieve a primary surplus of € 2.8[3] bn.[4] Whatever the level of the fiscal gab may be, the «gap» has to be covered and this can be solely done with new loans, lower interest rates and new measures or a combination of all the above. The government rules out new measures.

Moreover, the "gap" becomes larger if we add the obligations for expiring bonds. In that case, it is defined "financing gap." It will not be easy for Greece to raise money from the international markets on reasonable terms in order to cover the "gap", i.e. to repay interest payments and expiring bonds.

An agreement for new loans or other facilitations (lower interest rates, etc.) is the most likely solution according to the current circumstances. It is also provided in the Eurogroup Statement.[5] In that regard, the Greek side is considering to cover part of the fiscal gap in several ways apart from new loans from the international partners, one of which is to try to raise money from the international markets.[6] The Troika also motivates the Greek government towards this direction.

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[1] See Lapatsioras Sp. "Funding gap and social needs" newspaper "Avgi" August 18.8.2013. See also IMF Executive Board concludes 2013 Article IV consultation, Public Information Note No.13/64 June 5, 2013 .

[2] Greece: Third Review Under the Extended Arrangement Under the Extended Fund Facility— No. 13/153, June 5, 2013.

[3] See the Draft of the State Budget for 2014, Table 2.2, page 24.

[4] The difference between the year when the crisis broke out (2009) and 2013 is significant, since a fiscal deficit of € 24 bn was recorded at that time.

[5] Euro group Statement on Greece November 27, 2013.

[6] See newspaper "Kathimerini" 21.08.2013.

*We point out that a new loan agreement for closing the fiscal gap gives only a temporary solution for one to two years. Essentially, it postpones the tackling of the major problem which is the volume of the country's public debt.*

Therefore, the questions are what should be done with the Public Debt, what exactly the country should expect or request, when and what is possible to negotiate. These questions will necessarily occupy the Parliament. This is related to another question: What economic policy adjustment will be feasible for or after 2014? This note looks at the advantages and disadvantages of each alternative option.

*Our basic assumption is that the Public debt (and the ratio of the Public debt to GDP) will not be sustainable until 2020 or 2022*[7] *exclusively with national saving efforts* (=generating primary surpluses and privatizations), without any restructuring (=new "haircut") or rearrangement (=lengthening of debt repayment periods) and other facilitations (see below). The debt servicing in order for the debt to become sustainable only with our own forces requires a combination of growth rates and primary surpluses for many years which is not realistic to assume that will be achieved. It would also require possible refinancing from the markets at affordable terms.

## 2. Facilitating the Public debt service: Reduction of interest rates etc.

Measures which will ease the burden of debt service (flow relief) include the reduction of the interest rates of official lending to Greece especially from the first loan agreement, transfer of payments and capitalization of interest on EFSF loans, lengthening the payback periods etc.

In 2013 Greece will pay € 8.9 bn or 4.9% of GDP (see Appendix II, Table 2).[8] A further "artificial" reduction will mean fewer annual budget expenditures for interest payments and therefore less pressure for future cuts of other expenditures. Moreover, with the prolongation of loan repayments less borrowed funds would have to be found for the repayment of maturing debt after 2014.

The prospect of facilitating the debt repayment should not be underestimated. An aspect of great importance is how much the country can give to service the debt. The proposed measures for facilitating the debt service should be part of a comprehensive solution of the debt problem. If, for example a moratorium (= stopping all or part of interest payments) is agreed for 4 to 5 years or even more, the corresponding amounts could be invested. We also note that the Eurogroup has left open the possibility for an interest rate cut![9] A related investment program which would create jobs should certainly be agreed with the EU. It would provide help for the ignition of growth and the reduction of unemployment, although it will not solve

[7] That is, to descend to 124% of GDP (2020) and 110% of GDP (2022). See IMF Executive Board concludes 2013 Article IV consultation, Public Information Note No. 13/64 June 5 2013.

[8] State Budget 2013 in December 2012. The amount decreased from €11.7 bn (or 6% of GDP) in 2012.

[9] *Eurogroup Statement on Greece* 27 November 2012. The idea of a moratorium is supported by many economists such as Professor N. Economides at the Stern School of Business, New York University.

the problem. The most important is that it will favorably change the economic climate. Debt service payments will not suffocate our economy.

The question is whether the reduction of interest rates and the lengthening of the period of debt repayments (=extension of debt maturity) will allow Greece to return to the markets to cover the amortization of its obligations on reasonable terms. Although the repayment of public debt through new borrowing (e.g. by the ECB or NBS) cannot continue indefinitely, it is an illusion to expect that the country will return to the markets after 2014 to cover, on reasonable terms, the refinancing of debt plus any emergencies. Only for the loan amortizations, the requirements in the coming years will amount € 70.5 bn (2014-2020, see Figure 1 in Appendix II)[10]. According to our estimations, *these reductions are necessary*, *but not sufficient* for a definitive solution of the problem and therefore they will leave Greece exposed to unanticipated shocks. *The debt will remain as a* Damocles sword *over the Greek economy*, adversely affecting economic agents' expectations and prevent the return to the markets on reasonable terms.

## 3. A new formal restructuring (= deletion) of the debt to become "sustainable"

The second and more controversial possibility is to have an agreement on a new drastic cut of current debt (or the reduction of the stock of Public debt, "stock relief"). Obviously the restructuring of Public debt intertwines with the issue of its sustainability (see also the Appendix). In our case the Troika considers that the indicator for sustainability is the reduction of the debt to 124% of GDP by 2020 and 110% of GDP until 2022.[11]

*The debt arithmetic is against us.*

Today the IMF is pushing for a new restructuring of the Public debt which considers it necessary even if the current adjustment program is fully executed![12] Among economists and representatives of financial interests the opinion that the restructuring of debt is inevitable is increasingly and repeatedly expressed.[13] The

[10] Approximately € 72.5 bn based on GAO- the height of the amount depends on the exchange rate SDR-€ due to the loans from the IMF.

[11] IMF *Greece 2013 Artivle IV Consultation.* Country Report No. 13/154, June 2013. For a formal definition of sustainability see Balfoussias, Ath. Th. "Evaluation of Greek economic policy," Economic developments in KEPE, 12/2010, pp. 58-69. In general, the debt is sustainable if it is "serviced" (for which interest payments are secured by national resources- through growth) and if it is feasible the refinancing of repayment arrears on reasonable terms.

[12] IMF *Executive Board concludes 2013 Article IV consultation*, Public Information Note No. 13/64 June 5 2013.

[13] See last positive opinion expressed by the President of DIW (Berlin) Marcel Fratzscher in an interview given to Deutsche Welle in August 2013 as well as the estimates of the IFO in Die Welt 16.6.2013. In the debate juxtaposed the argument of "moral hazard". According to this, an early consideration for the cut of the debt would lead to the freezing of the ongoing reforms in the country. See comment by Lars Feld in der *Frankfurter Allgemeinen Zeitung*, 16.7.2013. But the moral hazard problem can be solved. See Bofinger, Peter "Back in Mark? Germany needs the €". For a more general solution by creating a debt restructuring mechanism in the EU see Gianviti, Fr.,

calculations, however, of the necessary debt relief vary. The IMF argues that a debt cut of the order of 4-5% of GDP is needed to achieve the objectives of 2020 and 2022. Moreover, a significant reduction of the stock of the debt, even if this happens gradually, would act as an incentive for the continuation of reforms or for the better incorporation into the economy of those reforms already made[14].

It is estimated that at the end of 2013, the country's public debt will amount € 321 bn, or 175.5% of GDP. The 2013 GDP is estimated to decrease dramatically to € 183 bn, which explains the estimated rise of the ratio of the debt to GDP compared to 2012 (€ 304 bn or 156.9% of GDP). In 2014 the GDP is projected to decline to € 319 bn, or 174.5% of GDP[15]. Therefore, from this perspective, the country is in a worse position to deal with the problem of its Public Debt as the country's production base has collapsed, according to official figures. Moreover, even if the objective of a 124% debt to GDP ratio is achieved until 2020, it is not certain that the situation will be further sustainable.

In Appendix III of this report, a technical-numerical exposition for the debt stabilization is available. From this numerical exposition, the stabilization of Pubic debt and even more its ambitious reduction from 175.5% to 110% of GDP in 2013, is facilitated if a cut on the stock of debt (in technical language: stock relief) is realized.

*A justification of the need for debt restructuring.*

The achievement -and even more the maintenance- of large primary surpluses in the future (in an economy already weakened) is almost impossible. Moreover, the growth prospects of the country are unfavorable, despite officially articulated expectations for a recovery in 2014, because of the weak export base, the existence of political uncertainties, the continuation of a restrictive fiscal policy, the excessively high debt to GDP ratio etc. At the present time, the arithmetic of debt is against the prospects for growth (see also the Appendix). Nor anyone can expect a significant debt reduction through privatizations (see also below).

In general, very large debts in absolute terms and also as a percentage of GDP are difficult to control ("unsustainable"), due to uncertainties and risks (causing lenders to demand high risk premiums, leading the way to sovereign defaults, especially when the expectations are in favor of this outcome). They weaken the ability of the governments to address economic problems. Even if the debts do not lead the growth process into full meltdown, they tend to slow it down.[16] This is true even if we cannot determine precisely the debt threshold above of which they stifle growth.

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Krueger, Anna et al "A European mechanism for sovereign debt crisis resolution: A proposal", Bruegel 2010.

[14] See statement made on economic conjuncture of the Prof. Kai Carstensen at the IFO Institute (in German) in newspaper Die Welt 26.6.2013.

[15] In 2010 (before the Memorandum) the total debt amounted to € 329.5 bn or 148.3% of GDP. For details on the Public Debt of the other years see the State Budget Draft for 2014 page 42, Table 3.1.

[16] Carmen M Reinhart, Kenneth Rogoff**,** *Debt and growth revisited* 11 August 2010, www.voxeu.org. They argue that when the ratio of debt to GDP exceeds 90%, the growth prospects dramatically

To put it differently, the large size of the debt (and the ratio of the debt to GDP) adversely affects the growth rate which of course, as already noted, is also affected by other factors. It also makes the markets cautious and deters those who plan to invest in the real economy. Therefore, a "haircut" of the debt within the euro zone, will probably accelerate the development, encourage investment initiatives and reduce the pressure for primary surpluses. [17] The key factor is growth.

It is impossible for the country to return to the capital markets to refinance its huge debt on reasonable terms. The size of the debt will deter potential lenders.

An organized deletion of part of the debt within the EU and the Eurozone would create new favorable effects. The most significant is its incorporation in the expectations of the markets. It will also allocate in a more balanced way the weights between lenders and borrowers, thus contributing to the stabilization of the EU[18].

*Negotiating capabilities and limitations*

The European governments have guaranteed the loans to Greece and hence every "haircut" would raise their own debt and probably would raise their own interest rates and finally would put a burden to their taxpayers. *The Greek politicians should not underestimate that a "haircut", especially when the debtor is a State, is a politically sensitive issue.* In that regard, it should not be underestimated the concern of other Member States that such a measure involves the so-called "moral hazard." This means that such a treatment may trigger a relaxation in fiscal policy and an interruption of the structural reforms not only in Greece but also in other countries which would have form expectations for the same treatment. Therefore, a "haircut" will be accompanied, if finally done (see below) with safety clauses!

An aggressively introduced request from the Greek side that would ignore the concerns of its partners, would negatively affect its external relations with incalculable economic consequences. It would be possible to trigger a new round on the debate of the so-called "Grexit". For this reason, the Greek side prefers to keep a low profile on the issue although the Minister of Finance Mr. Stournaras seems to expect actions towards "haircutting" and debt relief[19].

However, the outcome of the negotiations for any stock relief depends (also) on the credibility of the country, which is mostly measured by the progress of its fiscal

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worsen and therefore so does the debt management! For a critique on the text about its analytical and methodological framework that also results in questioning its main conclusions see Herndon, Thomas, Michael Ash and Robert Pollin, "Does high public debt consistently stifle economic growth? A critique of Reinhart and Rogoff ", University of Massachusetts at Amherst, Political Economy Research Institute, Working Papers Series, No. 322, 15 April 2013 & Ugo Panizza, Andrea F. Presbitero, "Public Debt and economic growth, one more time", 25 April 2013, www.voxeu.org.

[17] In Appendix III, we present a simple method for calculating the relationship among debt deletion and the primary surpluses!

[18] Βλ. Krueger Anna "A new approach to sovereign debt restructuring", Washington D.C. 2010.

[19] See the interview in the newspaper "Efimerida twn Sintaktwn", August 10-11, 2013.

policy implementation, the implementation of structural reforms and the exploitation of natural resources. The same holds for the estimated need for further support after 2014. As long as the reforms are postponed, the economic climate will deteriorate and the negotiating capabilities will be minimized. The timely fulfillment of the most critical prerequisites would improve the negotiating capacities of the country.

## 4. European tools for the reduction of the stock of Public debt

In the medium term, there are possibilities for a stock relief without being presented as a new "haircut".

We distinguish two of them which are already on the agenda.

(a) The banking sector recapitalization can be undertaken by the ESM, a fact that could reduce the debt by € 30 billion. This amount is comparable with the contribution of Hellenic Financial Stability Fund in the banking sector. This could happen after the establishment of the "European Banking Union". This arrangement will also put an end to the vicious circle between banks and sovereigns debt crisis.

(b) A partial "*debt-pooling scheme*" as the German Council of Economic Experts has proposed. Their proposal provides a quantifiable and time-limited joint guarantee on the part of the debt that exceeds the Maastricht limit of 60% of GDP[20]. This can be done under some strict conditions. The states should: Amortize the new bonds in a 25- year period, determine their taxes, the revenues of which should be used only for loan amortizations and in order to have access to guarantees, comply with the terms of both the Fiscal Compact and the Stability and Growth Pact.

In the same direction, regarding the *"debt- pooling scheme"* as a wider solution of the Eurozone's debt problem are the proposals made by Prof. Varoufakis. His basic idea is that the Maastricht legitimate debt of each country (60% of GDP) can be passed to ECB![21] Similar ideas have been expressed by other researchers, like Wyplosz[22], but have also been examined by the European Commission.[23]
The fact is that there is much activity around this issue at an EU level. Last July President Barroso announced the creation of an Expert Group in order to look into the merits and the risks, the legal requirements and the financial consequences of initiatives for the joint European issuance of debt in the form of a debt redemption fund and eurobills.[24]

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[20] See. Prof. Dr. Bofinger, Peter "*Zurück zu D-Mark, Deutschland braucht den Euro"*.

[21] See. revised proposal of Varoufakis, J., Holland, St. And Galbraith J. "*A modest proposal for resolving the Eurozone crisis"*, Version 4.0, July 2013.

[22] Βλ. Pierre Paris, Charles Wyplosz, "To end the Eurozone crisis, bury the debt forever", 6 August 2013, www.voxeu.org.

[23] European Commission *On the feasibility of introducing stability bonds*, Green Paper, Brussels 23.11.2011.

[24] European Commission Memo Strasburg, 2 July 2013. The setting up of an Expert Group was a prerequisite for voting in favor of the fiscal pact by the European Parliament!

**Definitions**

- Primary Surplus: The State Budget ordinary revenue is more than its expenditure (excl. revenue from privatizations and interest payments).
- Fiscal gap: The primary surplus is not sufficient for the payout of the interest payments.
- Stock relief: In economics, it is also known as "haircut". This measure is included in the IMF's adjustment programs.
- Rescheduling: A practice that involves restructuring the terms of an existing loan in order to extend the repayment period. Debt rescheduling may mean a delay in the due date(s) of required interest payments or reducing the interest payment amounts by extending the payment period and increasing the number of payments.
- Moral Hazard: The lack of any incentive to guard against a risk when you are protected against it with a contract (as by insurance).
- A debt- pooling scheme within the Eurozone: A part of the accumulated debt transferred to the European Stability Mechanism (ESM) or financed by the European Central Bank (ECB).
- Debt Sustainability: Is often defined as the ability of a country to meet its debt obligations without requiring debt relief or accumulating arrears. The primary surpluses (along with other national resources and the achievement

# APPENDICES

I. Table 1. Financing program: quarterly financing needs and disbursements of official assistance.
II. Graph 1 and Table 2. Maturity profile of the Central Government Debt and the obligations for expiring bonds and interest payments.
III. The sustainability of the Public debt.
IV. Further analysis based on an optimistic working hypothesis.

# Appendix I.

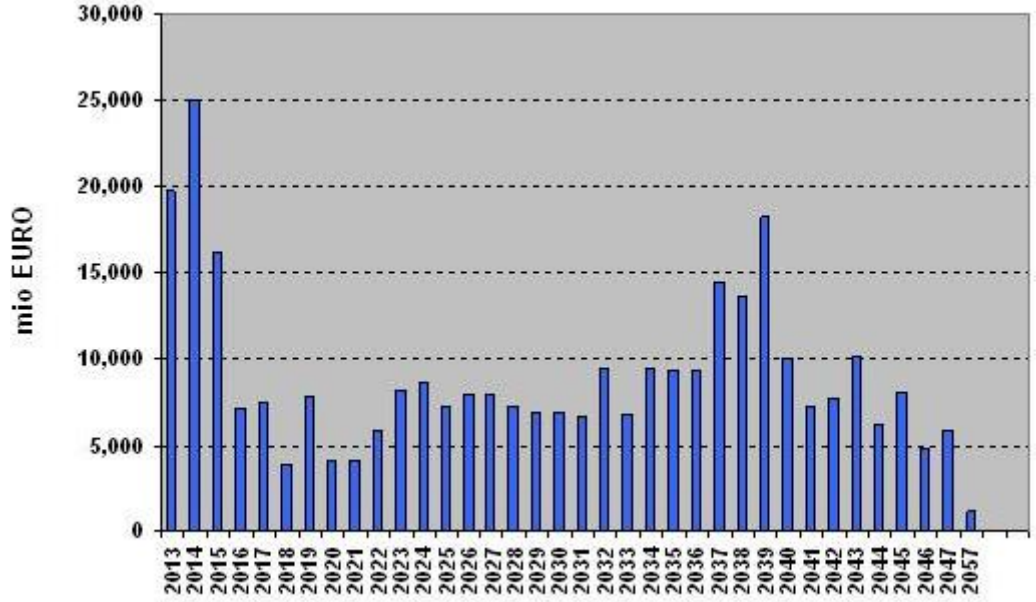
**Table 1.** Financing program: quarterly financing needs and disbursements of official assistance

| in bn EUR, unless otherwise noted | 2012 | | | | 2013 | | | | 2014 | | | | 2012-2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | |
| **Financing needs** | | | | | | | | | | | | | |
| **A. Government cash Deficit** | 2.7 | 2.2 | 2.7 | 1.9 | 2.0 | 1.9 | 1.5 | 0.6 | 1.4 | 0.5 | 1.3 | 0.3 | 18.9 |
| Primary deficit("-" is surplus) | 0.7 | 0.7 | 0.7 | 0.7 | 0.3 | 0.5 | -0.5 | -0.3 | -0.7 | -0.7 | -0.7 | -0.7 | 0.0 |
| Interest payments | 2.0 | 1.5 | 2.0 | 1.2 | 1.7 | 1.4 | 2.0 | 0.9 | 2.0 | 1.2 | 2.0 | 1.0 | 18.9 |
| **B. Other government cash needs** | 1.4 | -1.0 | 0.1 | 3.3 | 1.8 | 4.1 | 1.5 | 1.9 | 0.5 | 0.6 | 0.1 | 0.2 | 14.6 |
| Estimated cash adjustments(2) | 0.1 | 0.2 | 0.2 | 0.4 | 0.1 | 0.5 | 0.1 | 0.2 | 0.5 | 0.2 | 0.1 | 0.2 | 2.9 |
| Arrears | 0.0 | 0.0 | 0.0 | 0.5 | 1.7 | 2.7 | 1.4 | 1.7 | 0.0 | 0.0 | 0.0 | 0.0 | 8.0 |
| Cash buffer | 1.3 | -1.2 | -0.1 | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 |
| ESM capital | 0.0 | 0.0 | 0.0 | 0.9 | 0.0 | 0.9 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 2.3 |
| **C. Maturing debt** | 4.9 | 4.0 | 0.0 | 0.3 | 4.4 | 6.8 | 3.8 | 1.3 | 3.5 | 11.7 | 7.5 | 2.6 | 50.8 |
| Bonds & loans after exchange | 4.9 | 4.0 | 3.4 | 0.3 | 1.0 | 6.8 | 3.0 | 0.3 | 2.2 | 9.8 | 5.7 | 0.3 | 41.7 |
| Bonds after PSI and DBB (3) | 4.7 | 3.8 | 3.1 | 0.0 | 0.7 | 6.5 | 2.8 | 0.0 | 1.9 | 9.5 | 5.4 | 0.0 | 38.4 |
| other, inc lloans | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 3.2 |
| EU repayment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| IMF repayment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 1.0 | 1.3 | 1.9 | 1.9 | 2.3 | 9.1 |
| Short-term debt | 0.0 | 0.0 | -3.4 | 0.0 | 3.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **D. Cost of PSI** | 34.6 | 25.0 | 0.0 | 27.3 | 0.0 | 7.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 94.0 |
| Cash upfront for PSI (sweetener and accrued interest) | 34.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 34.6 |
| Bank recapitalisation | 0.0 | 25.0 | 0.0 | 16.0 | 0.0 | 7.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 48.2 |
| Cash up front for Buy back | 0.0 | 0.0 | 0.0 | 11.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 11.3 |
| **E. Gross financing needs (A.+B.+C.+D.)** | 43.6 | 30.3 | 2.8 | 32.7 | 8.3 | 20.0 | 6.7 | 3.8 | 5.4 | 12.8 | 9.0 | 3.0 | 178.4 |
| **Financing sources** | | | | | | | | | | | | | |
| **F. Private financing sources** | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.8 | 0.7 | 0.2 | 0.6 | 2.3 | 0.4 | 5.1 |
| Market financing | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Privatisation | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.8 | 0.7 | 0.2 | 0.6 | 2.3 | 0.4 | 5.1 |
| **G. Additional financing sources** | | | | | | | | | | | | | |
| ANFA & SMP profits | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.6 | 1.6 | 0.5 | 0.0 | 0.5 | 1.9 | 0.0 | 5.5 |
| Contingency measures | | | | | | | | | | | | | |
| **H. Financing needs per quarter** | 43.6 | 30.3 | 2.8 | 32.4 | 8.2 | 19.3 | 4.3 | 2.6 | 5.2 | 11.7 | 4.8 | 2.6 | 167.7 |
| **I. Official assistance disbursements** | 42.0 | 33.6 | 0.0 | 34.3 | 8.1 | 19.3 | 4.3 | 4.9 | 9.2 | 4.7 | 1.8 | 1.8 | 163.9 |
| EU | 40.4 | 33.6 | 0.0 | 34.3 | 4.8 | 17.5 | 2.5 | 3.1 | 5.7 | 2.9 | 0.0 | 0.0 | 144.7 |
| IMF | 1.6 | 0.0 | 0.0 | 0.0 | 3.3 | 1.8 | 1.8 | 1.8 | 3.5 | 1.8 | 1.8 | 1.8 | 19.1 |

***Source:*** European Commission, 2013

# Appendix II.

**Graph 1.** Maturity profile of Central Government Debt*




*as of June 30, 2013

***Source:*** Public Debt Management Agency (PDMA).

**Table 2.** Obligations for expiring bonds and interest payments

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|
| **Expiring bonds and interest payments (*)** | 26.9 | 24.9 | 16.1 | 6.8 | 7.7 | 3.6 | 7.6 | 3.8 |
| **Interest Payments (**)** | 7.5 | 8.7 | 9.8 | 10.5 | - | - | - | - |
| **Primary Surplus (**)** | 0.0 | 2.8 | 5.7 | 9.0 | - | - | - | - |

(*) Public Debt Management Agency, in bn €.

(**) Memorandum of Understanding July 2013, in bn €. From 2015 onwards, there is an optimistic IMF's forecast or a primary surplus of 4.5% of GDP on an annual basis.

# Appendix III.

**The sustainability of Public Debt**

A starting point for some calculations was the dynamic equation for the accumulation of Public Debt:

$$b_t - b_{t-1} = \frac{r_t - \gamma_t}{1+\gamma_t} b_{t-1} - s_t \qquad (1)$$

Where:

$s_t$ is the primary outcome as a percentage of GDP.
$\gamma_t$ is the growth rate of GDP.
$r_t$ is the average interest rate.
$b_{t-1}$ the so far accumulated debt as a percentage of GDP.

As can be inferred from the equation above, the evolution of the debt depends on

a) the interest rate $r_t$ (the higher it is, the higher the increase of the debt).
b) the growth rate $\gamma_t$ (positive growth rates reduce the ratio of public debt to GDP (particularly a rate of growth higher than the interest rate is needed).
(c) the primary outcome $s_t$ (the primary surplus reduces the Public debt).
(d) the so far accumulated Public Debt $b_{t-1}$.

From the above variables, the Government can only directly control the primary outcome $s_t$. However, it should be additionally noted that the situation becomes more difficult, if we take into account that a high ratio of Public debt to GDP presses downwards the growth rates!

As it is clear from the case of Greece, the most important factor for the effort of controlling the dynamic of Public debt is the growth rate of GDP. This can also be inferred from the following: so far several measures have been taken for the improvement of the three other factors[25], but due to the unprecedented contraction of the economic activity, the ratio of public debt to GDP will continue to increase until 2013, while, in absolute numbers, the Public debt will continue to increase until 2016.[26]

[25] A Primary surplus for 2013, a debt stock relief due to PSI on March of 2012, the reduction of interest rates and the elongation of existing loan disbursements.

[26] According to the MTFS 2013-2016. See the 1st quarterly report of the Parliamentary Budget Office, Chapter 2, The Targets of the Mid-term Fiscal Strategy (MTFS) 2013- 2016. However, on the draft of the State Budget for 2014 a Public debt reduction in absolute value is forecasted for 2014 compared to 2013.

Therefore, the question is which primary surpluses and growth rates it is rational for someone to expect. With a little modification of equation (1) we get:

$$\overline{s_t} = \frac{r_t - \gamma_t}{1 + \gamma_t} b_{t-1} \qquad (2)$$

We can now proceed by presenting two examples:

**Example 1**

Assume:

a ratio of public debt to GDP $\mathbf{b_{t-1}}$ of 120%
an interest rate $\mathbf{r_t}$ of 2.5 %
a growth rate $\boldsymbol{\gamma_t}$ of 0.0%

then, ceteris paribus, a primary surplus of 3% of GDP is required, for the ratio of Public Debt to GDP to remain stable at 120% of GDP.

**Example 2**

Assume:

a ratio of public debt to GDP $\mathbf{b_{t-1}}$ of 175%
an interest rate $\mathbf{r_t}$ of 2.5 %
a growth rate $\boldsymbol{\gamma_t}$ of 0.0%

then, a primary surplus of 4.4% of GDP is required ceteris paribus, for the ratio of Public Debt to GDP to remain stable at 175% of GDP.

Table 3 illustrates the (minimum) primary surpluses (+ surplus, -deficit) required for the ratio of Public debt to GDP to remain stable. On the horizontal axis the ratio of public debt to GDP appears and on the vertical axis the rate of growth, whereas the average interest rate is assumed to be 2.5%.

In our analysis for simplicity reasons we have deliberately ignored the effect of the stock-flow adjustment. If one considers that the revenues from the privatizations program (a key component of the stock flow adjustment) are estimated to reach € 22 bn until 2020 and that these revenues will be used directly for the debt reduction, then the above results would have been only marginally improved(in the case of a strict implementation of the program). See also the next Appendix with additional assumptions.

**Table 3.** Minimum Primary Surpluses for the stabilization of the ratio of Public debt to GDP.

| $b_{t-1}$ / $y_t$ | 80% | 100% | 120% | 140% | 160% | 170% |
|---|---|---|---|---|---|---|
| **3%** | -0.39% | -0.50% | -0.60% | -0.68% | -0.78% | -0.80% |
| **1%** | 1.20% | 1.50% | 1.80% | 2.10% | 2.40% | 2.50% |
| **0%** | 2.00% | 2.50% | 3.00% | 3.50% | 4.00% | 4.25% |
| **-1%** | 3.00% | 3.50% | 4.20% | 5.00% | 5.70% | 6.00% |
| **-3%** | 4.50% | 5.70% | 6.80% | 8.00% | 9.10% | 9.60% |
| **-5%** | 6.30% | 7.90% | 9.50% | 11.00% | 11.40% | 13.42% |

# Appendix IV.

**Extending the analysis according to an optimistic work assumption**

As we have already mentioned the growth rate of the Greek economy can only be partially determined by the implementation of the economic policy (mainly through Public Spending – its increase positively affects GDP according to the public spending multiplier whereas its reduction negatively affects it. Changes on the revenue side also affect the change of GDP while the institutional reforms also affect it but generally in an undefinable way with respect to the size of the change and the time of the appearance of results). To conclude, the growth rate is a variable the evolution of which across a decade can only be estimated with great uncertainty.

A very large part of the debt is subject to floating interest rates (the transnational loans from the EU countries, the loans from the EFSF and the loans from the IMF). These interest rates are independent from the economic policy. They are generally determined from the money markets and from the monetary policies of the major central banks(mainly the FED and secondarily the ECB). The fact that for reasons related to the management of the consequences of the global financial crisis of 2008 the interest rates of the central banks remain on historically low levels, which in turn leads on the current low interest rates for the part of the Public debt which is under floating interest rates, does not mean that, for the next decade, these interest rates will remain on these low levels.

Therefore, although the growth rate and the interest rates are not being determined from the economic policy they do play a crucial role on the changes of the debt stock (for its increase or its reduction).

In the following tables we show possible situations which we may encounter during the effort for the reduction of Public debt.[27]

*Primary surpluses needed for the reduction of Public Debt.*

By setting as a target for the Public debt to be reduced to 110% until 2022 (a target, which as we noted in the text, does not necessarily guarantee the growth of the Greek economy, since for over a decade the public debt will be above 100%) we examine what will be the necessary amount of primary surpluses, as a percentage of GDP, for this target to be achieved, during the period 2014-2022 in relation to possible combinations of interest rates and growth rates.

In Table 4, the first column gives possible values for the growth rate of the nominal GDP, γ, around the values of our optimistic work assumption (2, 3, 3.5, 4, 4.5, 5, 5.5). The values of our working assumption are being represented with bold letters (4% and 4.5%).

[27] The way under which these tables are produced follows from the basic dynamic equation (1) for the accumulation of Public debt which can be found at the beginning of Appendix III. We omit the analytical details for reasons of technical complexity. The interested reader is directed to Buiter 2009, chapter 9 (http://www.willembuiter.com/lectures.pdf).

The first line (2, 2.5, 3, 3.5, 4, 4.5, 5) gives possible values of interest rates(nominal) around the current values of the interest rates formally adopted in the analysis for the sustainability of Public debt(the basic values are also represented with bold letters: 3 and 3.5).

The rest of the values of table 4 refer to the needed sum of primary surplus and the revenues from privatizations (the revenues from privatizations are calculated to reach, on average, 1.2% of GDP, for the reference period) as a percentage of GDP. We will refer to this sum for convenience with the term "Primary surplus" but the reader must keep in mind that the primary surplus needed results if we subtract from the values appearing on the cells of the table the revenues from privatizations (1.2% of GDP).

The reader should also keep in mind that if he wants to translate the percentages with respect to GDP related to the fiscal surplus of 1% of GDP for the reference period, then, according to an optimistic work assumption, it is estimated, that this on average amounts to € 2.2 bn.

**Table 4.** Required Fiscal surpluses and other revenues

| | b=110% of GDP in 2022 | | | | | | |
|---|---|---|---|---|---|---|---|
| **γ/r** | 2 | 2.5 | **3** | **3.5** | 4 | 4.5 | 5 |
| 2 | 7.3 | 8.0 | 8.7 | 9.5 | 10.2 | 10.9 | 11.7 |
| 3 | 5.9 | 6.6 | 7.3 | 8.0 | 8.7 | 9.4 | 10.2 |
| 3.5 | 5.2 | 5.9 | **6.6** | **7.3** | **8.0** | **8.7** | 9.4 |
| **4** | 4.5 | **5.2** | **5.9** | **6.6** | **7.3** | 8.0 | 8.7 |
| **4.5** | 3.8 | **4.5** | **5.2** | **5.9** | **6.6** | 7.3 | 8.0 |
| 5 | 3.2 | **3.8** | **4.5** | **5.2** | 5.9 | 6.6 | 7.3 |
| 5.5 | 2.5 | 3.2 | 3.9 | 4.5 | 5.2 | 5.9 | 6.6 |

At the center of Table 4 we observe (where the outline of the cells has an intense black color) the values that the Primary surplus must have until 2022 so that for the Public Debt to fall to 110% of GDP. The Primary surplus must be 5.9% of GDP if the growth rate, γ, reaches 4% and the average (nominal) interest rate, r, burdening the debt stock, reaches 3%. The same will also hold if γ=4.5% and r=3.5%. What we immediately observe is that the important indicator is the difference of the growth rate from the interest rate and not their absolute values taken separately.

Indeed, if we look closely the diagonal darker colored cells of the Table, we can see that a Primary surplus of 5.9% of GDP is required if the growth rate, γ, is 3.5 and the interest rate, r, is 2.5, if γ is 3 and r is 2, if γ is 5 and r is 4 and if γ is 5.5 and r is 4.5.

Using this ascertainment as a guide, we can explore other cells around the aforementioned cells indicating our optimistic working assumption for the debt sustainability analysis. We observe that if we have rates of nominal growth of 4.5%

but the interest rates increase by 50 basis points (0.5%) and from 3.5% become 4%, then the needed primary surplus increases by 1.5 bn to 6.6% of GDP. If we assume that the growth rate on average reaches 3.5% (instead of 4.5%) and the interest rates increase from today's historical low 3.5% by 100 basis points to 4.5% then the needed Fiscal surplus is 8.7% (at the cell on the right of the Table which has a grid as background), that is almost three units above from what is needed in our working assumption.

In a nutshell, we see that the margins for the goal for the ratio of public debt to GDP to reach 110% are very narrow: Differences of the growth rate (which can only be partially affected from economic policy) from the average interest rates (which do not depend from economic policy) equal or above 1% and a continuation of historically high fiscal surpluses, without margins to overcome unpredictable adverse events.

Although from this table we can already see the consequences if the estimations of our working assumption about the future growth rate or the future interest rate do not match to the corresponding realized figures, the next table specifies it with respect to the height of Public debt.

*Feasible Public debt to GDP ratios with the values of our working assumption, for the primary surplus and other revenues, for the time period 2014-2022.*

In the following Table 5, we apply our working assumption for the value of the height of the primary surplus, i.e. 5.6% of GDP and examine the height of the Public debt which will result if this Primary surplus appears until 2022 according to the values which the rate (nominal) of growth, γ, and the average interest rate(nominal) will have.

**Table 5.** Debt to GDP in 2022 with targets for fiscal surpluses and other revenues

| | **S=5.6% of GDP constant sources of funding (primary surpluses + revenues from privatizations)** | | | | | | |
|---|---|---|---|---|---|---|---|
| **γ/r** | 2 | 2.5 | **3** | **3.5** | 4 | 4.5 | 5 |
| 2 | 125.3 | 132.2 | 139.4 | 146.9 | 154.7 | 162.8 | 171.3 |
| 3 | 112.4 | 118.7 | 125.3 | 132.1 | 139.3 | 146.7 | 154.4 |
| 3.5 | 106.5 | 112.5 | **118.8** | **125.3** | **132.1** | **139.2** | 146.6 |
| **4** | 100.8 | **106.6** | **112.6** | **118.8** | **125.3** | 132.1 | 139.1 |
| **4.5** | 95.5 | **100.9** | **106.7** | **112.6** | **118.8** | 125.3 | 132.0 |
| 5 | 90.3 | **95.6** | **101.0** | **106.7** | 112.7 | 118.9 | 125.3 |
| 5.5 | 85.5 | 90.5 | 95.7 | 101.2 | 106.8 | 112.7 | 118.9 |

In Table 5 we can observe the available narrow margins for the goal to be achieved. If the growth rate, γ, and the interest rate r take the values of our working assumption(γ=4% or 4.5% and r=3% or 3.5%), then as we can observe at the center of the Table(where the frame of the Table has darker color)we are getting closer to the target. The same and even better holds for every combination of γ(every value of the first column) and r(every value of the first line) which corresponds to a cell below the diagonal of the table with the darker color(all the cells with values 112). Because there the differences between the growth rate and the average interest rate are greater than one. However for the average interest rate to be at 2% not a significant reduction of interest rates is needed for a significant part of the debt(for example, it could be equivalent, with the EFSF borrowing with a higher interest rate than that for lending Greece). Although a growth rate of the nominal GDP of 5.5%, as an average rate, for all the reference period is overoptimistic. At the above side of the diagonal we observe the bad version with regard to the debt reduction target. For example with a constant rate of nominal growth 4% during the period 2014-2022, and an average interest rate of 4%, the debt reaches 125.3% of GDP whereas if the average interest rate reaches 4.5%, the debt increases to 132.1% of GDP.