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Julian Schumacher, University of Mainz
Beatrice Weder di Mauro, University of Mainz and CEPR

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Diagnosing Greek Debt Sustainability: Why is it so hard?[1]

Julian Schumacher
University of Mainz

Beatrice Weder di Mauro
University of Mainz and CEPR

Washington, September 10, 2015

Abstract

This paper analyses the serial misdiagnosis of Greek debt sustainability in the official sector lending framework. The standard debt sustainability analysis frameworks of the IMF and ESM have become inappropriate for Greece since they ignore the highly concessional terms of Greek debt. We show that two thirds of Greek debt contains grant elements of about 54%, and the present value of outstanding Greek debt is now about 100% of GDP, rising to about 120% under the new program. In spite of the exceptionally high debt relief already granted, these number still breach the thresholds of debt sustainability and suggest that further restructuring will be required. However, the main problem lies in the repayment flow over the medium term and in the question of burden sharing within the group of official creditors (European institutions and IMF). We also show that the lending policies of the IMF as well as the ESM have been adapted repeatedly to accommodate Greece, leaving the overall lending framework weakened.

[1] We thank Christoph Trebesch and Jeromin Zettelmeyer for very helpful comments.

I. Introduction

Taking a casual look at the level of Greece's debt, which the IMF has recently projected to rise to 200% of GDP, it seems obvious that Greek public finances cannot possibly be sustainable.[2] What is not obvious is how this can be subject to dispute. Yet, a brief history of Greek official sector debt sustainability assessments over the last 6 years shows how much and how quickly they have changed. In 2014 the assessment became gradually more sanguine and by the beginning of 2015 the verdict of its main official creditor institutions, Troika for short, was that Greek debt was sustainable. Eight months later however, at the time of writing, the Troika has been split over the question of debt sustainability: while the Europeans are pushing ahead with a new program for Greece the IMF is holding out. It seems that the diagnosis of debt sustainability is not so obvious, after all.

One reason why a diagnosis of debt sustainability is hard could be the role of politics, and in particular of the political feasibility of adjustment. Indeed, theory has long emphasized that sovereign debt is different from corporate debt, precisely because politics and institutions are crucial in determining a country's capacity *and* willingness to repay.[3] From this perspective, debt sustainability would depend inter alia on the particular political coalition, the strength of political institutions and even on personal egos of decision makers and their negotiation power at home and abroad. Thus, debt sustainability would not only be unobservable and country-specific but also time-varying and highly volatile. Political positions can change very rapidly, as showcased by the turmoil caused by the Greek government turnover in January 2015.

However, this is a perspective neither the IMF nor the Eurozone can adopt. As a matter of principle, they have to ensure equal treatment across members and cannot constantly change the goal posts in accordance with shifting political circumstances. Thus, they have to deploy a framework to assess debt sustainability that can be applied to the entire membership.[4] In addition, this framework should be designed with the goal of protecting both the debtor country from overborrowing as well as protecting the resources of the creditor institution and the financial system from restructuring too little, too late and too high a cost. A non-sustainable verdict should preclude the official sector from lending into cases of insolvency and should require some form of debt restructuring first.[5] Understanding the basis of official debt sustainability analysis is therefore crucial. And Greece has been both main shaper of this framework as well at its target.

This paper makes two contributions. First, we review the recent history of diagnosing Greek debt since the European sovereign debt crisis erupted in 2009. Specifically, we show a significant

[2] IMF (2015a, b).

[3] A large body of theoretical literature emphasizes this point, starting with Eaton and Gersovitz (1981) and summarized extensively in the surveys by Eaton and Fernandez (1995), Panizza et al. (2009), and Aguiar and Amador (2013). The empirical literature have has identified many political and institutional factor that impact on the probability of sovereign default. See e.g. Van Rijckeghem and Weder (2009), Tomz and Wright (2013), or Sandleris (2015).

[4] In its analytical framework, the IMF does make a reference to the political feasibility of primary balance adjustments (2013a, p. 4), but this does not seem to depend on the country-specific political situation.

[5] IMF (2014a, b).

volatility in the assessments of sustainability both over time as well as between creditor institutions, and how amendments to the analytical frameworks have further weakened the robustness of their conclusions. Second, we compare the European and IMF crisis lending frameworks and show that neither of the current frameworks sufficiently takes into account the extent of Greece's dependence on official sector funding. We analyze Greek debt using a present value approach to account for the concessionality elements. The main finding is that the overall debt contains a grant element of 37%, and the European loans up to 60%. Nevertheless, even in present value terms, Greek debt breaches sustainability thresholds and more relief, in particular on the debt service in the medium term, may be necessary.

We are not the first to argue that the face value of (gross) sovereign debt may be a misleading measure. For a very high debt country like Japan is it has long been suggested that government debt should be measured in net rather than gross terms. The IMF has endorsed the view that in some cases, net debt after accounting for sovereign assets should be considered.[6] A more recent suggestion is that sovereign debt should be expressed according to international accounting standards, including measuring the debt stock at fair values.[7] We are more in line with Dias et al. (2014) who show that measuring debt in present value, rather than face value, enables cross-country comparisons and discourages hiding true indebtedness behind convenient debt profiles. But our main point applies to Greece and countries borrowing from the ESM. For them, looking at gross debt will lead to misdiagnosis.

The remainder of the paper is organized as follows. Section 2 reviews the Greek debt sustainability analyses since the crisis erupted in 2009. Section 3 discusses the European and IMF debt sustainability analysis frameworks. Section 4 shows the results of analyzing Greek debt using the present value approach. Section 5 provides our policy conclusions.

II. The brief history of the (mis)diagnosis of Greek debt

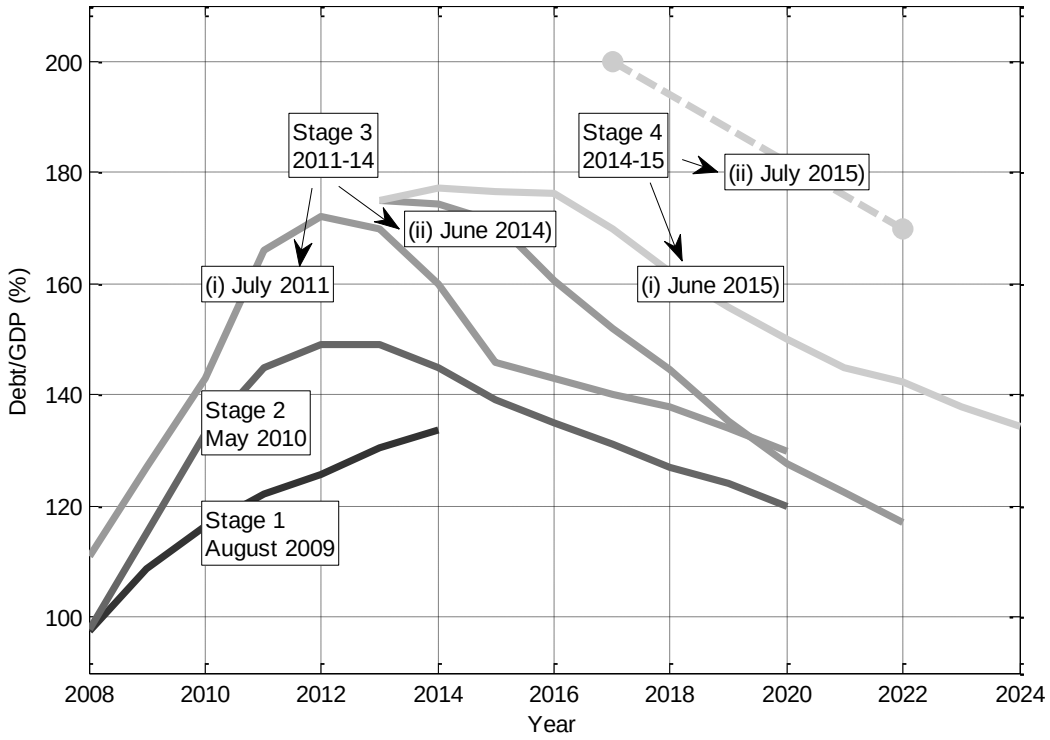
With hindsight, the recent history of Greek debt analysis is a story of repeated underestimating of debt dynamics. It can be structured into four stages with the first stage starting in the fall of 2009 (figure 1). At that time Greece was already in an Excess Deficit Procedure for breaching the limits of the Maastricht treaty, and had committed to bringing its deficit back to 3% of GDP during the coming year. In summer of 2009 the IMF already estimated the current deficit at 6.2% and warned that debt dynamics would become unsustainable unless policies where radically changed (see figure 1 first debt projection, IMF 2009). The debt/GDP ratio was expected to rise above 100% in 2009, and increase further to more than 120% within two years. The analysis concluded that fiscal consolidation was immediately required to achieve sustainability, but that fairly modest adjustments of 1.5% of GDP would be sufficient.

The Greek authorities pushed back on this assessment and in October shocked the world when they doubled the deficit estimates to 12.5% (at the same time they revealed misreporting of past

[6] IMF (2013a).
[7] See Serafeim (2015) and Kazarian (2015).

numbers, which also turned out to be substantially higher).[8] Concerns about fiscal sustainability deepened and triggered a confidence crisis. With hindsight it seems evident that the fiscal institutions and rules of the European stability and growth pact had not been able to detect, let alone prevent, the rapid increase in Greek debt and deficits. Nor had markets spotted the risks in time. When they woke up, financing quickly dried up. This is how Greece contributed to spur a series of reforms of the Eurozone designed to improve fiscal governance.

Figure 1: Four stages of (mis-)diagnosed Greek debt sustainability



NOTES: The graph shows the debt/GDP projections from the IMF's debt sustainability analyses at the four stages described in the text. The latest publication from July 2015 did not contain a full analysis, but only two datapoints: a peak at close to 200% within the next two years, and a reduction to 170% in 2022. The dashed line represents the lack of full data. All data are taken from the IMF (2009, 2010a, 2011, 2015a, 2015b).

The second stage began in May 2010 with the first joint bailout by Eurozone governments and the IMF. It constitutes the "original sin" in the recent history of Greek debt sustainability analysis, as well as major changes in the institutional framework of the Eurozone and the Fund. For the Eurozone it exposed the inconsistency of the "no bail-out" promise enshrined in Article 125 of the Treaty on the functioning of the European Union. Faced with the threat of an the imminent Greek sovereign default and high uncertainties about the direct and indirect costs to the monetary union, a "quick fix" was found to circumvent the "no bail-out" clause: Eurozone partner countries granted a credit line of up to EUR 80bn in bilateral loans through a special

[8] Moreover, Eurostat noted that it could not verify the new figures and flagged the risk of further upward revisions. The council of ministers of finance immediately mandated the European Commission to investigate. The report concludes that the quality and the governance of Greek fiscal statistics are seen as insufficient" revisions of this magnitude have been extremely rare in other EU Member States, but have taken place for Greece on several occasions" (EC 2010, p 3).

vehicle, the Greek Loan Facility (GLF).[9] This exceptional vehicle was replaced first with the creation of a multilateral structure (the European Financial Stability Fund, EFSF) and then though a treaty establishing the European Stability Mechanism (ESM). Thus, the Eurozone architecture had been significantly reformed.

For the IMF, the first Greek program also brought about an important change in its own policies. The May 2010 stand-by program granted Greece exceptional access to draw EUR 30bn, more than 3,000% of its quota. The sticky point of granting such a high level of access was the debt sustainability criterion. Under the baseline scenario, the Fund projected Greece's public debt as a share of GDP to peak in 2013 at 149% and gradually decline to 120% by 2020, although many risks to this baseline scenario were flagged.[10] On balance, the IMF considered debt to be sustainable over the medium term; however it noted that the significant uncertainties "make it difficult to state categorically that this is the case with a high probability".[11] Under the then existing exceptional access policy this statement would have precluded the Fund from approving the program without requiring a debt restructuring first. The quick-fix solution was to introduce a "systemic exemption" from the rule due to the high risk of international spillovers. This solution implied a major change in IMF lending policies since it means that the Fund can lend to insolvent countries, provided that spillovers are seen to be large.[12] The "systemic exemption" eventually became a permanent feature of IMF exceptional access policies.[13]

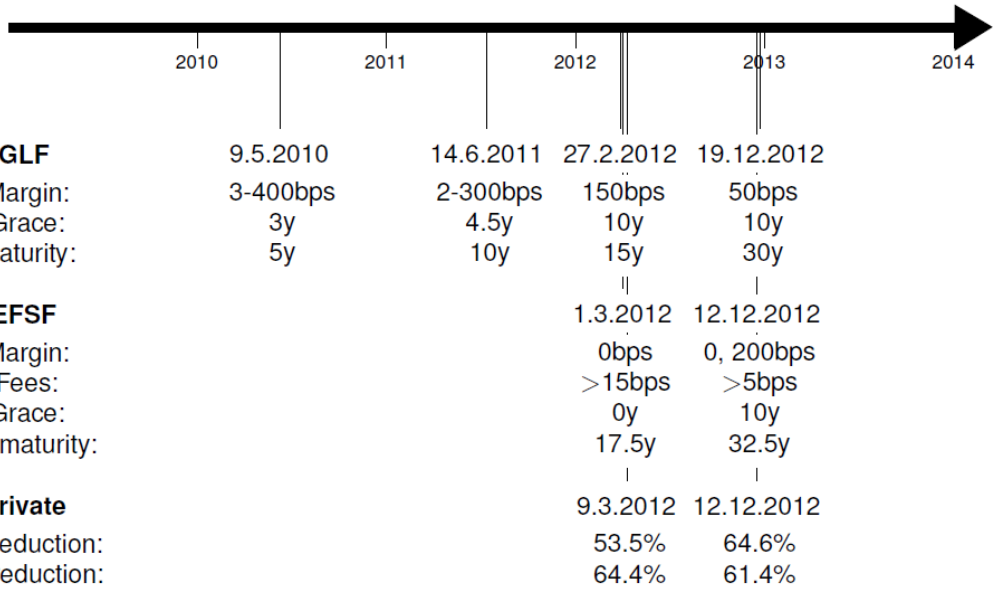
The third stage was the time of reckoning, when official-sector creditors acknowledged a debt restructuring was necessary. By mid-2011 Greek debt dynamics were generally recognized as unsustainable and a restructuring as unavoidable.[14] The well-publicized and documented part of this stage is the restructuring of private debt, which took place in March 2012. The process involved retroactively changing contracts by legislative action (the retrofitting of collective action clauses in domestic law bonds) and a good measure of coercion by governments on financial institutions; but the result was a high participation rate and a deep haircut with present value reduction of over 60%.[15]

The official sector part of the third stage was much more silent. Over time European public sector loans were also restructured, deeply and repeatedly. Figure 2 shows the timeline of Greek debt restructurings through the two main public loan vehicles for Greece, the GLF and the EFSF. Interest rates on bilateral loans in the GLF were lowered in three steps between 2010 and 2013, reducing the interest margin over the floating 3m EURIBOR rate from 3-400 bps to 50bps. Even more pronounced were the extensions of the grace period, from 3 to 10 years, and of the

[9] The eventually drawn amount was EUR 52.9bn.
[10] IMF (2010a).
[11] (IMF 2010a, p 20)
[12] The fact that this constituted a change in policies was not obvious to the board and lead to a heated discussion once one director had pointed it out. Directors first thought that this exception would only be applied to Greece, but the legal department of the IMF explained that it would carry over to all member countries due to equal treatment requirements (IMF 2010b).
[13] IMF (2014).
[14] IMF (2011).
[15] Zettelmeyer et. al. (2013).

maturity, from 5 to 30 years. EFSF loan conditions were also restructured in a similar way, most importantly by almost doubling the average maturity of the loans to more than 30 years.

Figure 2: Greek loan conditions over time



NOTES: The first entry for the Greek Loan Facility (GLF) and the European Financial Stability Fund (EFSF) denote the original terms of the loans, as set out in the Loan Facility Agreement (2010) and EFSF (2012a). The subsequent amendments to the GLF conditions were passed in the Amendments to the Loan Facility Agreement (2011, 2012a, 2012b), and to the EFSF conditions (2012b). The November 2012 agreement of the Eurogroup in which the GLF and EFSF restructurings of December 2012 were announced contained further measures to ease the Greek debt burden that were not part of the implemented agreements (Eurogroup 2012). In particular, these include a commitment to pass on profits from the bond purchases under the ECB's securities markets programme, and that further adjustments of the loan conditions would be considered conditional on the successful implementation of the reform programme. Data on the private sector restructurings are from Zettelmeyer et al. (2013) and include the PSI deal of March 2012 as well as the buyback operation of December 2012.

These concessions of European partner countries on lending conditions for Greece had a permanent effect on lending policies. The conditions of EFSF lending were amended accordingly, and the other EFSF program countries Ireland and Portugal similarly benefited from debt relief in the form of significantly increased maturities.[16] ESM lending policies were aligned. As a consequence, European crisis lending conditions are now closer to World Bank long-term lending to low income countries than IMF-type, short-term balance of payments assistance. Repayment schedules of European crisis loans are at least on par with the concessional maturities of World Bank financing.[17] Again, this reform was triggered by Greece but has now become a recurring feature and implies that the ESM will be engaged in crisis countries for the long haul.

[16] The maturity on Ireland's loan was increased from between 2016-29 to 2029-2042, and on Portugal loan from 2015-38 to 2025-2040, increasing the average weighted maturity to more than 20 years (EFSF 2013a, 2013b).
[17] The maximum term on World Bank (IBRD) loans is 35 years, with an average weighted maturity of 20 years (World Bank 2014). Non-concessional IMF loans are due much earlier, with final maturities between 3.25-5 years (Stand-By Arrangements) and 4.5-10 years (Extended Fund Facility); even for concessional loans, the IMF expects repayment within 8-10 years (IMF 2015c).

After the combined private and official debt relief the Troika concluded that Greek debt was finally sustainable. Moreover, the assessment became gradually more optimistic (see figure 1, IMF debt projection of May 2014). By the beginning of 2015 the Troika saw Greece on a good path. In its request for an extension of the Greek program to the German parliament, the Ministry of Finance justified the extension with a "confirmation of debt sustainability" by the European Commission, and explained that the "debt sustainability has improved since the last program review of April 2014".[18]

The fourth stage is the ongoing conflict between official creditors about debt sustainability, which at the time of writing this issue remains unresolved. On the one side the IMF has made debt relief a condition for participation in a third Greek program. In July it published two new debt projections within a short time (figure 1). It then argued that the systemic exemption can no longer be invoked for Greece and that it will not participate in funding a new program unless there is further debt restructuring on the European side. The Europeans have decided to go ahead with financing but debt restructuring and burden-sharing within the official sector is still subject to negotiation. These different approaches beg the question, whether there are differences in the debt sustainability analysis and lending framework between European institutions and the IMF. We turn to this question next.

III. A "look under the hood" of different debt sustainability analyses

The lending frameworks of IMF and ESM set the parameters under which countries in financial distress are considered illiquid rather than insolvent, and can therefore receive emergency financing without restructuring existing debt first. Within this framework the criteria to analyze debt sustainability play a crucial role.

The role of debt sustainability in the ESM and IMF crisis lending frameworks

The European crisis lending framework as laid out in the 2012 treaty establishing the ESM provides for a rule-based decision making about granting emergency loans. Article 13 requests that an application by a member state will be considered based on an assessment of three criteria through the EC and the ECB:

1. The risks to the financial stability of the euro area as a whole.
2. The sustainability of public debt (if appropriate, in conjunction with the IMF).
3. The actual or potential financing needs of the applicant member state.

In principle, ESM loans will only be extended if the member state's public debt is sustainable. However, the treaty does not give a clear guidance on how to proceed if the results of the ESM/EC/ECB debt sustainability analysis indicate an unsustainable situation.[19] Specifically, there are no provisions that would require a debt restructuring to unlock ESM access in a case

[18] BMF (2014, p. 4).

[19] We refer to the debt sustainability analysis framework mentioned in the ESM treaty, which is conducted jointly by the European Commission and European Central Bank, in the following as the "ESM framework".

where the DSA suggests an unsustainable debt. In addition, the assessment of financial risks "of the euro area as a whole" provides wide leeway for decision-making about loans regardless of the DSA results. In the assessment of the Greek loan application of July 2015, the EU concluded that although direct financial risks of a Greek default were small, they would create "significant doubts on the integrity of the euro area as a whole, currently and in the future" (EC 2015 p.5). This is bound to be the case for every member of the Eurozone.

The IMF's framework for lending "of last resort" to countries in financial trouble likewise relies on multiple variables. First and foremost, a country's maximum loan volume is determined by its "quota" – a blended measure of a nation's GDP, financial openness and its volatility, and official reserves.[20] In normal circumstances, countries are allowed to borrow up to 200% of their quota during a 12-month period, and not more than a cumulative 600% of their quota. The Greek quota, for instance, currently stands at SDR 1.1bn, or about USD 1.5bn, which would have limited the maximum Greek borrowing from the IMF to circa USD 9bn. However, in exceptional circumstances, member countries are allowed to borrow more than the normal limits under the exceptional access policy.[21] To obtain exceptional access under the rules prevalent at the time of the first Greek program four criteria had to be met:[22]

1. The country is under exceptional balance-of-payments-pressure exceeding the normal limits.
2. A debt sustainability analysis indicates a high probability that the debt will remain sustainable. If the debt sustainability analysis cannot conclude this with high probability, exceptional access may be granted on grounds of systemic concerns ("systemic exemption").
3. The country has good chances of regaining access to private markets before the bailout ends.
4. The country has a policy program convincingly promising success, as well as the institutional quality to implement the program.

Like the European framework, the IMF requires an in-depth DSA of the country's debt stock. Prior to the introduction of the "systemic exemption", and different from the European framework, the outcome of this analysis clearly prescribed if a debt restructuring was required before a loan could be granted.[23] Only if the debt level was deemed sustainable with high probability, exceptional access could be granted without recourse to a debt restructuring. If the debt was considered unsustainable, or sustainable but not with a high probability, no loans could be extended without a prior debt restructuring.

[20] IMF (2008).
[21] Access to this exceptional credit facility is determined by additional variables beyond the country quota. Providing large loans to countries in financial distress comes at greater risks, and granting exceptional access has therefore been controversial ever since Mexico received the first such loan of 688% of its quota in 1995 (IMF 1995). With the experience of further emerging markets-crises in the 1990s in mind, the IMF formalized this instrument in the early 2000s (IMF 2002, 2004).
[22] IMF (2004, p. 4).
[23] IMF (2014a).

The systemic exemption introduced as a consequence of the first Greek program in 2010 has therefore been a major policy change to this framework. It opens a loophole to grant access to exceptional financing even if the debt sustainability analysis suggests that the debt stock is not sustainable with high probability. Invoking the systemic exemption avoids a debt restructuring, if it is deemed to have exceedingly large negative externalities but the judgment of what constitutes a large externality is not bound.

How is debt sustainability assessed?

The IMF's as well as the ESM's debt sustainability analysis methodologies both require an analysis of the debt stock in a static framework using observed data about the current situation, as well as a dynamic framework using forecast data.[24] Forecasting requires a comprehensive macroeconomic model of at least growth, inflation, interest, and exchange rates, as well as fiscal policies, and is thus subject to uncertainty. Besides the benchmark assumptions, the data is therefore also exposed to a series of robustness checks and stochastic analyses in which alternative data trajectories are considered.[25]

The results of these exercises are then compared to a set of thresholds that mark an increased risk of debt distress. These thresholds are derived from running early-warning systems in the spirit of Kaminsky and Reinhart (1999) or Kraay and Nehru (2004). In these models, various measures of financial distress are regressed on a set of macroeconomic variables. In the IMF framework, the maximum thresholds for those variables are set such that the predicted probability of debt distress remains below 20%.[26] The ESM framework chooses the thresholds such as to minimize an equally weighted sum of false-positive and false-negative signals.[27] Table 1 shows the various thresholds for both frameworks, as well as for different country groups. While the ESM does not distinguish between different countries, the IMF framework has different variables for market-access and low-income countries. In addition, the values for advanced, emerging market, and developing economies are set different levels, and within the group of low-income countries further differentiated according to the institutional quality.

A country is only considered at low risk of debt distress if its debt stock and the predicted future development do not exceed these thresholds, both under the benchmark as well as under the robustness scenarios with more negative assumptions. If the indicators exceed the thresholds in the baseline scenarios, the probability of debt distress is considered high. The middle ground is more ambiguous: a moderate risk-rating is assigned if the thresholds are breached in the robustness scenarios, but remain below the critical values under the baseline assumptions.

The general framework is thus similar for all countries, both in the IMF and the ESM framework. However, the IMF analysis significantly differs between low-income countries (LIC) and market-access countries (MAC) along at least two dimensions that are not contained in the ESM analysis:

[24] IMF (2013a, b) and EC (2014).
[25] In particular, this includes negative shocks to the primary balance, real GDP growth, nominal interest rates, exchange rate, and contingent liabilities.
[26] IMF (2013a).
[27] Berti et al. (2012), EC (2014).

Table 1: Thresholds for risk of debt distress under different debt sustainability analysis templates

	European Commission	**IMF**			
	EU member states	*Market-access countries*		*Low-income countries*	
		Advanced economies	Emerging markets	Low-income countries	
				Policy-rating	
Debt/GDP	90%	85%	70%	Weak	38%
				Medium	56%
				Strong	74%
Gross financing needs	15%	20%	15%		
Debt profile					
Bond spreads	< 231 - 276.6	< 400, < 600, > 600	< 200, < 600, > 600		-
External financing requirement/GDP		< 17%, < 25%, > 25%	< 5%, < 15%, > 15%		-
Foreign currency debt/Total debt	29.82%	-	< 20%, < 60%, > 60%		-
Non-resident-held debt/Total debt	49.02%	< 30%, < 45%, > 45%	< 15%, < 45%, > 45%		-
Change in short-term debt	2.76	< 1, < 1.5, > 1.5	< 0.5, < 1, > 1		-
PPG external debt/GDP	-	-	-	Weak	30%
				Medium	40%
				Strong	50%
PPG external debt/exports	-	-	-	Weak	100%
				Medium	150%
				Strong	200%
PPG external debt/revenues	-	-	-	Weak	200%
				Medium	250%
				Strong	300%
PPG external debt service/exports	-	-	-	Weak	15%
				Medium	20%
				Strong	25%
PPG external debt service/revenues	-	-	-	Weak	18%
				Medium	20%
				Strong	22%

NOTES: The increasing values in the debt profile section of IMF MAC framework reflect values for low, medium, and high risk. The IMF LIC framework includes public and publicly guaranteed (PPG) debt. The thresholds in this framework are also conditioned on the quality of the country's policies and institutions, as measured by the World Bank's Country Policy and Institutional Assessment (CPIA) Rating. Countries with a higher CPIA rating are considered to be more resilient to indebtedness, and therefore higher thresholds are applied. All values are taken from EC (2014) and IMF (2013a, 2013b).

First, as the name suggests, market-access countries are assumed to borrow predominantly at market terms from market sources. This requires specific assumptions about the type and cost of market financing, including modeling the coupon, maturity, and currency structure of the debt. For low-income countries, borrowing from capital markets is considered an option, but since many low-income countries rely on official financing, the debt sustainability analysis predominantly assumes this source of funds and their specific form.

Second, for market-access countries, the stock of debt is considered at nominal values. This is in line with the emphasis on market financing: since the fiscal needs need to be covered with new issues, nominal liabilities reflect the direct issuance needs. The liabilities thus only comprise the amortization payments, without taking into account coupon payments or the life of a debt instrument:

$$FV = \sum_{t=0}^{T} A_t$$

where A_t represents amortization payments in year t. Coupon payments are not contained in the face-value measure of the debt stock FV.

This is different for low-income countries, who receive most of their financing from official sources, and whose debts are computed and analyzed in discounted present values. The present value is computed including all discounted cash flows:

$$PV = \sum_{t=0}^{T} \frac{C_t}{(1+d)^t} + \frac{A_t}{(1+d)^t}$$

where C_t represents coupon payments in year t, and d is the discount rate, which is set to 5%.[28] If a country borrows at market rates, the difference between the present and face value should be marginal, since the contracted interest rate should compensate for the discounting of future repayments. Expressing indebtedness in present rather than nominal terms thus not only ensures its comparability independent of repayment profiles, but also accounts better for debt which is contracted at below-market terms and long maturities. This is in line with the fact that the IMF's framework for low-income countries has been developed in cooperation with the World Bank, whose funding facilities have considerably longer terms than the IMF's emergency loans. The ESM does not make this distinction, and measures debt levels only at face value in its analysis, despite the grant element contained in its own lending.

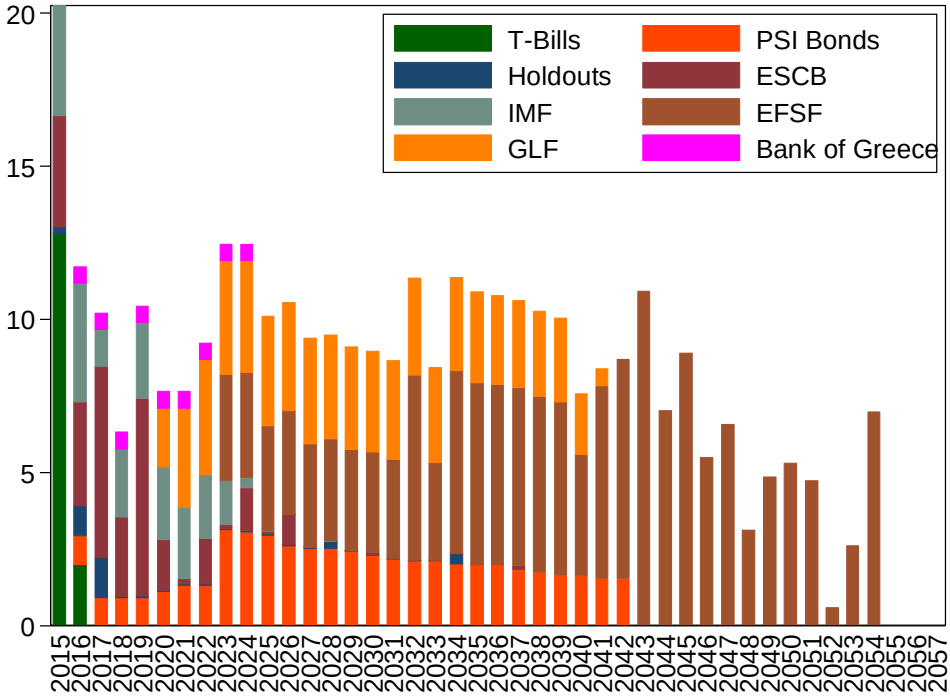
IV. The grant element in Greek debt

While Greek had been exclusively relying on private financing between the introduction of the euro and the start of the European sovereign debt crisis in 2009, the Greek debt today in many ways resembles the description of a low-income country's debt stock. As of end-July 2015, before the third program had been negotiated, more than 80% of its current outstanding debt is owed to official creditors. The average maturity is 15.7 years, with an average interest rate of 2.7%.[29]

Figure 3 shows the debt profile of Greece by creditor.[30] Only the relatively large amount of short-term debt (T-bills) and the remaining holdout bonds that were not restructured in 2012 require repayments to private investors within the next 8 years. Afterwards, the remaining PSI bonds amortize over a period of 20 years, stretched out through the maturity extensions of the 2012 debt restructuring. The bulk of the debt is owed to the EFSF, other Eurozone governments through the GLF, the IMF, and the ECB as well as other members of the European System of Central Banks (ESCB). Notably, the European official loans through the GLF and the EFSF only start becoming due in 2020 and 2023, respectively, and repayments are stretched out until 2054.

[28] IMF (2013c).
[29] See PDMA (2015). To put this in perspective, the average maturity of Italian and French sovereign debt is 6.5 and 6.9 years, respectively (Dipartimento del Tesoro 2015, Agence France Trésor 2015).
[30] Not including the new ESM program.

Figure 3: Greek repayment profile by creditor (face value)



As explained above, the official loans are extended at highly favorable terms (Table 2). This generates a significant element of concessionality: using a discount rate of 5% to compare the face value of the EFSF and GLF loans to their present value reveals considerable "grant elements" of up to 61%. On average, the Greek debt stock contains a grant element of 37%.

The recently negotiated third program over EUR 86bn is likely to increase this concessionality. The new ESM program will have the same 32.5 average maturity as the EFSF loans, with amortizations beginning in 2034, and similarly favorable interest rates. Assuming the IMF will contribute circa 10% of the total volume, in line with the currently outstanding share of IMF/European commitments, and request a maturity of 5 years, the average grant element will rise to more than 40%.

This perspective also considerably changes the evaluation of the debt stock. In face value terms, Greece's sovereign liabilities exceed 150% of GDP, or almost twice the benchmark for risk of debt distress of 85%.[31] Computing the present value of the debt stock, this headline figure drops to 98%. This is still in excess of the relevant IMF benchmark for low-income countries of 74% (see Table 1), but only about 25%age points. The new program, if enacted along the assumed lines, would increase the NPV of Greek debt to about 120% of GDP.

Important for the interpretation of these results is that the stark difference between face and present value of Greek debt is not a level effect that would leave the relative comparison of

[31] We do not include loans for which we could not find independent confirmation of the repayment schedule. This includes loans by the European Investment Bank, short-term repos, and additional foreign loans considered as "other" (Euronews 2015).

Greece to other European countries unchanged. Appendix Table A1 shows the debt composition for Italy and France, including the face as well as present value of their marketable debt. For France, the face value amounts to about 74% of GDP; the present value is only slightly lower at 69%. A similar picture emerges for Italy, with a face value indebtedness of 116% to GDP, or 113% if measured in present values.[32] This means that comparing Greek debt in face values to these countries puts it in a different league of its own; taking into account the present value of its debt profile puts Greece between France and Italy, and only slightly ahead if including the third program.

Table 2: Debt composition Greece

Debt	**Face value (Bn EUR)**	**Interest (Bn EUR)**	**Present value (Bn EUR)**	**Grant element** 1/
T-Bills	14.8	-	14.6	n/a
Bonds (PSI)	30.5	20.7	26.8	12%
Bonds (Holdouts)	2.8	0.7	2.9	-2%
Bonds (ECB, NCBs, EIB)	23.6	4.9	24.2	-2%
IMF	19.5	2.5	18.6	5%
EFSF	131.0	27.8	51.4	61%
GLF	52.9	13.5	33.2	37%
Bank of Greece 2/	4.8	-	3.8	n/a
Total (w/o new programme)	**280.1**	**70.0**	**175.6**	**37%**
of GDP	**156%**		**98%**	
	New programme 3/			
ESM	*77.8*	*31.7*	*31.9*	*59%*
IMF	*8.2*	*0.93*	*7.6*	*8%*
Total new programme	*86.0*	*32.7*	*39.5*	*54%*
Total	***366.1***	***102.6***	***215.1***	***41%***
of GDP	***204%***		***120%***	

1/ Defined as *GE = 1 - PV/NV* (IMF 2013b)

2/ Assuming constant amortization.

3/ Assuming the new programme is identical to the previous programmes with respect to the share of IMF/European lending.

However, while the debt appears much lower, applying the benchmarks of the low-income countries' DSA framework would still lead to the conclusion that Greek debt is not sustainable, and that further debt restructuring is necessary. In its most recent DSA, the IMF has expressed a similar judgment. Furthermore, the IMF has acknowledged that the nominal gross debt/GDP ratio is no longer a meaningful metric to evaluate sustainability.[33] The analysis suggests to look

[32] We only account for marketable debt, which reduces these numbers relative to the total indebtedness of 95% (France) and 132.1% (Italy), respectively (Agence France Trésor 2015).
[33] IMF (2015a, p. 11).

at gross financing needs instead, which increase relative to GDP above critical thresholds of 15-20% when the European loans start coming due in the mid-2020s.

The IMF proposes a restructuring could take the form of doubling the maturities on the European loans. However, due to the significant grant element of the EFSF and GLF loans, a pure re-profiling of this part of Greek debt will achieve a relatively smaller reduction in the present-value debt stock than an extension of maturities of earlier liabilities. Average maturities on the GLF and EFSF loans are already more than 30 years. For every euro due in 30 years, a doubling of maturities reduces the present value of that liability by only 19 cents. On the other hand, extending the term of a euro coming due next year by only 10 years reduces the present value of that obligation by 38 cents.

A debt operation only extending the European loans will therefore be relatively less efficient in achieving present-value debt stock reductions than a restructuring including shorter-term liabilities. Furthermore, it will not ease the financing needs until the mid-2020s, when those loans start becoming due. If funding pressure in the short to medium term needs to be reduced, either longer grace periods on the European loans, or an extension of repayment terms to the IMF and ECB are necessary to achieve meaningful effects. Due to their implicit seniority status, however, the latter is unlikely to occur. The requirement for a debt restructuring thus opens questions about burden-sharing within the official sector, whose answers depend on whether short to medium-term or long-term problems should be addressed by such an operation.

V. Policy Implications

The analysis of this paper has policy implication on three levels. First and most immediately, there are implications for the ongoing negotiations on the third Greek program. We have shown that the nominal debt stock projections paint far too bleak a picture of the actual burden. Evaluated in present value terms, Greek debt stands at about 100% and rises to about 120% under the new program, which is not exceptionally high for advanced countries. Nevertheless, even in present value terms, Greece still breaches the thresholds of the standard DSA for market-access countries and even those applied to lower-income countries.

Despite the extraordinary amount of private and public debt relief Greece has already received, further debt restructuring will be necessary. Moreover, the profile of Greek repayments shows that the liquidity squeeze is particularly high in the short to medium run. This is in line with the most recent IMF DSA, which has shifted to stressing gross financing needs rather than nominal debt stocks. A further extension of grace periods and maturities could alleviate this problem. But it leaves the question of burden-sharing and seniority within the official sector. The repayments over the next years are mostly owed to the IMF and the ECB, thus further concessions from the European partners would reduce their risk. This may contribute to the tough positions the IMF has recently adopted.

In the medium run, a key challenge for Greek debt managers will be to find a way of moving the official debts back to private investors on sustainable terms. Private creditors are unlikely to

extend funds at similarly concessional terms as the European official creditors. But refinancing the debt at market prices, and thereby removing the grant element of the current debt stock, will diminish the difference between present and face value again.

The second set of implications concern the mechanics of assessing debt sustainability in the official sector. Both the ESM and the IMF still apply the market-access framework to Greece, thus not taking into account the effective present-value debt relief that has already been granted. This is especially paradoxical in the case of the ESM, since the grant element of up to 60% is only contained in European loans. Nevertheless, the headline number of 200% nominal debt stock is still used in public and in negotiations. While the low-income country framework of the IMF/World Bank does account for grant elements in official lending, it also does not seem appropriate for a case like Greece. In particular, the low-income country framework sets different levels for debt sustainability depending on the quality of institutions and policies. This may be sound in principle but not feasible in practice inside the Eurozone.

Finally, there are broader implications for the European monetary union as well as the international monetary regime. The Greek debt drama has profoundly changed the architecture of the Eurozone: it spurred a furry of reforms of the fiscal governance at the EU level, it led to the creation of a permanent crisis lending mechanism, and finally, it designed the ESM from an "IMF-like" to a "World Bank-like" institution. The importance of this last step has not been sufficiently recognized. De facto, the large grant element in European crisis lending has added fiscal buffer to the architecture of the monetary union by stretching the adjustment burden over time. At the same time it means that repayment of loans to European institutions now could extend over several decades, which may be problematic if political constellations change. Greek debt to the European official sector now already extends to 2054 and may be further extended.[34] This raises the specter of renewed political summersaults and decades of renegotiations, which are extremely bruising for both sides. This might be a reason why the Eurozone partner countries should consider some scheme akin to the Highly Indebted Poor Countries (HIPC) process, where multilateral debt forgiveness was granted after an extended period of good policy track record.

For the IMF the introduction of the "systemic exemption" has blown a large hole into its lending framework. The principle of committing to not lend into unsustainable debt dynamics is sound for several reasons: it protects the IMF resources, it protects the debtor from excess adjustment, and from restructuring too little, too late and at too great costs. So far the systemic exemption has been invoked 34 times, after all, negative externalities can always be expected in debt crises of larger countries. The IMF reputation has suffered but the shareholders seem to prefer not to bind their own hands and keep the option of an exemption whenever it seems opportune.

The ESM has an even larger commitment problem. Its version of the systemic exemption is the requirement that the euro area as a whole would suffer from financial distress if a loan was not granted. According to the latest Greek program assessment this requirement will always be fulfilled since any disorderly default or exit would raise doubt about the integrity of the Eurozone. It has become meaningless as a commitment device and therefore, it is even more

[34] The new ESM program already has a projected repayment period up to 2059.

important that the ESM develops a stringent framework which in the future prevents it from lending into insolvency.

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Appendix

Table A1: Marketable debt composition France and Italy

Debt	Face value (Bn EUR)	Interest (Bn EUR) 1/	Present value (Bn EUR)	Difference PV/FV
		France 1/		
T-Bills	155.9	-	153.9	1.2%
Bonds	1,429.0	424.8	1,331.3	6.8%
Total	**1,585**		**1,485**	**6.3%**
of GDP	**74%**		**69%**	
		Italy 2/		
T-Bills /2	136.3	-	134.1	1.6%
Bonds /3	1,742.5	535.5	1,691.1	2.9%
Total	**1,879**		**1,825**	**2.9%**
of GDP	**116%**		**113%**	

1/ Assuming HICP inflation rate of 2% and setting floating interest rate benchmarks to Euro-average (1999-2015).

2/ Bills: BTFs. Bonds: OATs, BTANs.

3/ Bills: BOTs. Bonds: BTPs, CCTs, EMTN, Eurobonds, Global bonds, ISPA OBBL.