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## Assessing the sustainability of Maltese government debt

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BANK ĊENTRALI TA' MALTA  
EUROSISTEMA  
CENTRAL BANK OF MALTA

## **Assessing the Sustainability of Maltese Government Debt**

**John Farrugia and Owen Grech<sup>1</sup>**

WP/04/2013

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## **Abstract**

This study discusses the concept of fiscal sustainability and, by so doing, sheds light on government debt dynamics. It then presents a conventional debt sustainability analysis (DSA) exercise to gauge the sustainability of Maltese general government debt over the medium to long term. The exercise consists of two alternative scenarios which reveal how the government debt-to-GDP ratio might evolve over the next decade. For robustness, each scenario is subjected to a number of adverse shocks. The results suggest that Maltese government debt is sustainable, but this comes with important caveats.

JEL classification: H63, H68.

Keywords: government debt sustainability, conventional debt sustainability analysis, Malta.

## 1. Introduction

The global financial and economic crisis has placed a significant strain on public finances in many advanced economies. Concerns over countries' ability to finance their rising debt commitments have led to a renewed interest in the study of debt sustainability, especially since sound public finances are a crucial foundation for price stability, financial stability and economic growth. This paper discusses the concept of fiscal sustainability and, by so doing, sheds light on government debt dynamics. It then presents a conventional debt sustainability analysis (DSA) exercise, commonly employed by many international institutions and financial market participants, to gauge the sustainability of Maltese general government debt over the medium to long term.<sup>2</sup>

## 2. The Concept of Fiscal Sustainability

The starting point for assessing debt sustainability is the government budget constraint – an equation that governs the evolution of government debt. It can be expressed as:

$$d_t = \frac{1 + r_t}{1 + g_t} d_{t-1} - pb_t + dda_t$$

and shows that the debt-to-GDP ratio ( $d_t$ ) is equal to the debt ratio inherited from the previous period ( $d_{t-1}$ ) multiplied by the “snowball effect” – which captures the joint impact of the real effective interest rate ( $r_t$ ) and the real GDP growth rate ( $g_t$ ) – less the primary balance-to-GDP ratio ( $pb_t$ ), plus the deficit-debt adjustment-to-GDP ratio ( $dda_t$ ).

Looking at the individual elements of the government budget constraint, the real effective interest rate, which is the nominal effective interest rate net of inflation, raises the debt ratio since it represents interest paid on past accumulated debt.<sup>3</sup>

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<sup>2</sup> Conventional DSA methodology is applied in Deutsche Bank Research (2010), ECB (2011), The Economist (2011) and ECB (2012). For alternative methodologies that have been employed to assess government debt sustainability, see European Commission (2011) and ECB (2012).

<sup>3</sup> The real interest rate is given by  $r = \frac{i - \pi}{1 + \pi}$ , where  $r$  is the real interest rate,  $i$  is the nominal interest rate and  $\pi$  is the inflation rate. However, it can be approximated by  $r \approx i - \pi$ , provided  $i$  and  $\pi$  are not large, say smaller than 10%.

Although the inflation rate does not feature explicitly in the government budget constraint above, it nonetheless reduces the debt-to-GDP ratio, via its impact on the real interest rate.

Since debt is expressed as a fraction of GDP, real GDP growth raises the denominator of the debt ratio and reduces the debt burden.

The primary balance is the overall balance (i.e. revenue less expenditure) excluding interest payments. A positive primary balance-to-GDP ratio lowers the debt ratio since a primary surplus allows the government to pay off some of the existing debt. Conversely, the debt ratio will increase if the primary balance-to-GDP ratio is negative, because a primary deficit has to be financed through further borrowing.

The deficit-debt adjustment, also referred to as the stock-flow adjustment, captures those transactions or factors that influence the outstanding debt but are not reflected in the primary balance. Examples include privatisation receipts, the purchase of assets, the granting of loans and changes in deposit holdings. A positive deficit-debt adjustment-to-GDP ratio is recorded when the net effect of such transactions is an increase in the outstanding debt. Hence, if this ratio is positive, the debt-to-GDP ratio will rise and vice versa.

If the government budget constraint is solved forward, one can derive a condition for debt sustainability, known as the inter-temporal budget constraint:

$$d_0 \leq \sum_{i=1}^{\infty} \rho_i (pb_i)$$

where  $d_0$  is the initial debt ratio,  $\rho_i$  is the discount factor that depends on future values of the real GDP growth rate and the real interest rate, and  $pb_i$  is the primary balance ratio.<sup>4,5</sup> The inter-temporal budget constraint reveals that, for debt to be sustainable, the net present value of all future primary balances must be large enough to repay the initial debt. In other words,

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<sup>4</sup> The discount factor is calculated as  $\rho_i = \frac{(1+g_i)}{(1+r_i)} \rho_{i-1}$ , where  $g_i$  is the real GDP growth rate and  $r_i$  is the real effective interest rate.

<sup>5</sup> For simplicity, here the deficit-debt adjustment is assumed to be equal to zero.

the original debt and the interest accumulated over time will eventually have to be paid through sufficiently large surplus primary balances.<sup>6</sup>

This facet of sustainability, referred to as solvency, is a medium- to long-term concept. There is, however, another side to sustainability. To be in a sustainable position, governments must also be liquid. Liquidity measures the government's ability to access financial markets, allowing it to meet all upcoming obligations in the short term. Although this paper focuses mainly on the solvency aspect of sustainability, and only briefly touches upon liquidity issues, the two dimensions of sustainability are important and closely interconnected.

### 3. Conventional DSA for Malta

Except for a brief period in the mid-2000s, the general government debt-to-GDP ratio in Malta has been on an upward trend since 1995 (see Chart 1), so that by the end of 2012 it stood at 72.1%.<sup>7</sup> Although lower than the euro area average ratio, a constantly increasing debt profile may prove to be unsustainable.

One way of assessing the solvency aspect of sustainability is to apply conventional DSA. Starting from the government budget constraint, conventional DSA involves assuming paths for the determinants of the evolution of the debt ratio ( $g_t, i_t, \pi_t, pb_t, dda_t$ ) over a medium- to long-term horizon, to generate a trajectory of the debt ratio. Within this context, projected debt paths are considered to be sustainable if they are unlikely to require 'major readjustments'.<sup>8</sup> This paper applies conventional DSA to generate two separate scenarios for Maltese government debt over a ten-year horizon spanning from 2013 to 2022. The assumptions underlying these scenarios are explained below and average values are provided in Table 1.

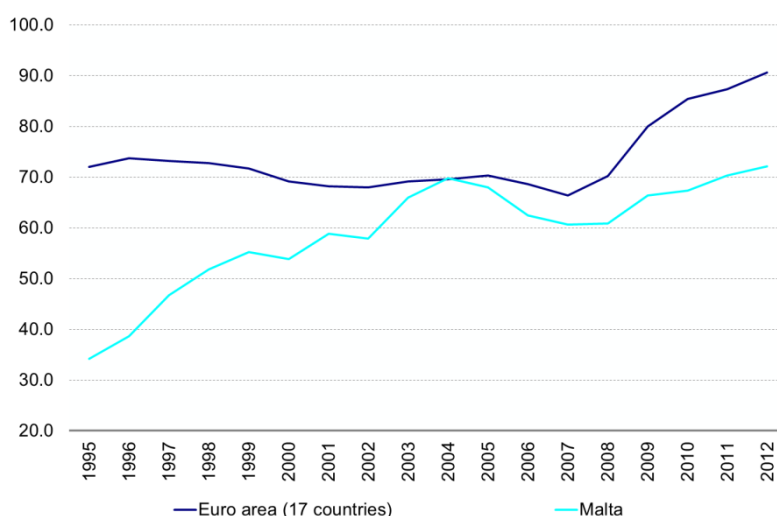
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<sup>6</sup> For further details on government debt dynamics and fiscal sustainability, see Escolano (2010) and Ley (2010).

<sup>7</sup> This study uses the 2012Q4 vintage of national accounts and general government statistics, published in March and April 2013, respectively.

<sup>8</sup> See Blanchard (1990).

**Chart 1**  
**GENERAL GOVERNMENT DEBT : 1995-2012**  
(% of GDP)



Source: Eurostat.

### 3.1. Scenario 1

The assumptions underlying the first scenario are based on the Bank's latest projections over the 2013-2015 period.<sup>9</sup> Thereafter, the paths for the input variables are constructed as follows. Real GDP growth is based on the Bank's estimates of potential growth with a simultaneous gradual closure of the output gap. This produces a gradually rising profile for real GDP growth.

The nominal interest rate is defined as an effective rate, that is, interest payments paid in the current year as a percentage of the previous year's debt. The interest payments reflect a projection of interest rates at different maturities and the maturity structure of government debt.<sup>10</sup> The projected interest rates are derived by applying a spread on euro area interest rate projections provided by the European Central Bank (ECB), while the maturity structure of government debt observed in 2012 is assumed to persist throughout the projection horizon.

<sup>9</sup> These projections were prepared for the Eurosystem's June 2013 Broad Macroeconomic Projection Exercise (BMPE). The BMPE is a biannual exercise resulting in projections covering various macroeconomic variables, based on a common set of assumptions and principles. For instance, on the fiscal side, measures are included only once they have been approved by the national parliament, or if they have been defined in sufficient detail by the government and are likely to pass the legislative process. This consideration accounts, in part, for the differences between the Bank's and the Government's forecasts. See ECB (2001) for further details regarding the Eurosystem's staff macroeconomic projection exercises.

<sup>10</sup> We distinguish between four maturities: three months, one year, five years and ten years.



Inflation, as measured by growth in the GDP deflator, is assumed to gradually converge to 1.9%, in the spirit of the ECB's objective of inflation rates that are below, but close to, 2% over the medium term.

Between 2016 and 2022, the structural component of the primary balance as a percentage of GDP is kept constant at the rate projected for 2015, while the cyclical component reacts to the output gap. This implies that the overall balance-to-GDP ratio is expected to improve by one percentage point over the projection horizon, reaching -2.3% by 2022 from -3.3% in 2012, which would largely be brought about through an improvement in the primary balance ratio.

The deficit-debt adjustment is set at zero from 2016 onward since over the medium to long term there is virtually no information on these one-off transactions.<sup>11</sup>

**Table 1**  
**SCENARIO ASSUMPTIONS: AVERAGES 2013-2022**

*Per cent*

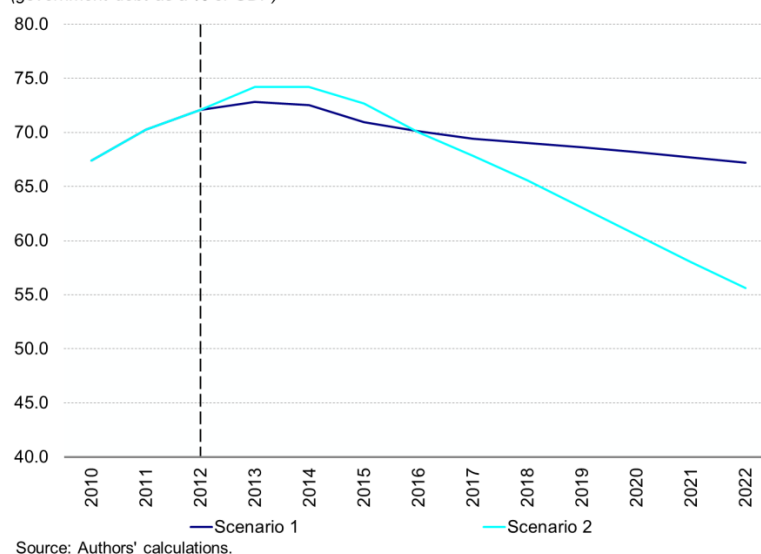
	Real GDP Growth	Nominal Interest Rate	Inflation	Primary Balance-to- GDP Ratio	Deficit-Debt Adjustment-to- GDP Ratio
Scenario 1	2.1	4.6	2.3	0.7	0.1
Scenario 2	2.0	4.7	2.0	2.2	0.2

Sources: Central Bank of Malta, Ministry of Finance: *Update of the Stability Programme: 2013-2016*, authors' assumptions.

These assumptions produce a trajectory for the debt-to-GDP ratio that is set to peak in 2013 before declining gradually to 67.3% by the end of the projection horizon in 2022 (see Chart 2). This improvement in the Government's fiscal position is largely driven by stronger real GDP growth and favourable developments in the primary balance ratio. These results are encouraging since they suggest that the upward trend in the debt ratio will be reversed in the coming years.

<sup>11</sup> The assumptions underlying the input variables over the period for which no official projections are available, are ones commonly employed in such exercises. The ECB, for example, makes similar assumptions in its conventional DSA exercises.

**Chart 2**  
**DEBT SUSTAINABILITY ANALYSIS - SCENARIOS**  
*(government debt as a % of GDP)*



### 3.2. Scenario 2

A second scenario, which is built on the Government's fiscal and macro projections as laid out in its latest Stability Programme Update, is also considered.<sup>12</sup> Since these projections only extend to 2016, assumptions are made regarding the values that the input variables take over the rest of the projection horizon. These assumptions are broadly in line with those underlying the first scenario over the 2017-2022 period. The main difference is the path given to the structural component of the primary balance as a percentage of GDP, which produces a gradually improving overall balance-to-GDP ratio, with a balanced budget achieved by the year 2020. This is in line with the degree of fiscal consolidation outlined in the Stability Programme Update and concords with the Government's intention of achieving a balanced budget over the medium term. Therefore, while the macro assumptions are only slightly less favourable than those under the first scenario, the fiscal targets are far more ambitious.

<sup>12</sup> In line with the requirements of the Stability and Growth Pact, all Eurosystem members are required to submit an annual assessment of their country's economic outlook in relation to their medium-term objectives, together with detailed proposals aimed at addressing potential shortcomings. These are contained in a Stability Programme Update. Malta's latest Update, covering the period 2013-2016, was published in April 2013. The Government's targets therein are closely tied to the commitments laid out in the Treaty on Stability, Coordination and Governance, also known as the Fiscal Compact. In line with the Compact, the Government has to actively pursue a policy of fiscal consolidation geared towards achieving a balanced budget in the medium term and consistently reducing the debt-to-GDP ratio until it falls below the 60% threshold value. For Malta's latest Update, see Malta's Ministry for Finance (2013a); and for further details on the Fiscal Compact, see Schembri (2013).

Together, these assumptions generate a path for the debt-to-GDP ratio that rises initially but declines considerably thereafter, with the debt ratio reaching 55.7% by 2022 (see Chart 2). Again, the decline in the debt ratio over the projection horizon is mainly the result of stronger real GDP growth and improvements in the primary balance ratio. By the end of the projection horizon, the debt ratio emerging from the second scenario is considerably lower than that of the first scenario – 55.7% compared to 67.3%. This variation is explained almost entirely by the different assumptions regarding the primary balance ratio.

### 3.3. Sensitivity Analysis

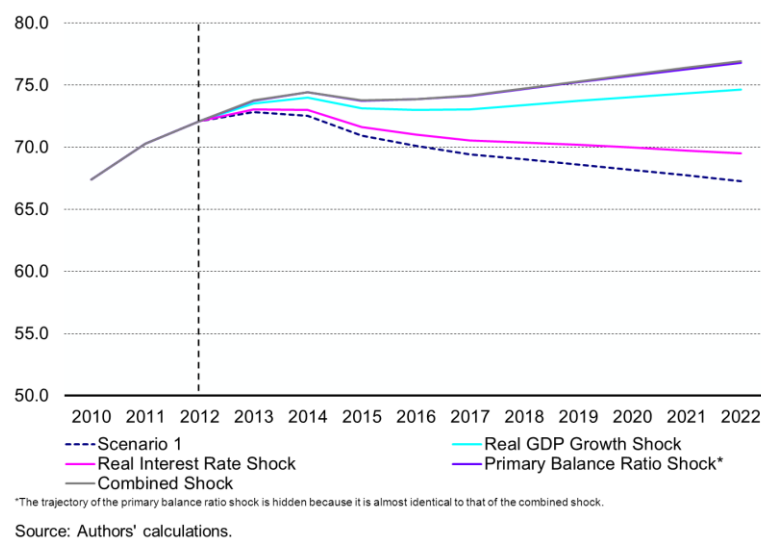
In order to assess the robustness of the results, four adverse shock scenarios, based on magnitudes that are common in the literature, are considered. These show how the debt trajectories would change if the macroeconomic environment is less favourable than assumed under the two scenarios. The first three shocks are adverse single-variable shocks to the real GDP growth rate, the real interest rate and the primary balance ratio, calculated as the baseline projection minus 0.5 of a historical standard deviation in the case of the real GDP growth and primary balance ratio shocks, and plus 0.5 of a historical standard deviation in the case of the real interest rate shock. Since an economic shock generally affects the real GDP growth rate, the real interest rate and the primary balance ratio simultaneously, the fourth shock is an adverse multi-variable shock of 0.25 of a historical standard deviation in all three variables. The shocks are all permanent ones, that is, they persist throughout the 2013-2022 period.<sup>13,14</sup> As shown in Charts 3 and 4, the sensitivity analysis reveals that under most of the shock scenarios, the debt ratio remains on a downward trajectory and in the few cases where the shock pushes the debt ratio along an upward path, increases in the ratio are very moderate.

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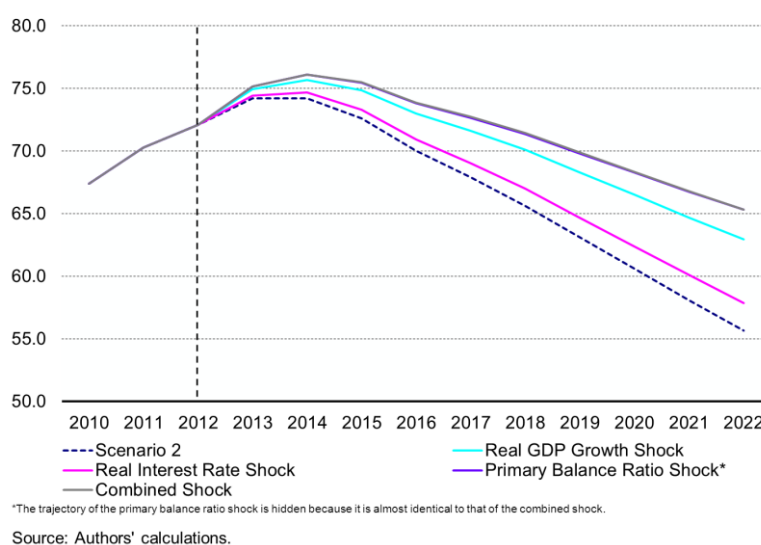
<sup>13</sup> The historical standard deviations are based on data covering the 2000-2012 period.

<sup>14</sup> The economic activity shock translates into real GDP growth that is 1.0 p.p. lower in each year of the projection horizon. Under the interest rate shock, real interest rates are 0.3 p.p. higher throughout, while the fiscal shock is equivalent to primary balance-to-GDP ratios that are 0.9 p.p. lower in all years. The combined shock translates into real GDP growth that is 0.5 p.p. lower, real interest rates that are 0.2 p.p. higher and primary balance ratios that are 0.5 p.p. lower in each year.

**Chart 3**  
**SHOCKS TO SCENARIO 1**  
(government debt as a % of GDP)



**Chart 4**  
**SHOCKS TO SCENARIO 2**  
(government debt as a % of GDP)



### 3.4. Is Maltese Government Debt Sustainable?

What can we infer about the sustainability of Maltese government debt? Recall how sustainability was defined within the context of conventional DSA. Projected debt paths are deemed to be sustainable if they are unlikely to require ‘major readjustments’, such as a substantial increase in taxation, major cuts in government spending, monetisation or outright default.

The analysis above does not point towards a likely need for drastic adjustments. First, the two principal scenarios suggest that the debt-to-GDP ratio is set to decline markedly over the next ten years. Since the Government can sustain the current debt ratio, it is unlikely to face difficulties in servicing lower debt ratios in the absence of significant changes to the current economic landscape. Second, sensitivity analysis reveals that the need for major adjustments will be unlikely even if substantial shocks materialise since debt ratios will still remain below the current level or slightly above it. In light of all this, Maltese government debt appears to be sustainable.<sup>15</sup> This comes, however, with a number of important caveats.

Firstly, conventional DSA only delivers reliable results to the extent that the assumed paths set for the macroeconomic, fiscal and financial variables used as inputs are realised. Secondly, although the empirical literature points towards interdependencies between these variables, this tool does not capture such feedback effects. For example, one strand of literature suggests that primary balances react to changes in the debt ratio, with fiscal tightening often following periods of rising indebtedness as governments attempt to address sustainability concerns.<sup>16</sup> In addition, several studies find that, beyond a certain threshold, debt has an adverse effect on economic growth.<sup>17</sup> Another empirical finding is that high debt ratios may lead to a rise in government bond yields.<sup>18</sup> These and other such links are absent from a conventional DSA setup. If feedback effects are believed to be limited, this approach

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<sup>15</sup> By assessing sustainability over the medium to long term, this study focuses on the solvency aspect of sustainability. Recall, however, that there are two dimensions to debt sustainability; solvency and liquidity. Therefore, for debt to be fully sustainable, the Government must also be in a liquid position. In order to gauge whether this is the case, a number of indicators which shed light on this aspect were considered. These included various facets of the debt structure – debt by maturity (short-term vs. long-term), debt by holder (resident vs. non-resident), debt by currency (domestic currency vs. foreign currency) and debt by instrument (fixed interest rate vs. floating interest rate) – and the evolution of government bond yield spreads. This analysis reveals that close to 90% of government debt has a residual maturity greater than one year. Consequently, debt needs to be rolled over rather infrequently and thus refinancing risks are limited. The share of government debt held by residents of Malta stands in excess of 90%. Indeed, higher shares of debt held by residents are generally preferred since residents are likely to be less sensitive to adverse economic developments because they usually have access to more accurate and timelier information than non-residents. Virtually all government debt is denominated in euro and hence there is almost no exposure to exchange rate risk. More than 95% of long-term debt (debt with a maturity that is greater than one year) is subject to a fixed interest rate and thus interest rate risk is also largely contained. Moreover, historically, government bond yield spreads have been relatively low and stable. Together, these considerations suggest that the Government is in a favourable position with regards to liquidity.

<sup>16</sup> As examples, see Bohn (1998), Mendoza and Ostry (2008) and ECB (2011).

<sup>17</sup> See Reinhart and Rogoff (2010), Kumar and Woo (2010), Checherita and Rother (2010), Cecchetti, Mohanty and Zampolli (2011), Balassone, Francese and Pace (2011), Padoan, Sila and van den Noord (2012) and Baum, Checherita-Westphal and Rother (2012).

<sup>18</sup> See, for example, Codogno, Favero and Missale (2003), Ardagna, Caselli and Lane (2004), Attinasi, Checherita and Nickel (2009) and Schuknecht, Von Hagen and Wolswijk (2010).

can be expected to deliver reliable results; however, if the interdependence between the input variables is pronounced, one should treat the results with caution. Finally, this analysis is based on explicit government liabilities only. However, there are other liabilities that might ultimately have to be borne by the Government, such as contingent liabilities, implicit liabilities and other off-budget liabilities.<sup>19,20</sup>

Despite its limitations, conventional DSA carries a number of advantages. It is fairly transparent and straightforward to use, which makes it easier to interpret and communicate the results. Moreover, the setup is flexible and hence the baseline can easily be adjusted to reflect a different set of assumptions. These benefits explain why this tool is widely used by international institutions and financial market participants alike.

## **4. Concluding Remarks**

A number of policy implications emerge from this analysis. The main conclusion that Maltese government debt appears to be sustainable partly hinges on the assumption that there will be fiscal consolidation over the medium to long term. It is therefore important for the Government to adhere to its commitment to fiscal discipline, particularly during economic upturns. In this regard, the 2014 pre-budget document outlines several fiscal measures that are conducive towards fiscal rigour.<sup>21</sup> In particular, fiscal rules – especially those embedded in the Fiscal Compact – are likely to serve as a useful means of ensuring that fiscal targets are met. Fiscal discipline is also vital to provide sufficient fiscal space – that is, room for fiscal manoeuvre – to counter adverse shocks. It also has to be ensured that contingent liabilities do not undermine sustainability. With government-guaranteed debt standing at around 18% of GDP at end-2012, the Government's exposure could be lowered through improved

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<sup>19</sup> Contingent liabilities are future liabilities that only arise if a particular event materialises, an example being the guarantees the Government has given to cover borrowings by public non-financial corporations. Implicit liabilities relate mostly to entitlements that fall due in the future, such as pensions and health spending associated with an ageing population. Off-budget liabilities are liabilities that originally do not fall under the definition of general government but could eventually become classified as government debt. This may arise from, for example, the reclassification of state-owned enterprises as part of general government. A case in point is the reclassification of Malta Shipyards Limited in 2008.

<sup>20</sup> For a critique of conventional DSA, see Leeper (2010).

<sup>21</sup> These measures include the introduction of fiscal rules, the creation of an independent fiscal institution, a multi-annual medium-term budgetary framework that will provide pathways for public expenditure beyond the immediate term, a comprehensive spending review that identifies cost savings through the reduction of waste and other inefficiencies as well as through sound practices and better incentives, and monitoring monthly cash data to detect slippages sufficiently in advance. See Malta's Ministry of Finance (2013b).

performance in public corporations that account for the majority of government-guaranteed debt. Similarly, it is important for the authorities to mitigate the risks associated with implicit liabilities by, for example, addressing at a sufficiently early stage the projected increase in ageing-related expenditures, through pension and healthcare reform.<sup>22</sup>

In conclusion, the recent European sovereign debt crisis has been a bitter reminder that sustainable public finances are a crucial pillar of a healthy economy. Its absence threatens price stability, financial stability and economic growth. It is therefore imperative that a sound fiscal framework that supports the sustainable evolution of public finances – and thus safeguards the stability and prosperity of the broader economy – is in place at all times.

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<sup>22</sup> Many of these policy recommendations were also put forward by the IMF. See IMF (2012).

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