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Public Debt Sustainability – the Case of Poland

Abstract. As public debt soared in many countries, the issue of debt sustainability started attracting more and more attention worldwide. In this paper, we understand debt sustainability as a sovereign's ability to service debt without significant adjustments to revenue and/or expenditure, and without increasing the public-debt-to-GDP ratio. The paper delivers a debt sustainability analysis for Poland. Three scenarios have been modeled for developments in Poland's primary balance until 2021. The first one, the so called baseline or status quo scenario, indicates how much Poland would be indebted in 2021 in case there were no adjustments to its public sector revenues and/or expenditures (the primary balance). The other two scenarios address the question of the extent to which Poland would have to consolidate its primary balance if it aimed to: (a) keep the current level of public debt, or (b) bring the public-debt-to-GDP ratio down to a threshold level of 50%. This paper contributes to the theory of public debt sustainability. The methodology applied in the scenario building is based on that developed by Deutsche Bank Research.

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Keywords: public debt sustainability, primary balance, public-debt-to-GDP-ratio, gross public debt stock

Introduction

When a government spends more than it collects in revenues, it has a budget deficit, which it finances by borrowing from the private sector. The accumulation of past borrowing is labelled as government debt. Public debt sustainability is defined as a sovereign's ability to service debt without large adjustments to revenue and/or expenditure, and without increasing public-debt-to-GDP-ratio.

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The global crisis caused an unseen fiscal deterioration. Financial markets and the European Commission became increasingly concerned about fiscal policies of individual countries. According to the European economic forecast of the European Commission,¹ Poland appears to not face a risk of fiscal stress in the short term. The country is at medium sustainability risk in a medium-term perspective, and at low risk in a long-term perspective, conditional upon the full implementation of the planned, and ambitious, fiscal consolidation, and on maintaining the primary balance (fiscal deficit minus the costs of debt burden) well beyond the 2014 expected level to be reached in that year. Government debt (55.6% of GDP in 2012 and for 2014 expected to reach 56.1%) which is below 60% of the GDP Treaty criterion. Risks would be much higher in the event of the structural primary balance reverting to lower values as observed in the past, such as the average values for the period between 1998-2012.

Although the opinion of the European Commission on the public debt sustainability of Poland is not pessimistic, the Public finance sector debt management strategy for 2013-2016, elaborated by official authorities in Poland, contains risks of future developments. The first cluster of risk takes into consideration the structure of the debt itself, and includes liquidity risk, foreign exchange risk, and interest rate risk. The second cluster of risk focuses on the volume of the public sector debt, and highlights the debt of local government units, the debt of independent public health care units, and the debt of other units.

This paper provides the debt sustainability analysis for Poland, which is based on methodology applied by Deutsche Bank Research. Three scenarios of the Polish primary balance development until 2021 are modelled. The first scenario, so called the baseline, indicates how much Poland would be indebted in 2021 in a case where there would be no adjustments to revenue and/or expenditure of public finance (primary balance). The two other scenarios provide answers to the questions of how much of its primary balance Poland would have to consolidate if it aimed to reach the public-debt-to-GDP-ratio at (a) stable debt level and (b) at the threshold point. ()

This paper is structured as follows: discussing methodology and the data used for the analysis; gauging possible future public debt dynamics (2012-2021) in a baseline scenario, as well as, in two alternative scenarios; followed by the last section which captures concluding remarks.

1. Data and methodology

The data set covers the time span of 2002 to 2012 and includes the gross domestic product (*GDP*, mil. \in , current prices), public debt (*d*, as % GDP), gov-

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¹ European Economic Forecast, Directorate General for Economic and Financial Affairs of the European Comission, Brussel 2013, p. 21.

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ernment primary balance (pb_r , as % GDP), GDP growth rate (g_r , %), nominal interest rate on existing debt (it, %), which is derived from the nominal interest expenditure divided by the previous period debt stock. Furthermore, we use data of the required rate of return for new debt and refinancing, which is expressed by the yield to maturity (YTM_r , %), real interest rate (r_r , %), inflation rate (π_r , %) and average maturity of debt, which is expressed in years. Data for Poland was obtained from these available databases: the Eurostat, the European Central Bank, the National Bank of Poland, the OECD database, and the database of the Ministry of Finance of Poland. The methodology dedicated to the reduction of debt levels is published by Sebastian Becker, Gunter Deuber, Sandra Stankiewicz and Eduardo Levy-Yeyati². This methodology was improved by the calculation of the required primary balance by iterative numerical methods, which can be studied in Daniel Fylstra et al. or Emília Zimková and Vlastimil Farkašovský³.

As mentioned above, three scenarios are estimated. The first, so called baseline or status quo scenario, assumes that Poland will not introduce any structural reforms or austerity measures, which could improve the primary balance compared to the present state. Therefore, it is assumed that the nominal interest rate will increase, thus reflecting the fear of investors.

$$i_{t} = \begin{cases} \frac{AM_{2012} - k_{t}}{AM_{2012}} \times i_{2012} + \frac{k_{t}}{AM_{2012}} \times YTM_{2012}, t \in (2013, 2019), k_{t} \in (1, 7)\\ \hline YTM_{2012}, t \in (2020, 2021) \end{cases}$$
(1)

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The primary balance is assumed to remain at the current level, since Poland would not put effort into consolidating public finance. Other variables are at levels forecasted by OECD and the National bank of Poland. Next, there is Growth+ (positive) and Growth– (negative) scenarios, which assume a higher or lower GDP growth rate than expected. GDP growth rate after 2014 is expressed as the ten years average of GDP growth rate +/– double the standard deviation. According to the three sigma rule, it corresponds to a 95% confidence interval. Therefore, those scenarios form upper and lower hypothetical limits of the future Polish GDP growth rate. Similarly in Consolidation+ (positive) and Consolidation– (negative) scenarios, we assume that the primary balance will be at the ten year average level +/– double the standard deviation.

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² S. Becker, G. Deuber, S. Stankiewicz, *Public Debt in 2020*, in *Deutche Bank Research*, 2010, p. 41; E. Levy-Yeyati, *Optimal Debt? On the insurance value of international debt flows to developing countries*, "Open Economies Review" 2006, vol. 20, pp. 489-507.

³ D. Fylstra et al., *Design and use of the Microsoft Excel Solver*, in *Interfaces*, 2013, pp. 29-55; E. Zimková, V. Farkašovský, *Variantné modelovanie primárnej bilancie Slovenskej republiky*, in *Acta Publici*, 2013

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To determine the level of public debt in different periods, it is necessary to quantify the amount of debt increases (Δd_t) between different periods. According to Becker, Deuber and Stankiewicz,⁴ changes in public debt between periods can be expressed as follows:

$$\Delta d_t = d_{t-1} \times \frac{\left(\frac{r_t}{100} - \frac{g_t}{100}\right)}{1 + g_t/100} - pb_t \tag{2}$$

Gross borrowing requirements (GBRt) will be:

$$GBR_{t} = \frac{\Delta d_{t}}{100} \times GDP_{t} + \frac{\left(\frac{\Delta d_{t}}{100} \times GDP_{t}\right)}{AM_{t}}$$
(3)

The second scenario, which is the stabilizing of primary balances (pb_t^*) until 2021, is calculated by Becker, Deuber and Stankiewicz with this formula:

$$pb_{t}^{*} = d_{t-1} \times \frac{\left(\frac{r_{t}}{100} - \frac{g_{t}}{100}\right)}{1 + g_{t}/100}$$
(4)

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The third scenario, which allows for a lower or adjusted debt to GDP ratio at a chosen level by achieving the same level of primary balance during the time frame indicated, was calculated by the function of MS Excel for iterative numerical methods.

2. Empirical Results and Discussion

For the base line or status quo scenario, the main prerequisite was that no structural changes took place and that the primary balance would remain at the current level. Under this condition the public debt-to-GDP ratio of Poland in 2021 would reach 79,6% of GDP (chart 1).

Growth+ and growth– estimations in the baseline scenario assume that the real economy of Poland will grow (+), and in this case the public debt-to-GDP ratio would be low, as the denominator would increase, and on the contrary, growth– estimation assumes that the real economy would be in recession (–), and in this case, the public debt-to-GDP ratio would be high, as the denominator would decrease. The same sensitivity test is estimated for the consolidation effort of the government (+ and –) to capture 95% of the probability that future development will be in line with our estimations (chart 2).

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⁴ S. Becker, G. Deuber, S. Stankiewicz, op. cit., p. 41.



Chart 1. Base-line or status quo scenario (public debt as % of GDP)

Source: author's own estimation.



- Status quo – – Growth+ ····· Growth–

- - Consolidation-

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Consolidation+

Chart 2. Base-line or status quo scenario (primary balance as % of GDP)

Source: author's own estimation.

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Source: author's own estimation.



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Chart 4. Scenario stabilizing debt levels of Poland (primary balance as % of GDP)

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Source: author's own estimation.

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Chart 5. Scenario lowering debt levels of Poland to the threshold point (public debt as % of GDP)

Source: author's own estimation.

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Source: author's own estimation.

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As to the primary balance or status quo scenario, we can see that the primary balance would remain at the current level of 2,5% of deficit. It is evident that this situation is not expected by either financial markets or by the European Commission.

The second scenario estimated for Poland is a scenario of stabilizing debt levels in Poland to the level of 55,6% of GDP (from 2012) until 2021 (chart 3). This scenario for Poland would be accepted by the European Commission with an applause, keeping in mind however, that this level is still below the Treaty criterion.

The debt stabilizing scenario assumes the consolidation of public finance to the level of a modest surplus in the primary balance over GDP in the range of 0,1-0,5% (chart 4).

The third scenario assumes that debt levels of Poland will reach the so called threshold point, which is at the level of 50% of the GDP. This scenario reflects a more ambitious plan for the Polish governments. Chart 5 exhibits the development of public finance as a percent of GDP.

The primary balance in this case would be at the level of 0,8% of the GDP (chart 6). This goal should be reached by either increasing GDP growth or by consolidating public finance.

In all scenarios the official predictions up until 2016 use data from the gross domestic product, public debt, government primary balance, GDP growth rate, nominal interest rate on existing debt, rate of return for new debt (which is expressed by yield to maturity), real interest rate, and the inflation rate and average maturity of debt (which is expressed in years).

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Conclusion

The aim of this paper was to create a quantitative debt sustainability analysis for Poland by applying methodology based on the one used by Deutsche Bank Research. Three scenarios of Polish primary balance development until 2021 were modelled. The first scenario, so called baseline or status quo, says how much Poland would be indebted in 2021 in the case where there would be no adjustments to revenue and/or expenditure of primary balance. It was found that in this case, the debt-to-GDP ratio would rise in Poland to 79,6% of GDP by 2021, and would exceed 60% of the GDP Treaty criterion. The two other scenarios provide answers to questions of how much Poland has to consolidate its primary balance if it would aim to reach public-debt-to-GDP-ratio on (a) a stable debt level and (b) a threshold point at a level of 50% indebtedness of GDP. In the debt stabilizing scenario, the primary balance has to reach a modest surplus in the range of 0,1-0,5% of the GDP. The strategy of public debt sustainability should contain both quantitative

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and qualitative aspects, for example, policies which would implement consolidation measures. This contribution has focussed on the quantitative part, as qualitative policies would be beyond the scope of this paper. The qualitative steps have to take into consideration that Poland faces long-term fiscal challenges related to age related expenditures, specifically pension, health care and long-term care. This is why the country needs to implement long-term sustainability enhancing policies. Moreover, there are international conditions which can influence public debt management in Poland and they cannot be controlled by the government. Encompassed in this, we can include the situation of the EUR and USD markets, actions undertaken by the central banks (including the ECB), or concerns about the eurozone future.

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Bezpieczny poziom długu publicznego – przypadek Polski

Streszczenie. Wraz z gwałtownym wzrostem długu publicznego w wielu krajach coraz więcej uwagi poświęca się tematowi zdolności do obsługi zadłużenia. W niniejszym artykule za bezpieczną wysokość długu uważa się taką, która powoli państwu (społeczeństwu) unieść ciężar zadłużenia bez dokonywania istotnych korekt wydatków i przychodów budżetu państwa i bez zwiększenia stosunku długu do PKB. Artykuł przedstawia analizę zdolności Polski do obsługi jej długu publicznego. Przygotowano w tym celu trzy scenariusze zmian w saldzie pierwotnym Polski do 2021 r. Pierwszy, zwany podstawowym lub konserwatywnym, wskazuje, jakie byłoby zadłużenie kraju w 2021 r., gdyby nie nastąpiły żadne korekty w przychodach i wydatkach sektora publicznego (saldzie pierwotnym). Pozostałe dwa scenariusze odpowiadają na pytanie, do jakiego stopnia Polska musiałaby skonsolidować swoje saldo pierwotne, gdyby zamierzała utrzymać obecny poziom długu do PKB albo sprowadzić dług w stosunku do PKB do progu 50%. Artykuł stanowi przyczynek do teorii długu publicznego i ustalania jego bezpiecznej wysokości. Do zaprojektowania scenariuszy wykorzystano metodologię Deutsche Bank Research.

Słowa kluczowe: zdolność do obsługi długu publicznego, bezpieczna wysokość długu publicznego, saldo pierwotne, stosunek długu publicznego do PKB, dług publiczny brutto

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