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Maciej Wysocki, Cezary Wójcik, Andreas Freytag

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Populists and Fiscal Policy: The Case of Poland

Abstract

The past decade has witnessed an increase in populist movements across the world. Some of those movements have gained strong political support and formed populist governments promising new sets of economic and fiscal policies. This raises the pertinent policy question: how do such populist governments influence fiscal policy outcomes? We approach this question by looking at the case of Poland which according to several recent studies has experienced the highest level of populist rhetorics in recent years. Indeed, when the new populist government took power, between 2015-2019, Poland experienced a major social and fiscal policy shifts: the new government decreased the statutory retirement age despite sever aging problem and launched one of the biggest social programs in Europe which resulted in sharp increase in political support for the government. In the paper we provide some first evidence of the impact of such policies on fiscal outcomes. Our analysis reveals that fiscal sustainability parameters have significantly deteriorated sharply after 2015 when the new government undertook populist policies, despite the fact that current (observable) deficit and debt levels remained stable. Specifically, our estimates suggest that just after a year since the introduction of the new fiscal program, the strength of reaction of the primary balance to a change of the public debt decreased by nearly 50% in 2017 and the parameter turned negative and statistically insignificant thereafter which means that from 2018 fiscal policy lacked long term sustainability. Overall, our estimations show that in the period of 2016-2019 fiscal sustainability parameters were the lowest since Poland joined the EU in 2004. While our analysis has several limitations, the case of the populist government in Poland provides some early evidence that populists do have negative impact on long term fiscal sustainability.

JEL-Codes: C220, E600, H630.

Keywords: fiscal sustainability, fiscal and social policy, populism.

Maciej Wysocki
SGH Warsaw School of Economics
Warsaw / Poland
mw46600@doktorant.sgh.waw.pl

Cezary Wójcik
SGH Warsaw School of Economics
Warsaw / Poland
cezary.wojcik@sgh.waw.pl

Andreas Freytag
Friedrich-Schiller-University Jena / Germany
andreas.freytag@uni-jena.de

1. Introduction

The past decade has witnessed a sharp increase in populist movements across the world, some of which managed to gain strong political support and formed populist governments who are promising a new set of economic policies, including new tax, social and fiscal policies. This raises a pertinent policy question: how do such populist governments influence fiscal policy outcomes?

We approach this question by looking at the case of Poland which is a very relevant example for empirical study for several reasons. First, populists in Poland entered political scene not only as a minority coalition partner (as it was the case in several EU countries already before) but, indeed, formed a majority government with strong political base. Second, populist government in Poland have been now in power during the two consecutive terms from 2015 until now, which creates an opportunity for some empirical analysis. Third, the Polish government seems to meet all major criteria for populism established in the literature, in particular a clear „us vs. them" rhetoric as well as „short-termism" and „protective" economic policies.

Indeed, when the new Polish populist government took power in 2015, Poland immediately experienced a major social and fiscal populist policy shift. Between 2016-2019, the new government decreased the statutory retirement age despite country's sweeping aging problem (in fact, one of the strongest among EU members) and launched several new social programs, including the so-called Family 500+ program under which social expenditure on family and children support increased suddenly from 1.5% to nearly 3% of GDP. Under the program (expanded additionally in 2019 in the run-up to parliamentary elections) families started to receive a tax-free benefit of PLN 500 (about EUR 120) per month for children until they reach the age of 18 (see EC, 2018,[4] or IBS, 2017[5]).

This policy shift is in line with the literature on populist governments' macroeconomic policies, which are shown to be short-term oriented and typically not sustainable (e.g. Ball, Freytag and Kautz, 2019). The Polish government also seems to fulfill all major criteria the

4 https://ec.europa.eu/social/main.jsp?langId=en&catId=89&newsId=9104&furtherNews=yes#navItem-2
5 https://ibs.org.pl/app/uploads/2017/10/IBS_Policy_Paper_02_2017_en.pdf

economic and political science literature assigns to a populist government (Funke, Schularick and Trebesch, 2020).

Indeed, the new policy move became highly controversial. Many economists have argued that overall it would lead to a significant deterioration of long-term fiscal sustainability. The government has argued in turn that the new social program was well financed by a complementary policy of VAT gap reduction (which resulted in an increase in tax revenues) and has seen no risk to country's fiscal sustainability. The controversy has remained strong to date, because as the fiscal sustainability parameters are essentially unobservable variables that need to be estimated, the observable current fiscal debt and deficits levels have decreased in relation to GDP and the country saw one of the biggest improvements in VAT gap reduction in the EU in recent years (see for example CASE, 2019[6]).

Against this backdrop, in this paper we look at the Polish case in more details and provide some first empirical evidence of the impact of the observed populist fiscal and social policy shift implemented in 2016-2019 on long-term fiscal sustainability of the country. Our analysis reveals that fiscal sustainability parameters have significantly deteriorated after 2015 when the new government took power. Specifically, our estimates suggest that just after a year since the introduction of the new programs, the strength of reaction of the primary balance to a change of the public debt decreased by nearly 50% in 2017 and the parameter turned negative and statistically insignificant thereafter which means that from 2018 fiscal policy lacked long-term sustainability. Overall, our estimations show that in the period of 2016-2019 fiscal sustainability parameters were the lowest since Poland joined the EU in 2004.

Our approach is novel in so far, as it combines two branches of the literature, which have been disjunct in the past: both issues, the literature on populism and the literature on fiscal sustainability, are dealt separately. The studies available on economic effects of populism focus primarily on the impact of populist policies on growth and inflation and treat fiscal policy as intermediary leading to inflation. As inflation has not been a problem for Poland in the recent years and growth (until late 2021), one might conclude that populist policies are costless. As such approach may be misleading, we take a direct look on the link between populist policies and fiscal sustainability, something that have not been done much before. Unlike

6 https://ec.europa.eu/taxation_customs/sites/taxation/files/vat-gap-full-report-2019_en.pdf

previous studies focusing on fiscal sustainability in the region without regard to political process at all (see e.g., Ciżkowicz et al., 2015; Krajewski et al., 2016 or Bökemeier, 2017) or with regard to crisis developments (see Wysocki and Wójcik, 2019), in this paper we take a specific look at and the link between the populist policies and fiscal sustainability. Moreover, as compared to the previous studies that analyzed weak measures of fiscal sustainability (see e.g., Stanek, 2014 or Wysocki, 2017), we analyze the fiscal sustainability in a strong sense by using a fiscal response approach, as suggested by Bohn (1995, 1998). Specifically, we use the test proposed by Bohn (1998) which analyzes whether the primary surplus relative to GDP is a positive function of public debt relative to GDP and which is now a widely accepted as a better measure of fiscal sustainability.

The reminder of the paper is organized as follows. The next section presents theoretical and methodical considerations. Section 3 provides data description and recent developments of most important time series. Section 4 describes estimation methods. Section 5 presents results of econometric tests. Section 6 concludes.

2. Populism: Theoretical and Methodological Considerations

In this section, we first look at theoretical and methodological considerations regarding populism and its definition. Secondly, we provide some recent evidence that the Polish government in 2015-now indeed fulfills the criteria of populist governments set out in the literature. Next, we briefly discuss the literature on economic consequences of populism, before we give an overview about the literature on fiscal sustainability.

a) The characteristics of a populist government

To understand the incentives of populist governments and thus the economic consequences of populism, it is necessary to define populism. Two characteristics of populism stand out in the literature. First, populists follow a worldview that distinguishes between "us and them" (Albertazzi and McDonnell, 2008), with "us" being the people (and the populists) and "them" representing an allegedly corrupt domestic elite and some obscure foreign actors. This distinction is usually combined with the claim that the populists (and only the populists) understand the true public will ("*volonté generale*") (Houle and Kenny, 2016; Kaltwasser and Taggart, 2016).

The second common aspect is that populists use economic policies which are meant to offer short-term "protection" (Guiso et al. 2017) from perceived systemic insecurity. As the older literature already has pointed out, populists prefer a mix of distributive policies and expansionary fiscal policies, which is backed by protectionist policies to protect the population from the negative effects of this combination. In other words, they neglect macroeconomic constraints (Sachs 1989; Dornbusch and Edwards 1991; Edwards 2019; Guiso et al. 2017).

Whereas in the 1960s, 1970s and 1980s, populist governments were mainly prevalent in Latin America and mostly located on the left of the political spectrum (Sachs, 1989 and Dornbusch and Edwards, 1991), this has changed in the 21st Century. Populism is now at least as much a right-wing phenomenon and it happens increasingly in Europe and other Western democracies. It is generally acknowledged that the economic policies of populist governments are problematic, to say the least.

b) Populism in Poland in recent years

In a recent study, Celico et al. (2022) created a continuous index of populism for a total of 1920 parties in 163 countries, covering the period from 1970 to 2019, combining data from several recent expert surveys via the usage of Machine Learning tools, in particular Random Forest Regression. According to this database the recent government of Poland formed by a Law and Justice Party (PiS government) in the period 2015-2019 achieved the highest level of the index of populist rhetoric in Poland that fluctuated between 8.93 to 9.12 (where the score 10.0 was the maximum value). Moreover, the PiS government achieved the highest score of populist rhetoric at latest election among the whole sample in the database and was ahead of such parties as: LS/CA from Greece, SDS from Slovenia, FN from France, SDP from Czechia and Fidesz from Hungary (Celico et al., 2022).

Moreover, Funke, Schularick and Trebesch, (2020, p.14 and pp.13-137) provide evidence that the Polish government run by a Law and Justice party (PiS Party) fulfills all major criteria of populism set out in the literature. They show that the PiS party, the party that forms the government, regularly has used an anti-elite rhetoric and claimed to represent the people. The purpose of the aggressive rhetoric against the elites and appealing to the will of the people through a highly redistributive fiscal policy was to gain the legitimacy of power among a less wealthy but more numerous electorate, which in turn results in a better electoral

result for the party (Gromadzki et al., 2022). In this sense, the fiscal policy of the PiS government was a function of election polls, and de facto disregarded the economic situation and European Union's Medium-Term Budgetary Objectives (MTOs). Moreover, the PiS government claims to represent Catholic values, which is important since the Catholic religion plays a significant role in Poland. By claiming the corrupt nature of previous governments, the necessity of "law and order" has been emphasized by the PiS in opposition as well as in the government. What distinguish this new type of populism in Poland is the fact, that this phenomenon could be described as populism within the institutional framework of the European Union. Therefore the margin of maneuver of the populist government has been limited to some extent by the EU institutions such as European Commission or Court of Justice of the European Union. That is why this populist rhetoric of the PiS government in Poland has been accompanied by an anti-EU as well as xenophobic attitude, which by the time of writing this paper in 2022 has been further intensified. In order to provide alternative perspective on populism in Poland, similar to the approach of Sáenz de Viteri and Bjørnskov (2018), we have calculated two indices of populism that measure the share of all articles in "Financial Times" and "The Economist" which mention the word "Poland" in relation to the word "populism". It turns out that both indices have increased significantly since 2015, when the PiS party won the parliamentary elections in Poland (see Table 1 and Table 2).

Table 1: **The value of the 'Populism index' in "The Economist" in the period 2010-2019**

Number of articles that mention the words:	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
"Poland"	101	84	67	117	94	89	114	94	179	113
"Poland" + "Populism"	3	0	0	0	1	6	7	9	15	9
Value of	2.97%	0.00%	0.00%	0.00%	1.06%	6.74%	6.14%	9.57%	8.38%	7.96%

Source: own elaboration based on the online archive of "The Economist".

Table 2: **The value of the 'Populism index' in "Financial Times" in the period 2010-2019**

Number of articles that mention the words:	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
"Poland"	1272	1129	1145	1077	1286	1134	1280	1155	1009	868
"Poland" + "Populism"	20	17	17	17	36	47	146	138	160	123
Value of	1.57%	1.51%	1.48%	1.58%	2.80%	4.14%	11.41 %	11.95 %	15.86 %	14.17 %

Source: own elaboration based on the online archive of "Financial Times".

c*) Economic consequences of populist macroeconomic policies*

The contemporary literature on populism is mainly focusing on its drivers, only very limited analysis of modern populist economic policy is available. Therefore, we find only a – still very limited – number of papers dealing with the economic consequences of populism of the past; mainly focusing on Latin America where in the 1960s, 1970s and 1980s mainly left-wing populists were in office. It is important to notice that this literature is focused on growth and inflation. There is no direct link between populist policies and fiscal sustainability in the literature; instead both issues are dealt with separately. Despite a rather clear evidence that fiscal problems of populist governments in Latin America were mostly responsible for an accommodative monetary policies leading to periods of hyperinflations in many countries, the literature on left-wing populism focuses on inflation. The main reason for the neglect of fiscal consequences may have been the much more disastrous social economic consequences of high and volatile inflation; these two variables are highly relevant for the well-being of the general population. In particular the negative effects of hyperinflation are well-known and have been experienced by the population in Latin America. As populist claim to represent exactly this general population, it makes sense to take a look at the performance of populist governments.

Indeed, the empirical literature about populist governments' economic policy confirms the prediction that they tend to pursue short-term oriented policies in order to generate successes directly after coming to power, but do not fully consider the long-run effects of these policies. Sachs (1989, p.15) identifies a combination of social conflict, distributive goals and macroeconomic policies to spur a negative "populist policy cycle". This result is backed by Dornbusch and Edwards (1991) who also indicate that there are various phases of economic

development under populist government.[7] Later work by Edwards (2019) distinguishes between the so-called classical populists whom he describes as "macroeconomic populists", who rely on monetary policy to finance their fiscal activities, and what he calls new populists being more "microeconomic populists", interfering into the structure of the economy with the help of regulation and protectionism. One may argue that the modern types of populists are representing both types. However, in EU countries, the macroeconomic type of populism is probably more relevant, as microeconomic policies, in particular trade and competition policy are mostly pursued on the EU level.

Rodrik (2018) argues that economic populism may be economically successful, using the New Deal of Franklin D. Roosevelt's government in the United States in the 1930s as example. Although one might doubt whether the Roosevelt Administration meets the definition of a populist government, the populist economic policy mix may well be welfare enhancing in the short run, as it may create new jobs and lead to higher growth rates. However, a permanent neglect of macroeconomic budget constraints may fire back later, mostly in the form of lower growth, higher unemployment and increasing inflation. This observation has lead Ball, Freytag and Kautz (2019) to define a pattern they label walking stick. Economic development is positive at the beginning of a populist's term and declines in the second half of the term. Evidence for Latin America supports this hypothesis. Therefore, it forms the start of our analysis, as an unsustainable fiscal policy may well start in a promising way.

An interesting side-result of Ball, Freytag and Kautz (2019) is that populist governments on average perform better with respect to economic growth (as opposite to inflation) than non-populist governments in their Latin American sample. This may tempt populist governments to argue in favor of a populist policy mix in today's Europe. Populists who claim to represent the people could try to use such evidence (which they did not so far), in particular since inflation (until late 2021) no longer seemed to be a problem. They must consider, though, that the short-term significantly looks better than the medium to long term in the empirical work by Ball, Freytag and Kautz (2019).

Summing up our considerations, it should be stated that the PiS government has represented a slightly different type of populism that has been functioning within the institutional framework of the European Union. The anti-elite rhetoric was aimed at

[7] We focus entirely on the economic outcome of populism and do not discuss related political conflicts.

legitimization of its power among the less wealthy electorate, which was accompanied with a short-term fiscal policy focused on a high degree of income redistribution. At this stage of analysis we can say that the PiS party fulfilled the criteria of running the populist economic policy in Poland, which was focused primarily on achieving an electoral effect and disregarded the conditions resulting from the business cycle. Later in this paper, we will show the empirical results that provide evidence to support this thesis.

d) Measuring fiscal sustainability: literature review

Since fiscal policies in the EU and in Poland as member of EU were not associated with high inflation (until late 2021), we need another tool to understand the long-run effects of populist policies. It cannot be ruled out that fiscal problems also occur when populist governments increase public spending without causing high, volatile and persistent inflation – it may endanger fiscal sustainability, i.e. the potential of future generations to maintain an adequate living standard with solid public finances.

The literature distinguishes two main approaches to examining fiscal sustainability: in the „weak" sense and in the „strong" sense. The first approach is primarily based on the stationarity tests of the relation of the public debt stock to GDP (Hamilton & Flavin, 1986; Wilcox, 1989; Trehan & Walsh, 1991) as well as on the testing of the presence of co-integrating vector between budgetary revenues and expenditures (Hakkio & Rush, 1991). Examining the fiscal sustainability in a strong sense, in turn, involves estimation of the fiscal reaction function in which the primary balance of the budget in relation to GDP is a dependent variable, while the level of the public debt in relation to GDP is an independent variable (Bohn, 1998, 2007).

Several recent studies have employed these different approaches to the analysis of fiscal sustainability for a set of the new EU member states, including Poland. However, there are little or no studies so far that look specifically at Poland after 2016. For example, in one of the most recent studies, Wysocki and Wójcik (2018) looked at the evolution of fiscal sustainability in Poland between 2004-2016 with a specific aim of analyzing the impact of the global financial crisis on fiscal sustainability. They found that that fiscal policy in Poland was sustainable in the strong sense throughout the whole period and that - importantly - fiscal sustainability has in fact significantly improved in the post-crisis period of 2009-2016.

However, due to short time series the paper could not address the post-2016 policy measures and their impact on sustainability.

Similarly, Krajewski et al. (2016) have used panel stationarity and co-integration tests as well as estimates of certain parameters of fiscal reaction function for Bulgaria, Czechia, Estonia, Lithuania, Latvia, Poland, Slovakia, Romania and Hungary. They found out that despite financial turmoil these countries demonstrated the existence of a long-term relationship between revenues and expenditures and they have statistically relevant parameters of the fiscal reaction function. The study indicates that public finances in those countries were sustainable only in the weak sense, whereas panel data analysis used in the paper limits somewhat inferences on individual countries. Similar conclusions were obtained also by Wysocki (2017) or Pączek-Jarmulska (2016). However, none of these studies could at the time provide an analysis of the post-2016 either.

Other country studies evaluated fiscal sustainability in the CEE countries before the outbreak of the global financial crisis, but not after 2016. Particularly, Stoian & and Câmpeanu (2010) estimated regression equations based on Bohn's fiscal response mechanism individually for all CEE countries with OLS based on quarterly data for 2000 until 2008. The results were mixed as they indicated sustainable behavior for some countries (Bulgaria, Czechia, Estonia and Lithuania), whereas others (Latvia, Poland, Romania and Slovenia) have faced difficulties.

Other studies used fiscal reaction function for a larger pool of countries in the CEE region, see for example: Staehr (2010), Krajewski et al (2016), Bökemeier (2017). Particularly interesting approach has been used in the research by Baldi and Staehr (2016). They analyzed fiscal reaction functions, using quarterly data for the period 2000-2012, before and after the global financial crisis – and possible changes – in order to explain the different fiscal performance situation of EU economies and found a change in fiscal policy: there was only a slight and rather similar response before the crisis, but a stronger debt effect after 2008, especially for crisis-affected economies.

Against this background, this paper goes into a similar direction like Stoian and Câmpeanu (2010) and Baldi and Staehr (2016) and Wysocki and Wójcik (2018). In particular, we analyze the fiscal sustainability in the strong sense, as compared to the previous studies that analyzed weak measures of fiscal sustainability (see for example, Krajewski et al

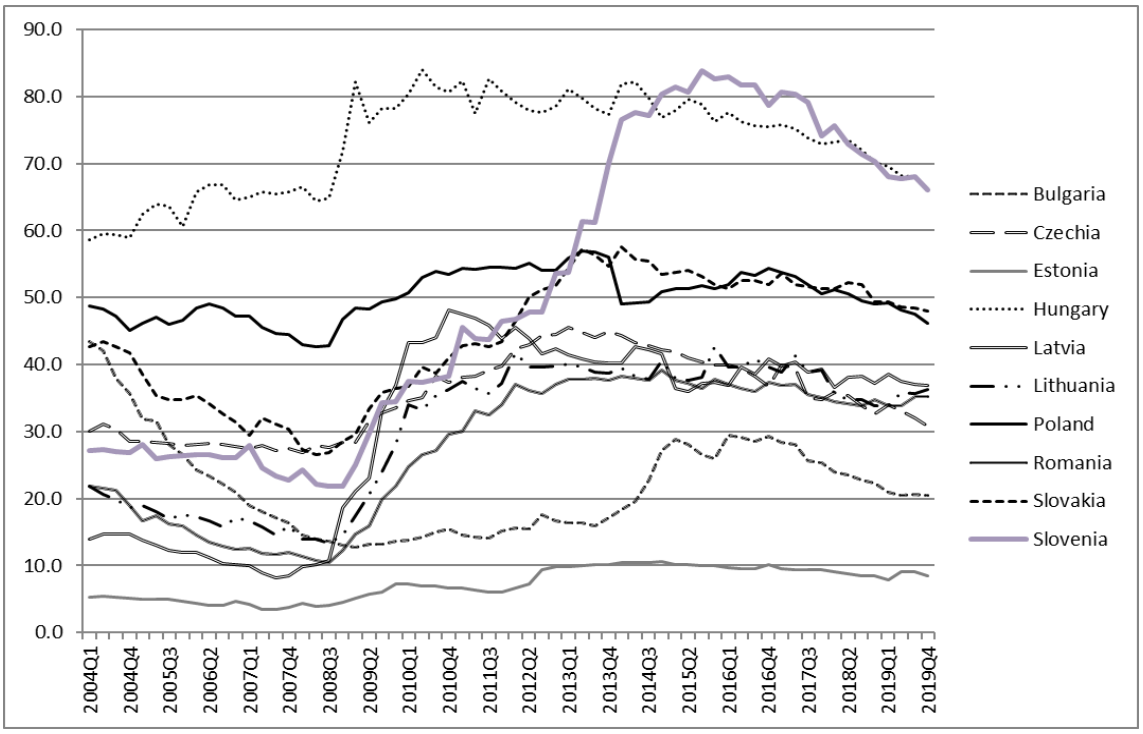
(2016), Wysocki (2017), Bökemeier, Stoian, 2016). At the same time, we use longer sample and additional statistical and econometric tests that allow us to re-evaluate and extend the results of Wysocki & Wójcik (2018) in the context of policy changes in 2016-2019.

3. Data and recent developments

We use quarterly data from Eurostat for the period from 2004 Q1 to 2019 Q4 for the following time series: government consolidated gross debt *(d)*, budget deficit *(bb)*, primary budget surplus *(ps)* and output gap *(og)*. The output gaps were calculated with the usage of Hodrick–Prescott filter (1997). The unit of all the variables was percentage of GDP. We use data beginning from the year 2004 as we intend to evaluate the changes in fiscal sustainability since Poland joined the EU up until 2019.

When we look at the government consolidated gross debt in Poland we see a slight reduction of the debt to GDP ratio between 2016-2019. The debt had been growing steadily (similarly as in the other CEE countries) since 2008 Q4 until 2014 Q1 (see Figure 1) which resulted from a fiscal expansion on the one hand and from a huge drop in tax revenues after outbreak of global financial crisis on the other. In 2014 Q1 Poland experienced a rapid drop in government gross consolidated debt which was a result of the redemption of the government-bond share of open pension funds assets in the amount of 8.5% of GDP. The debt level was stable and slightly decreasing thereafter with some noticeable reduction of its level in relation to GDP after 2016. Importantly, throughout the whole period the government consolidated gross debt in Poland has not exceeded 60% of GDP, which is the threshold level guaranteed by Article 216, Clause 5 of the Polish Constitution.

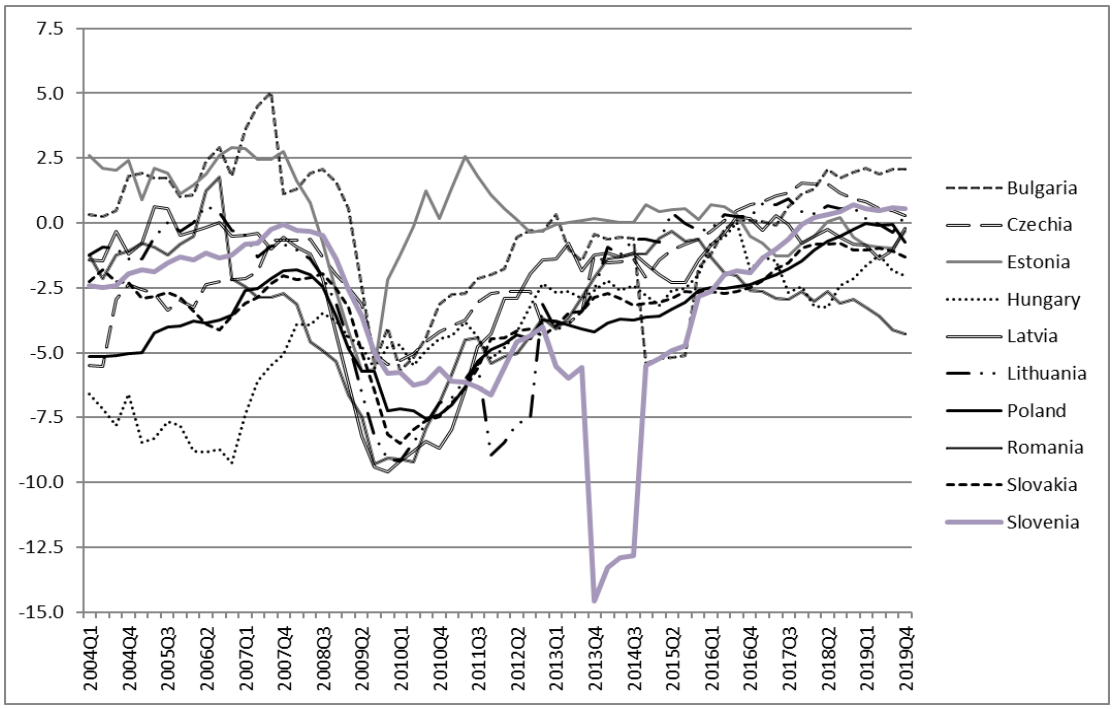
Figure 1: **Government consolidated gross debt *(d)* in CEE countries as percentage of GDP**



Source: own elaboration based on Eurostat

Secondly, the budget balance has been improving steadily, after it reached its minimum at the level of 7.6% of GDP in the crisis year 2010. Since 2011 Q1 the fiscal conditions in Poland have begun to improve gradually (see Figure 2). Furthermore, in January 2011 Poland introduced a formal expenditure rule, which has had a positive impact upon the pace of the reduction of the budget deficit (see more detail in Działo, 2012). The fiscal deficit was also improving since 2016 when the new social policy programs, including Family 500+ and VAT gap reduction polices were introduced by the government.

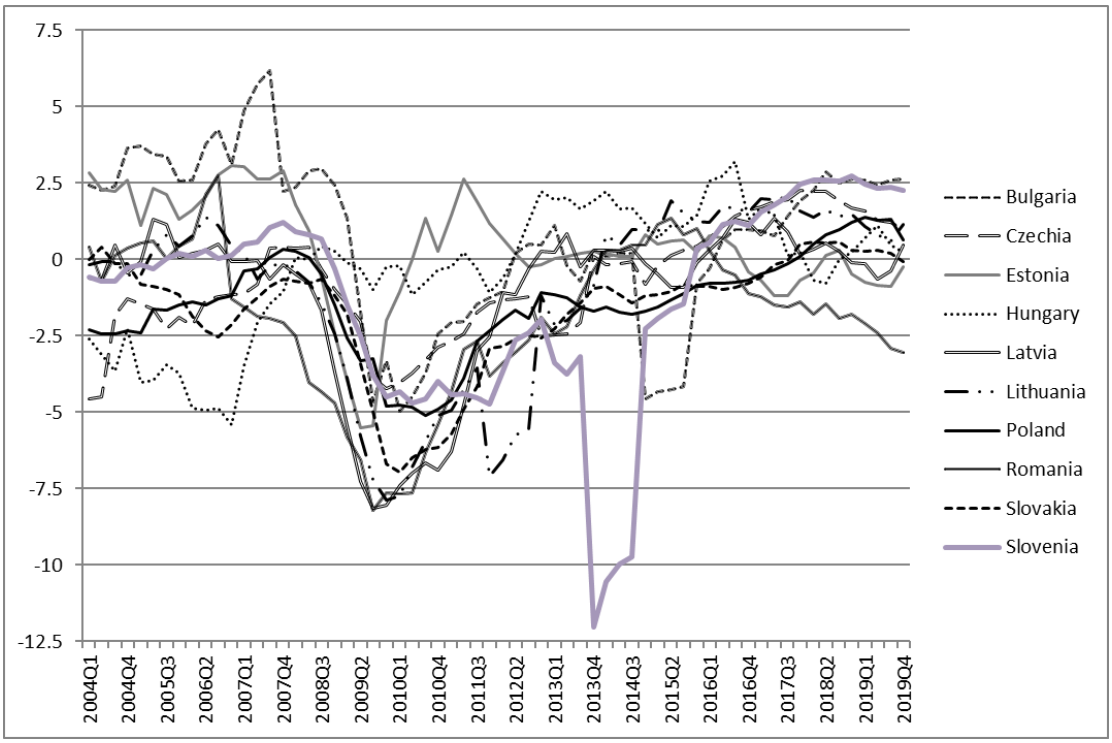
Figure 2: **Budget balance *(bb)* in CEE countries as percentage of GDP**



Source: own elaboration based on Eurostat

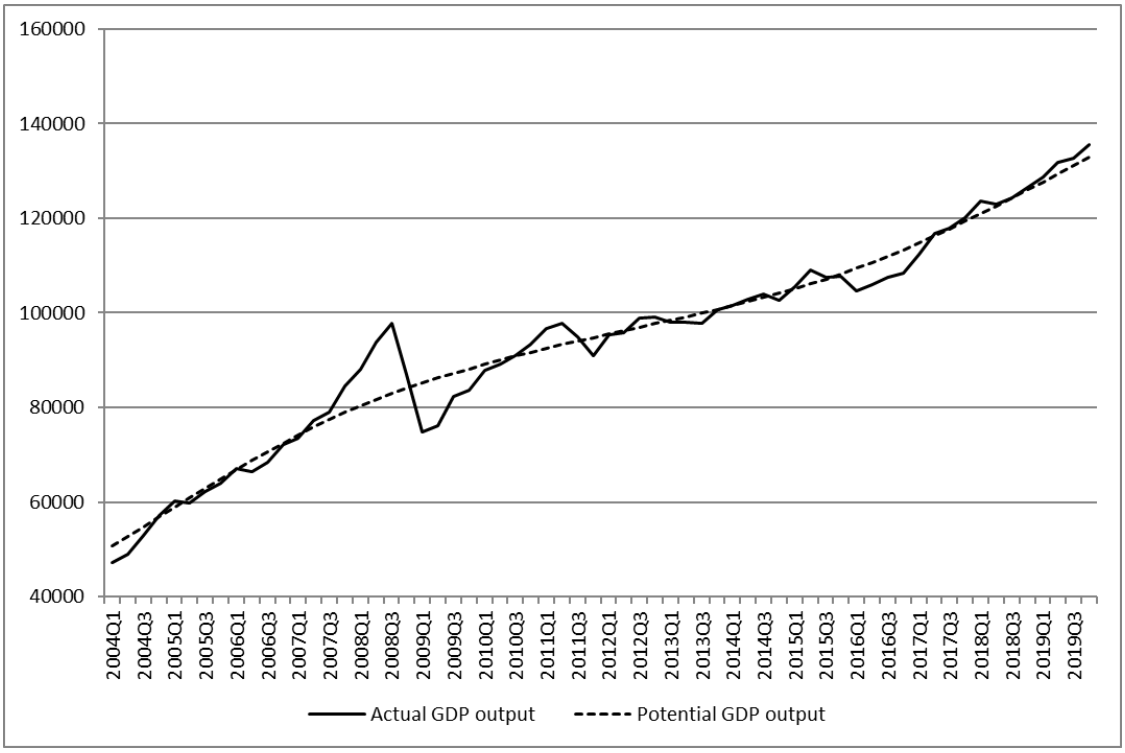
Thirdly, Poland and the entire CEE region experienced massive impact of the global financial crisis also on the levels of primary surpluses (see Figure 3). Almost every country had a significant primary budget deficit in the year 2009. Poland reached the pick of the primary deficit in 2010 Q3. However, primary deficits started to improve thereafter and in 2019 it was in surplus. The developments in the fiscal area have been reflecting variation of the output gap which in Poland reached its peak just before the crisis in 2008 reached its peak. The output gap dropped strongly to negative values during the crisis time between 2009-2010. While output gap turned negative in 2016 is started to improve thereafter and since 2017 output gap was positive until the end of 2019 (see Figure 4).

Figure 3: **Primary budget surplus *(ps)* in CEE countries as percentage of GDP**



Source: own elaboration based on Eurostat

Figure 4: **Actual GDP output vs potential GDP output in Poland (in thousands of EUR)**



Source: own calculations based on Eurostat data with the usage of Hodrick–Prescott filter

When analyzing the social expenditure of the Polish government in 2004-2019 the most notable event is certainly the significant increase in expenditure on family and children which since 2016 has permanently exceeded 2.5% of GDP (see Figure 5). This was mainly the result of the Family 500+ program stimulating demographic policy, consisting of subsidizing households of PLN 500 a month for having a second and subsequent child in the family. In 2019, when parliamentary elections took place in Poland, the program criteria were extended and subsidies in the amount of PLN 500 also included the first child in the family. Also other programs (for example, 300+) have been introduced although they were significantly smaller than the main Family 500+ program. Among other important social changes statutory retirement age was reduced in 2016 although the immediate impact of the change was contained and more impact is expected in the future. At the same time, the government embarked on a swift policy of VAT gap reduction and since 2016 Poland was one of the countries with the biggest reduction of the gap among EU countries. The reduction of the gap was, however, smaller than the overall increase in public revenues, as an important part of these revenues resulted from improved economic conditions since 2016. Overall, however, Poland experienced significant fiscal and social policy sift between 2016-2019. (see Table 3 with a summary of the most important social and fiscal policy change and their size[8]).

Table 3: **The most important social and fiscal policy changes in Poland of 2016-2019**

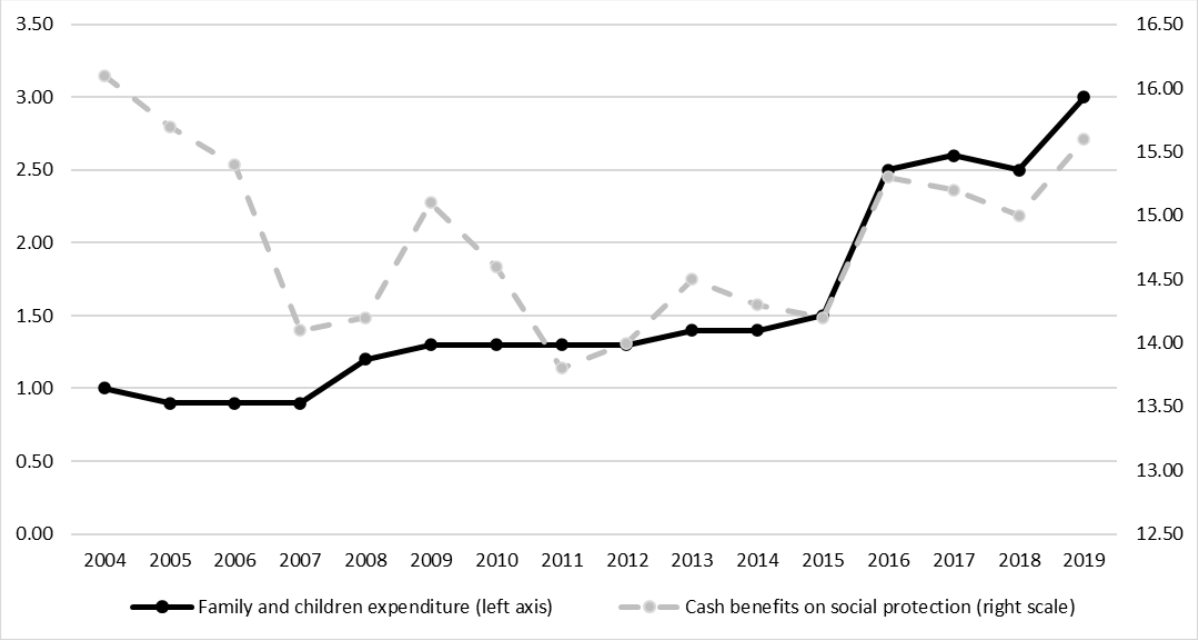
	Name	Description	Year	Size (in bn of PLN)
Additional budget expenditure	Family 500+	In April 2016, the government support program was introduced in the form of a monthly family benefit in the amount of PLN 500 for each second, third and subsequent children in the family, which is payable for every child brought up to 18 years old, regardless of the income achieved by the family. From 1 July 2019, the childcare benefit has been extended and is now also available for the first child.	2016	17.6
			2017	23.0
			2018	24.5
			2019	27.3
	Good start (300+)	In July 2018, the government introduced a monthly benefit of PLN 300 for each child studying at school until they reach the age of 20. Disabled children learning at school will receive a benefit until they reach the age of 24.	2018	1.4
			2019	1.4

[8] Estimations of VAT gap reduction in the years 2016-2019 based on Konopczak (2019).

	Name	Description	Year	Size (in bn of PLN)
	Lowering statutory retirement age	In November 2016, parliament passed a law that lowered the retirement age to 60 for women and 65 for men from October 2017. This action was in spite of the demographic projections, which indicated a deepening of the aging process and an increase in the economic burden of the pension system from 24.8 in 2007 to 43.7 people of post-working age per 100 people of working age in 2030.	2017	2.2
			2018	10.0
			2019	12.0
	Pension+	In May 2019, about 9.7 mio pensioners received the so-called Pension+. It is a one-off cash benefit in the amount of the minimum pension, which currently amounts to PLN 1.100. However, the program is to be continued in subsequent years.	2019	10.7
Additional budget revenue	VAT gap reduction	As a result of a series of comprehensive measures to seal the tax system, as well as good economic conditions in 2016-2018, tax revenues (in particular VAT) increased significantly. Among the most important reducing the so-called VAT gaps should be mentioned: the introduction of a uniform control file (JPK), the STIR system to limit the possibility of using the financial sector for tax fraud, the SENT system for monitoring road and rail freight transport, and the fuel package that ordered the rules for importing fuels into the country. However, in 2019 compliance effect of VAT gap reduction vanished and was negative at the level PLN 0.4 bn.	2016	6.7
			2017	10.9
			2018	4.3
			2019	-0.4

Source: own elaboration based on Ministry of Finance, Ministry of Family, Labour and Social Policy and Supreme Audit Office.

Figure 5: **Social expenditure in Poland as percentage of GDP**



Source: own elaboration based on Eurostat

4. Estimation Methods

As indicated earlier, in this paper we examine the fiscal sustainability empirically in the strong sense using the fiscal response approach of Bohn (1995, 1998). The test by Bohn (1998) suggests to analyze whether the primary surplus in relationship to GDP is a positive function of public debt stock in relationship to GDP. In particular, following considerations of Fincke & Greiner (2012) the evolution of public debt stock could be given as follows:

$$\dot{D}(t) = r(t)D(t) - PS(t) \quad (1)$$

where

$D(t)$ – real level of net public debt stock at time *t*,

$\dot{D}(t)$ – derivative of net public debt stock over time $\frac{d}{dt}$,

$r(t)$ – real interest rate over time *t*,

$PS(t)$ – primary budget surplus at time *t* i.e. government revenues minor government expenditures (without interest payments).

Suppose now that the government selects a primary surplus that is a linear function of public debt $\gamma(t)D(t)$, as well as an autonomous component $\varphi(t)Y(t)$, which is independent from debt and is a function of GDP growth. Of course, the component $\varphi(t)Y(t)$ can be controlled to some extent by the government, but not completely, as it also depends on the business cycle, which may periodically affect the amount of government spending (see Bohn 1995, 1998; Canzoneri et al. 2001). Then the primary surplus $PS(t)$ can be expressed as follows:

$$PS(t) = \gamma(t)D(t) + \varphi(t)Y(t) \tag{2}$$

Dividing the identity (2) by the amount of GDP $Y(t)$ on both sides, then we obtain the following form of the fiscal reaction function:

$$ps(t) = \gamma(t)d(t) + \varphi(t) \tag{3}$$

where:

$ps(t) = \frac{PS(t)}{Y(t)}$,

$d(t) = \frac{D(t)}{Y(t)}$.

Substituting the decomposition of the primary budget surplus $PS(t)$ from formula (2) to equality (1), we obtain the following identity:

$$\dot{D}(t) = (r(t) - \gamma(t))D(t) - \varphi(t)Y(t) \tag{4}$$

If we express the dynamics of public debt over time not in absolute terms, but as GDP ratios, we get:

$$\dot{d}(t) = \left(\frac{\dot{D(t)}}{(Y(t)}\right) = \frac{1}{Y(t)}\left(\dot{D}(t) - D(t)\frac{\dot{Y}(t)}{Y(t)}\right) \tag{5}$$

Note that by dividing the identity (5) by $d(t)$, we get:

$$\frac{\dot{d}(t)}{d(t)} = \frac{\frac{1}{Y(t)}\left(\dot{D}(t) - D(t)\frac{\dot{Y}(t)}{Y(t)}\right)}{\frac{D(t)}{Y(t)}} = \frac{\dot{D}(t)}{D(t)} - \frac{\dot{Y}(t)}{Y(t)} \quad (6)$$

Dividing the identity (4) by $D(t)$, and we get:

$$\frac{\dot{D}(t)}{D(t)} = (r(t) - \gamma(t)) - \varphi(t)\frac{Y(t)}{D(t)} \quad (7)$$

By transforming the identity (6) and substituting it to the left side of the equation (7), we get:

$$\frac{\dot{d}(t)}{d(t)} + \frac{\dot{Y}(t)}{Y(t)} = (r(t) - \gamma(t)) - \varphi(t)\frac{Y(t)}{D(t)} \quad (8)$$

Let:

$$\frac{\dot{Y}(t)}{Y(t)} = g(t).$$

Then, we can insert the parameter $g(t)$ denoting the GDP growth rate into equation (8):

$$\frac{\dot{d}(t)}{d(t)} + g(t) = \left(r(t) - \gamma(t)\right) - \varphi(t)\frac{Y(t)}{D(t)} \quad (9)$$

Thus, after simple transformations of equation (9) we get:

$$\dot{d}(t) = (r(t) - \gamma(t) - g(t))d(t) - \varphi(t) \quad (10)$$

Equation (10) shows that the first derivative of public debt-to-GDP ratio is a linear function of public debt $d(t)$. The directional parameter of this function depends on the average level of interest rates $r(t)$, parameter $\gamma(t)$ from the fiscal reaction function (3) and $g(t)$, which is the GDP growth rate (see Greiner and Fincke 2009).

Let's assume that $r(t) - \gamma(t) - g(t) = const \neq 0$ and $\varphi(t) = const > 0$. We can simply conclude that if $\gamma > r - g > 0$, then $d(t) \overset{\infty}{\rightarrow} A < \infty$. Then, in the long run, the public debt decreases and converges to some finite level A. This is due to the fact that the first derivative of the public debt dynamics equation is negative. This condition is sometimes referred to as fiscal sustainability in the strong sense (see Greiner and Fincke 2009). It should

be noted that that $r(t)$ in this case does not mean the repo rate, but the average yield on government bonds.

Our empirical approach involves three stages. First, we verify data quality and examine the integration level of key variables using the following tests: ADF, KPSS, PP, Zivot-Andrews (1992) and Lee-Strazicich (2003). Second, we run cointegration analysis using the Johansen test (1991), Lütkepohl-Saikkonen-Trenkler test (2004) and Pesaran-Shin-Smith bounds test (2001). Third, we estimate fiscal reaction functions in which the primary balance of the budget is our dependent variable, and the level of public debt stock and the output gap are key independent variables (see Bohn, 1995). In doing so, we first replicate the analysis of the earlier study on the full time frame and then use rolling-window estimates in order to gauge the changes of the fiscal sustainability parameter over time.

Following Krajewski et al. (2016) we estimated the parameters of the following behavioural equation:

$$ps_t = \alpha_0 + \alpha_1 ps_{t-1} + \beta_0 og_t + \beta_1 og_{t-1} + \gamma_1 d_{t-1} + \varepsilon_t \quad (11)$$

where:

ps_t – primary surplus-to-GDP ratio,

ps_{t-1} – primary surplus-to-GDP ratio 1 period lagged,

og_t – output gap-to-GDP ratio,

og_{t-1} – output gap-to-GDP ratio 1 period lagged,

d_{t-1} – public debt stock-to-GDP ratio 1 period lagged.

The key parameter is γ_1, which indicates the reaction of primary surplus to the changing level of public debt in the previous period. If this parameter is significantly different from zero (positive), this means that the growing stock of public debt effectively leads to generating a fiscal surplus, thus ensuring the long-run solvency of the public sector.

5. Results of the econometric analysis

We first checked the level of integration of every budgetary variable for Poland. In doing so, we have used three standard unit root tests ADF, PP, KPSS (see table 4) and two additional tests, that take into account the presence of structural breaks: Zivot-Andrews and Lee-Strazicich tests. For our calculations we have used RATS Software Version 10.0. In every

test we have chosen the level of significance of 5%. In all cases we have accepted hypothesis about the existence of structural break, so the use of Zivot-Andrews test and Lee-Strazicich test were justified (see Table 5 and Table 6, respectively). It should be underlined that the locations of the breaks don't really correspond to the date of the break that would seem to be appropriate from looking at the data. This is because of the fact that those procedures are not tests for break, but unit roots tests allowing for breaks, and the break locations are chosen to give the most negative test statistic, not the best fit to the data.

Table 4: **Unit root test results of primary surplus , public debt stock and output gap**

Variable	**ADF**	**PP**	**KPSS**
primary surplus-to-GDP ratio *(ps)*	I(3)	I(1)	I(0)
public debt stock-to-GDP ratio *(d)*	I(2)	I(1)	I(0)
output gap-to-GDP ratio *(og)*	I(0)	I(0)	I(3)

Source: own calculations

Table 5: **Zivot-Andrews test results of primary surplus , public debt stock and output gap**

Variable	**ZA (intercept & trend)**			
	order	**test statistic**	**critical value at α=5%**	**break**
primary surplus-to-GDP ratio *(ps)*	I(0)	-5.37	-5.08	2009 Q3
public debt stock-to-GDP ratio *(d)*	I(2)	-5.72	-5.08	2014 Q2
output gap-to-GDP ratio *(og)*	I(0)	-6.47	-5.08	2008 Q3

Source: own calculations

Table 6: **Lee-Strazicich test results of primary surplus , public debt stock and output gap**

Variable	**LS (intercept & trend)**			
	order	**test statistic**	**critical value at α=5%**	**break**
primary surplus-to-GDP ratio *(ps)*	I(0)	-5.10	-4.27	2009 Q2
public debt stock-to-GDP ratio *(d)*	I(2)	-5.53	-4.32	2015 Q1
output gap-to-GDP ratio *(og)*	I(1)	-4.93	-4.09	2007 Q2

Source: own calculations

The results of time series integration tests are inconclusive, which is largely due to the presence of structural breaks. However, due to the fact that there is an economic justification for the long-term relationship among variables, we proceeded to study cointegration. To our calculations we have used GNU R software and urca package. The test shows that according to the maximal eigenvalue test of Johansen-Procedure (1991) at the level of significance of 5% (see Table 7) we can accept hypothesis about the existence of one cointegrating vector.

Table 7: **Values of maximal eigenvalue statistic of Johansen-Procedure**

Number of vectors	**test**	**10 pct**	**5 pct**	**1 pct**
r <= 2	6.67	6.50	8.18	11.65
r <= 1	7.33	12.91	14.9	19.19
r = 0	28.30	18.90	21.07	25.75

Source: own calculations

Because of the existence of structural breaks in all aforementioned macroeconomic time series in Poland, we use the Lütkepohl-Saikkonen-Trenkler trace test (2004) with the critical values from Trenkler (2003) (see Table 8). This test takes into account the presence of endogenous structural shifts in the time series, because includes shift correction in linear trend. In this case at the level of significance of 5% the value of test statistics also affirms that there exists in Poland at least one cointegration vector among primary surplus (PS), public debt stock (D) and output gap (OG).

Table 8: **Values of trace statistic of Lütkepohl-Saikkonen-Trenkler test**

Number of vectors	test	10 pct	5 pct	1 pct
r <= 2	6.03	5.42	6.79	10.04
r <= 1	15.37	13.78	15.83	19.85
r = 0	34.11	25.93	28.45	33.76

Source: own calculations

In the light of mixed results on the order of integration, we use Pesaran-Shin-Smith bounds test (2001). Despite the possible difference in the orders of integration of variables at the level of significance of 5% the value of test statistics confirms that there exists strong cointegration relationship among primary surplus-to-GDP ratio, public debt stock-to-GDP ratio and output gap-to-GDP ratio in Poland (see Table 9).

Table 9: **Values of Pesaran-Shin-Smith bounds test (unrestricted intercepts; unrestricted trends)**

Level of significance	<------- I(0) ---------- I(1) ----->		F-statistic
10 pct	4.353	5.257	865.117
5 pct	5.137	6.173	
1 pct	7.013	8.230	

Source: own calculations

After carrying out the tests of integration order and cointegration analysis we have estimated the fiscal reaction function. The structure of the fiscal reaction function is in the line with former specifications by Bohn (2007), Krajewski et al (2016) and Wysocki & Wójcik (2018). Because of the fact that we use quarterly data, all variables were lagged by 4 instead of 1:

$$ps_t = \alpha_0 + \gamma_1 d_{t-4} + \alpha_1 ps_{t-4} + \beta_0 og_t + \beta_1 og_{t-4} + \varepsilon_t \quad (12)$$

where

ps_t – primary surplus-to-GDP ratio,

d_{t-4} – public debt stock-to-GDP ratio 4 quarters lagged,

ps_{t-4} – primary surplus-to-GDP ratio 4 quarters lagged,

og_t – output gap-to-GDP ratio,

og_{t-4} – output gap-to-GDP ratio 4 quarters lagged.

Our analysis of the key parameter γ_1 proceeds in the following steps. First, in order to put our analysis in the context of the earlier literature and use the earlier results as out starting benchmark, we first estimate the key fiscal reaction functions by replicating the estimations of the earlier study that looked at the period before the policy shift of 2016-2019 (see Wysocki and Wójcik (2018)). We confirm that indeed between 2004-2016 Poland's fiscal policy was sustainable in the strong sense with the γ_1 parameter assuming the value of 0.15418. We confirm also that in the post-crisis period of 2008-2016 fiscal sustainability improved significantly, with the γ_1 parameter assuming the value of 0.21766. In comparison to the whole sample of 2004-2016 the strength of reaction of the primary deficit to a change of the public debt increased in the post-crisis time up until 2016 by nearly 50%.

Second, we ask: what will be the change of the γ_1 parameter if we extend the time series by the years 2016-2019? Our underlying assumption is that if fiscal and social policy shifts of 2016-2019 impacted fiscal sustainability in a positive or negative way, this should be reflected in the respectively increase or decrease of the γ_1 parameter in the time series extended by the years 2016-2019. To make such comparison, we estimate the same fiscal reaction functions for the whole extended period between 2004 Q1-2019 Q4 and then we split the sample into the pre-crisis period from 2004 Q1 to 2008 Q3 and the post-crisis period from 2008 Q4 to 2019 Q4 (see Appendix 1) and run sensitivity and robustness tests (see Appendix 2). We find that when compared to the previous results on pre-2016 time frame the parameter γ_1 has indeed deteriorated, both for the whole sample (2004 Q1 – 2019 Q4) and for the post-crisis sample (2008 Q4 – 2019 Q4). This suggests that the policy shift 2016-2019 has weakened country's fiscal sustainability. Moreover, we see also that the impact of the 2016-2019 is stronger in the estimations of the shorter post-crisis period (fall of γ_1 parameter from 0.21766 to 0.15432) which may reflect a higher weight of 2016-2019 in the shorter time series (see Table 10 and Table 11). Importantly, while γ_1 the parameter is reduced in the extended time series it is still positive and statistically significant. It is unclear, however, if this reflects a positive value of the parameter in the period of 2016-2019 or a much stronger parameter prior to 2016.

Table 10: **Comparison of the results of fiscal reaction function for Poland since 2004**

	Replication of the estimates for 2004-Q1-2017 Q2 (Wysocki & Wójcik, 2018)		**Extended time series Period 2004 Q1-2019 Q4**	
Coefficients	**Estimate**	**Std. Error**	**Estimate**	**Std. Error**
(Intercept)	–8.48962	2.99832	-7.672820	2.027536
d4	0.15418	0.06012	0.150669	0.040665
ps4	0.55059	0.12596	0.806149	0.098023
og	0.06635	0.04602	0.087979	0.031678
og4	–0.01698	0.0484	0.009975	0.032881

Source: own calculations

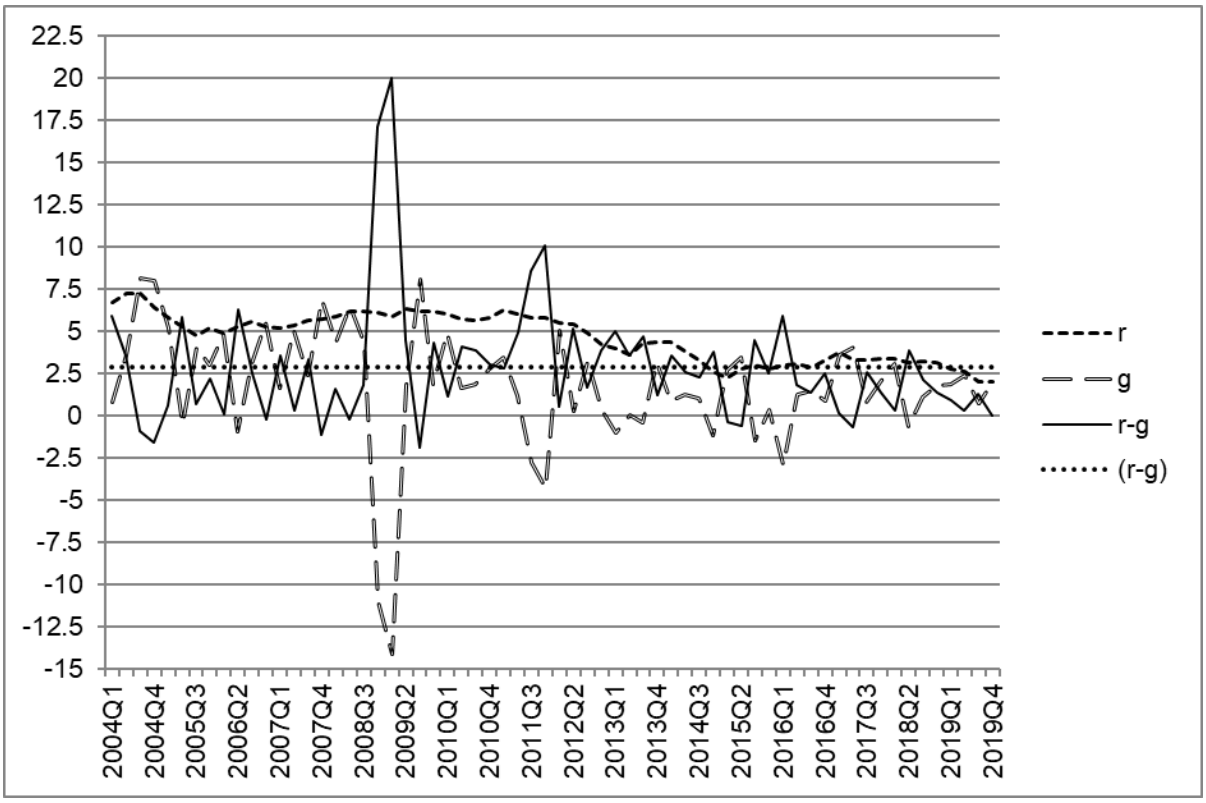
Table 11: **Comparison of the results of fiscal reaction function for Poland since 2008**

	Replication of the estimates for 2008 Q4-2017 Q2 (Wysocki & Wójcik, 2018)		**Extended time series Period 2008 Q4-2019 Q4**	
Coefficients	**Estimate**	**Std. Error**	**Estimate**	**Std. Error**
(Intercept)	–12.14877	3.51475	-7.77463	3.20753
d4	0.21766	0.06726	0.15432	0.06139
ps4	0.46872	0.1183	0.86903	0.09086
og	0.19921	0.07687	0.08919	0.06777
og4	0.08874	0.04901	0.14276	0.04470

Source: own calculations

In figure 6 we additionally plot times series for r, g , $r - g$, and average $(r - g)$ that we discussed in section 1. It appears that $(r - g)$ in Poland in the period 2004 Q1 – 2019 Q4 on the average was positive and accounted for 2.88 percentage points (see Figure 6)

Figure 6: **Average government bond yield vs dynamics of GDP growth Q/Q in Poland (in %)**



Source: own calculations based on Eurostat data

In order to scrutinize our results we decided to split the sample in to two periods: from 2004 Q1 to 2015 Q4 and from 2016 Q1 to 2019 Q4, respectively. Thanks to this research procedure we could investigate the fiscal outcomes prior to and after the policy shift in Poland. We assumed that structural break occurred in 2016 Q1. In an aim to confirm this we have launched Chow test. At the level of significance of 5% we reject the null hypothesis about the uniformity of model parameters in two groups of observations in favour of the alternative hypothesis (see Table 12). However, since the fact that the sample from 2016 Q1 to 2019 Q4 is very short, we should treat these results with caution.

Table 12: **Results of Chow test for Poland (structural break assumed in 2016 Q1)**

F value	d.f.1	d.f.2	p-value
15.64	43	12	4.015E-06

Source: own calculations

Further analysis showed that the γ1 parameter in fiscal reaction function is positive and statistically significant for the period from 2004 Q1 to 2015 Q4 (see Table 13). However, in case of the sample from 2016 Q1 to 2019 Q4 the parameter γ1 parameter is positive, but not statistically significant, which means that on this period fiscal policy in Poland was not sustainable in a strong sense (see Table 14).

Table 14: **Estimation results of the fiscal reaction functions for Poland (2004 Q1 – 2015 Q4**

Coefficients	**Estimate**	**Std. Error**	**t value**	**Pr(>|t|)**	**F-statistic**	**p-value**	**Adjusted R-squared**
(Intercept)	-6.45074	2.28244	-2.826	0.00712 **			
d4	0.11727	0.04720	2.485	0.01693 *			
ps4	0.63566	0.13720	4.633	3.33E-05 ***	7.944 on 4 and 43 DF	6.915E-05	0.3714
og	0.08839	0.03410	2.592	0.01298 *			
og4	0.01949	0.03665	0.532	0.59766			

Source: own calculations

Table 15: **Estimation results of the fiscal reaction functions for Poland (2016 Q1 – 2019 Q4)**

Coefficients	**Estimate**	**Std. Error**	**t value**	**Pr(>|t|)**	**F-statistic**	**p-value**	**Adjusted R-squared**
(Intercept)	-2.43890	9.93230	-0.246	0.81307			
d4	0.06396	0.19275	0.332	0.74974			
ps4	0.23320	0.61446	0.380	0.71555	13.43 on 4 and 7 DF	0.002129	0.8189
og	0.03060	0.15303	0.200	0.84718			
og4	0.23365	0.05854	3.991	0.00525 **			

Source: own calculations

In an aim to verify that the γ_1 parameter was actually higher in the period pre-2016 than in the period post-2016 we launched Welch's t-test with the following null hypothesis:

$$H_0: \gamma_{1,2004Q1-2015Q4} \geq \gamma_{1,2016Q1-2019Q4} \quad (13)$$

At the 5% significance level, there is no reason to reject the null hypothesis that the value γ_1 for the model covering the period 2004 Q1 - 2015 Q4 exceeds the value γ_1 for the model covering the period 2016 Q1 - 2019 Q4 (see Table 16).

Table 16: **Results of Welch's t-test for Poland**

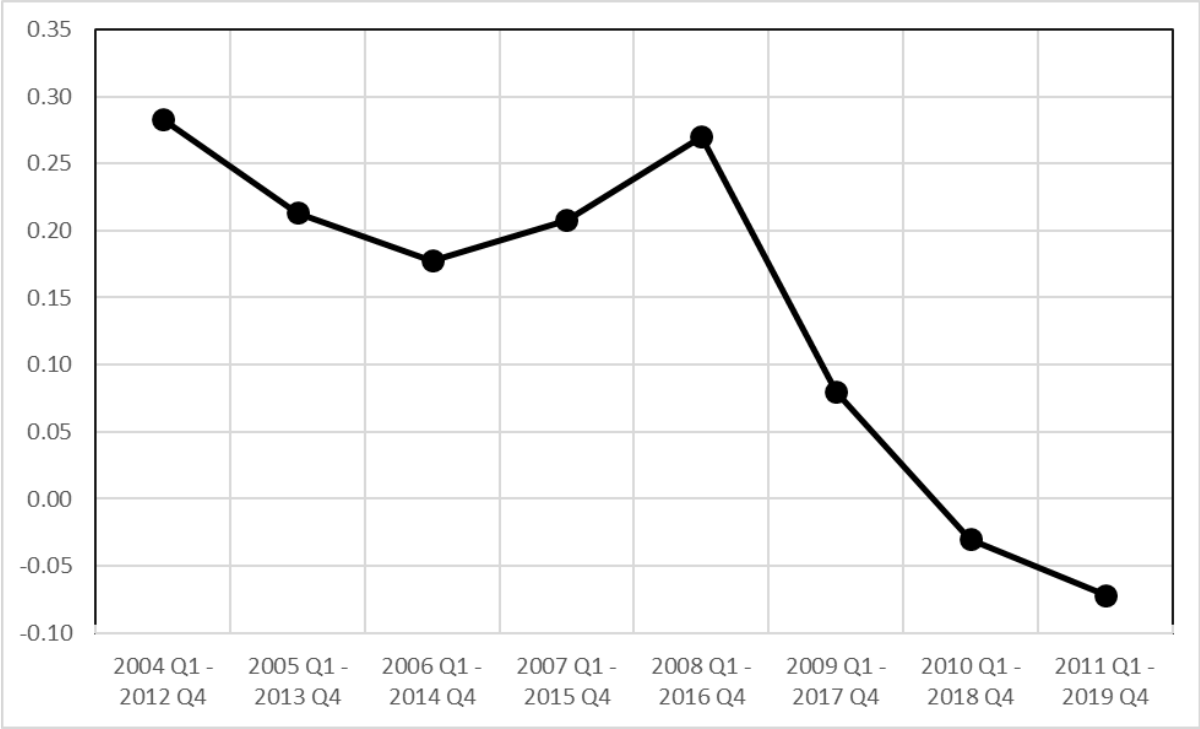
t value	df	p-value
0.9510991	11	0.8193

Source: own calculations

Next we carried out several rolling-window estimations. By cutting the time series into shorter intervals we could evaluate the relative impact of the pre-2016 and post-2016 time series and gauge the change of γ_1 parameter over time. The key decision for rolling-window estimations is the choice of the window lengths. The lengths of the window should have economic justification and at the same time should allow for a sufficient degree of freedom to carry out estimations. We chose 8 year window intervals, 32 quarters with a step of 4 quarters each, similar to other authors (see for example Roache (2014)). The window of 8 years reflects the lengths of two standard electoral cycles in Poland (4 years each) and at the same time offers a reasonable time frame of 32 quarters for conducing estimations. Choosing electoral cycles as a benchmark for our choice of window lengths is grounded in the now very well established political business cycle theory put forward by Nordhaus (1975), especially as in the period 2016-2019 Poland had two elections in 2018 and 2019.

Overall, we ran 8 additional estimations for time windows covering 8 years with a step of 4 quarters, starting with a window involving 2004 Q1 – 2012 Q4 and ending with a window 2011 Q1 – 2019 Q4. (see Table 17). We can observe that since 2016 the γ_1 parameter started to deteriorate significantly, and in the last two periods achieved negative values and was not statistically significant, which means a lack of fiscal stability in a strong sense (see Figure 7). This provides further evidence that the 2016-2019 may have negatively impacted country's fiscal sustainability.

Figure 7: **D4 coefficients (parameters γ1) based on rolling-window estimations**



Source: own calculations

Table 17: **Rolling-window estimations results of fiscal reaction functions for Poland**

Period	Coefficients	Estimate	Std. Error	t value	Pr(>|t|)	F-statistic	p-value	Adjusted R-squared
2004 Q1-2012 Q4	*(Intercept)*	-13.83649	4.91242	-2.817	0.008961 **	6.649 on 4 and 27 DF	7.35E-04	0.42160
	d4	0.28277	0.10990	2.573	0.015898 *			
	ps4	0.92414	0.24351	3.795	0.000759 ***			
	og	0.08504	0.04141	2.054	0.049802 *			
	og4	0.01969	0.04153	0.474	0.63922			
2005 Q1-2013 Q4	*(Intercept)*	-11.07915	3.41522	-3.244	0.003133 **	7.685 on 4 and 27 DF	2.86E-04	0.46310
	d4	0.21330	0.07349	2.902	0.007290 **			
	ps4	0.75901	0.18347	4.137	0.000308 ***			

Period	Coefficients	Estimate	Std. Error	t value	Pr(>|t|)	F-statistic	p-value	Adjusted R-squared
	og	0.10891	0.03943	2.762	0.010199 *			
	og4	0.03871	0.04306	0.899	0.37656			
2006 Q1-2014 Q4	*(Intercept)*	-10.01180	2.71595	-3.686	0.001009 **	9.084 on 4 and 27 DF	8.77E-05	0.51050
	d4	0.17782	0.05538	3.211	0.003405 **			
	ps4	0.60282	0.14923	4.040	0.000398 ***			
	og	0.13550	0.03816	3.551	0.001431 **			
	og4	0.06814	0.04213	1.617	0.11745			
2007 Q1-2015 Q4	*(Intercept)*	-11.80824	2.22184	-5.315	1.31E-05 ***	13.79 on 4 and 27 DF	3.01E-06	0.62270
	d4	0.20800	0.04499	4.623	8.39E-05 ***			
	ps4	0.54755	0.12048	4.545	0.000103 ***			
	og	0.13193	0.03098	4.258	0.000223 ***			
	og4	0.09558	0.03469	2.755	0.010369 *			
2008 Q1-2016 Q4	*(Intercept)*	-15.11338	3.04046	-4.971	3.29E-05 ***	9.991 on 4 and 27 DF	4.28E-05	0.53710
	d4	0.27007	0.05702	4.737	6.18E-05 ***			
	ps4	0.50295	0.14764	3.407	0.00208 **			
	og	-0.00213	0.07568	-0.028	0.97777			
	og4	0.06933	0.03777	1.836	0.07745 .			
2009 Q1-2017 Q4	*(Intercept)*	-4.22690	3.41551	-1.238	0.22654	22.55 on 4 and 27 DF	2.81E-08	0.73550
	d4	0.07974	0.06294	1.267	0.21597			

Period	Coefficients	Estimate	Std. Error	t value	Pr(>|t|)	F-statistic	p-value	Adjusted R-squared
	ps4	0.71789	0.10622	6.758	2.95E-07 ***			
	og	-0.04511	0.06684	-0.675	0.50548			
	og4	0.16839	0.04141	4.066	0.000372 ***			
2010 Q1-2018 Q4	*(Intercept)*	1.74149	3.19806	0.545	0.59100	17.22 on 4 and 27 DF	3.97E-07	0.67670
	d4	-0.03012	0.06058	-0.497	0.62300			
	ps4	0.69333	0.09942	6.974	1.7E-07 ***			
	og	-0.04838	0.06177	-0.783	0.44000			
	og4	0.04336	0.06531	0.664	0.51200			
2011 Q1-2019 Q4	*(Intercept)*	3.99186	2.92495	1.365	0.18400	16.91 on 4 and 27 DF	4.73E-07	0.67240
	d4	-0.07182	0.05672	-1.266	0.21600			
	ps4	0.67432	0.11215	6.013	2.05E-06 ***			
	og	0.05163	0.06011	0.859	0.39800			
	og4	0.03997	0.05495	0.727	0.47300			

Source: own calculations

6. Conclusions

The past decade has witnessed sharp increase in populist movements across the world, some of which managed to gain strong political support and formed populist governments promising new set of economic policies, including new tax, social and fiscal policies. This raises a pertinent policy question: how do such populist governments influence fiscal policy outcomes?

We approach this question by looking at the case of Poland. We provide the first empirical evidence of the impact of the populist policy shift in 2016-2019 on long-term fiscal

sustainability in Poland. Our analysis revealed that fiscal sustainability parameters have deteriorated between 2016-2019. Specifically, the γ_1 parameter in fiscal reaction function for Poland was actually higher in the period pre-2016 than in the period post-2016. Furthermore, rolling-window estimations suggest that just after a year since the introduction of the Family 500+ program, the strength of reaction of the primary deficit to a change of the public debt decreased significantly. Moreover, the parameter turned negative and statistically significant thereafter which means that from 2018 fiscal policy lacked long-term sustainability. Overall, our estimates suggest that in the period of 2016-2019 fiscal sustainability parameters were the lowest since Poland joined the EU in 2004.

So, how do populist governments influence fiscal policy outcomes? The case of Poland suggests that populists have negative impact for long-term sustainability. Given that long-term fiscal sustainability is key for long-term growth it may suggest a more general statement that populism is negative for growth in the long-run. There are certainly several weaknesses of our analysis related to the still very short time-series or the choice of necessary window intervals and therefore our results should be seen as preliminary and treated with caution.

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Appendix 1

Robustness check analysis – additional estimations on the samples prior to and after the crisis

Table 18: **Estimation results of the fiscal reaction functions for Poland (2004 Q1 – 2008 Q3**

Coefficients	Estimate	Std. Error	t value	Pr(>|t|)	F-statistic	p-value	Adjusted R-squared
(Intercept)	-15.14501	7.69549	-1.968	0.0692 .	9.558 on 4 and 14 DF	0.0006087	0.6554
D4	0.30876	0.16526	1.868	0.0828 .			
PS4	0.36630	0.25603	1.431	0.1745			
OG	0.07502	0.02662	2.818	0.0137 *			
OG4	-0.01238	0.06046	-0.205	0.8408			

Source: own calculations

Table 19: **Estimation results of the fiscal reaction functions for Poland (2008 Q4 – 2019 Q4)**

Coefficients	Estimate	Std. Error	t value	Pr(>|t|)	F-statistic	p-value	Adjusted R-squared
(Intercept)	-7.77463	3.20753	-2.424	0.02051 *	28.7 on 4 and 36 DF	9.336E-11	0.7347
D4	0.15432	0.06139	2.514	0.01656 *			
PS4	0.86903	0.09086	9.565	2.01E-11 ***			
OG	0.08919	0.06777	1.316	0.19652			
OG4	0.14276	0.04470	3.194	0.00292 **			

Source: own calculations

Appendix 2

Furthermore, for the extended time series the estimations of the majority of parameters are statistically significant and the results of the F-statistic confirm the proper specification of the model.

Table 20**: Estimation results of fiscal reaction function for Poland (2004 Q1 – 2019 Q4)**

Coefficients	Estimate	Std. Error	t value	Pr(>|t|)	F-statistic	p-value	Adjusted R-squared
(Intercept)	-7.672820	2.027536	-3.784	0.000383 ***			
D4	0.150669	0.040665	3.705	0.000492 ***	21.16 on 4 and 55 DF	1.319E-10	0.5775
PS4	0.806149	0.098023	8.224	3.77E-11 ***			
OG	0.087979	0.031678	2.777	0.007480 **			
OG4	0.009975	0.032881	0.303	0.762753			

Source: own calculations

In our robustness check analysis we split the sample to investigate the fiscal outcomes prior to and after the crisis. We assumed that structural break occurred in 2008 Q4. In an aim to confirm this we have launched Chow test. At the level of significance of 5% we reject the null hypothesis about the uniformity of model parameters in two groups of observations in favour of the alternative hypothesis (see Table 21).

Table 21**: Results of Chow test for Poland (structural break assumed in 2008 Q4)**

F value	d.f.1	d.f.2	p-value
6.253176E+00	5	50	1.408247E-04

Source: own calculations

Further analysis showed that the γ_1 parameter is positive and statistically significant both for the period 2004 Q1 to 2008 Q3 and for 2008 Q4 to 2019 Q4 as well. That means that the fiscal policy in Poland has been sustainable in a strong sense also since 2008 Q4 (see

Appendix 1). Furthermore, redemption of some series of T-bonds in 2014 Q1 in amount of 8.5% of GDP (see Figure 8) had no significant impact upon our conclusions (see Table 22 and Table 23).

Table 22: **Estimation results of fiscal reaction functions for Poland (2004 Q1 – 2019 Q4) for gross consolidated debt without the effect of the redemption of the government-bond share of the open pension funds**

Coefficients	Estimate	Std. Error	t value	Pr(>|t|)	F-statistic	p-value	Adjusted R-squared
(Intercept)	-6.45467	1.28378	-5.028	5.61E-06 ***	26.52 on 4 and 55 DF	2.807E-12	0.6337
D4	0.11430	0.02320	4.928	8.01E-06 ***			
PS4	0.62392	0.09263	6.736	1.02E-08 ***			
OG	0.10253	0.02977	3.445	0.0011 **			
OG4	0.02710	0.03118	0.869	0.3884			

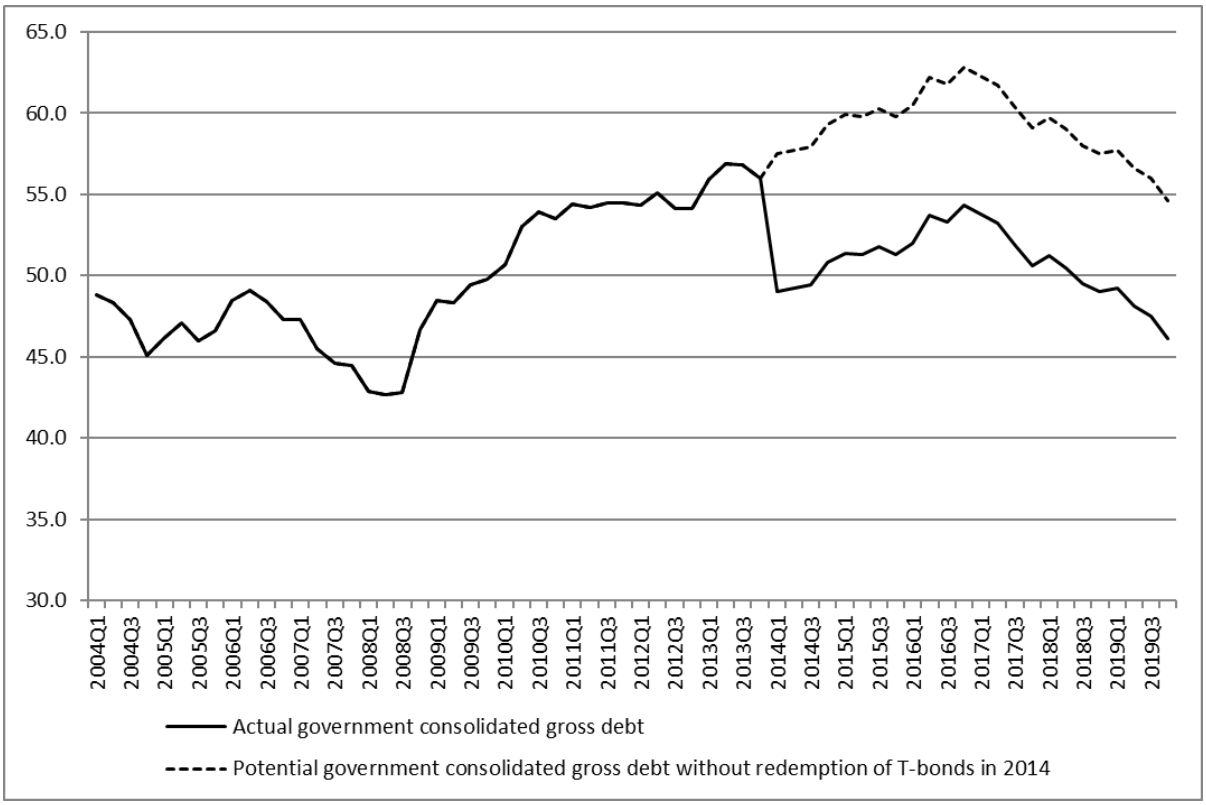
Source: own calculations

Table 23: **Estimation results of fiscal reaction functions for Poland (2008 Q4 – 2019 Q4 for gross consolidated debt without the effect of the redemption of the government-bond share of the open pension funds**

Coefficients	Estimate	Std. Error	t value	Pr(>|t|)	F-statistic	p-value	Adjusted R-squared
(Intercept)	-14.69174	1.92479	-7.633	4.94E-09 ***	77.2 on 4 and 36 DF	< 2.2E-16	0.884
D4	0.25168	0.03229	7.795	3.06E-09 ***			
PS4	0.44022	0.07899	5.573	2.58E-06 ***			
OG	0.07687	0.04474	1.718	0.094331 .			
OG4	0.11628	0.02952	3.938	0.000361 ***			

Source: own calculations

Figure 8: **Actual vs potential government consolidated gross debt in Poland without redemption of T-bonds in 2014 as percentage of GDP**



Source: own elaboration based on Eurostat and Ministry of Finance of Poland