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Fiscal Policy in Poland: the Stabilizing Expenditure Rule and Optimization of the Financial Policy of Local Government Units

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Warsaw, November 2017

The objective of the hereby submitted PhD thesis was to assess how fiscal rules affect fiscal policy, including fiscal sustainability in the general government sector, taking into account the specific features of its subsectors. In the first part of the dissertation we investigated the impact of the stabilizing expenditure rule on cyclicality and sustainability of fiscal policy at the GG sector level in Poland. This was done based on a series of stochastic simulations carried out within the 2014-40 time horizon. Most of the fiscal reaction functions, estimated on the basis of outcomes of the simulations, indicated a positive, and moderately robust impact of the debt-to-GDP ratio and the adjusted output gap on the primary budget balance. Thanks to the local government financial policy optimization model put forward in the second part of the thesis, we verified hypotheses about the impact of selected factors on the optimal ratios of the local government's current expenditure and own investment to its current revenue. We characterized the impacts of: the infrastructure-to-revenue ratio, the infrastructure depreciation rate, the limit of EU funds, the share of own funds appropriated for investments co-funded by the EU, the discount factor, the interest rate, the debt maturity rate, the debt ratio and the past current expenditure ratio. The impact of those factors was quantified in terms of magnitude and timing.

Background Literature

The general government (GG) expenditure in Poland in 2000-2015 constituted about $41 - 46\%$ of GDP, while the revenue – $38 - 42\%$ of GDP. The GG sector consists of three subsectors: the central and social security subsectors, controlled by the government, as well as the local subsector which is mostly influenced by authorities of the local government units (LGU): voivodeships, poviats and communities. While fiscal policy run at the central level may give rise to more stable business cycles and stronger income redistribution, instruments (e.g. level or structure of expenditure) of policy conducted at the local level can be better adjusted to preferences of citizens of a given region. Hence, the role of the state in the Polish economy is fundamental, whereas its policy should be considered from two perspectives: of the central government and of the numerous, heterogeneous local authorities.

Since the end of 2013, the governmental fiscal policy in Poland has been conducted under the stabilizing expenditure rule (SER). According to the SER, public debt should remain below 43% of GDP in the medium term, while the nominal balance should on average amount to the medium term objective (MTO) which is currently equal to -1% of GDP. These targets are supposed to be achieved by limiting growth of the public expenditure. The SER determines that their rate of growth in principle cannot exceed the medium-term real GDP dynamics. Hence, the rule was designed to make fiscal policy stable and countercyclical with regard to the nominal balance and acyclical with regard to the expenditure dynamics. Fiscal sustainability is understood in this context as "a government's ability to indefinitely maintain the same set of policies while remaining solvent" (Burnside, 2005). Countercyclical fiscal policy, in turn, consists in a negative correlation between variables expressing the fiscal policy stance, e.g. the primary deficit, and the phase of the business cycle, measured e.g. by the output gap.

Determinants of governmental fiscal policy were discussed in a number of studies. The IMF (Akitoby et al., 2013) suggests that after the crisis 2008-09 there was substantial revision in the approach to the stabilizing role of fiscal policy. According to the IMF, this role should consist not only in ensuring long-term sustainability but also in stabilizing short-term business fluctuations. More broadly, the crisis has undermined the paradigm that optimal fiscal policy can be redu-

ced to leaving automatic fiscal stabilizers to operate freely, in line with the theses formulated by Gordon and Leeper (2005).

The crisis, related i.a. to excessive indebtedness of economies in the euro area periphery, created scope for more research on the fiscal space – which measures the distance to the point at which a country loses its fiscal sustainability (Ghosh, 2013). Before 2008, sovereign debt risk in many advanced economies was underestimated whereas fiscal policy was run in a procyclical way (Eyraud and Wu, 2015). Poland was no exception and also conducted expansionary fiscal policy in the times of economic upturn in 2005-2008. The Polish Ministry of Finance (2012) admitted that "(...) rules [applied at the time] did not prevent a deep imbalance of public finances. Hence, further strengthening of the fiscal framework is necessary." Also, Jajko (2008) asserted that the lack of sustainability in Poland's public finances led to a systematic rise of public debt. The excessively loose fiscal policy in Poland was also observed by Jędrzejowicz, Kitala, and Wronka (2008). On the other hand, the consensus was not shared by Mackiewicz (2010) who claimed that fiscal policy in Poland in 1993-2008 was countercyclial and stable.

Fiscal rules, in particular expenditure ones, are widely recommended as a remedy for the weaknesses of discretionary fiscal policy (see e.g. Ayuso-i-Casals, 2012). Holm-Hadulla et al. (2012) proved that expenditure rules reduce the procyclicality of government spending in the presence of unexpected output gaps. Other authors (i.a. Carnot, 2014; Debrun et al., 2008 and Petrova, 2012) took into consideration the details of the formulae underlying such rules.

Further related studies include Lu, Vazquez and Ho (2013) as well as Pigoń and Ramsza (2014), who carried out simulations of the Polish economy under the assumption of a binding expenditure rule. A similar stochastic approach was also adopted in two other articles published in the IMF series, written by: Celasun, Debrun and Ostry (2007) as well as Kawakami and Romeu (2011).

However, in the literature to date there have been no simulations of the Polish economy generated on the basis of detailed, comprehensively verified econometric models describing the main macroeconomic and fiscal variables, under the assumption that the stabilizing expenditure rule is binding in the current form. Furthermore, the previous analyses of cyclicality and sustainability of Poland's fiscal policy need to be updated. The current PhD thesis fills this gap in the literature.

Literature on the optimal allocation of goods at the local level, as well as on local governments' fiscal policy in general, i.e. the "fiscal federalism" literature is, in contrast, rich and diversified. This body of literature is, however, not as connected to current political affairs as the literature about fiscal rules and fiscal policy run at the central level. Oates (2005) distinguished three strands of literature on local governments' fiscal policy: 1) seminal, old (first-generation) theories, 2) public choice theories, and 3) contemporary (second-generation) theories (see also Weingast, 2009).

Pathbreaking studies on the allocation of public goods, including the ones provided by local governments, were published in 1950s. They are included in the old (first-generation) theories category according to the Oates' classification. Samuelson (1955) stated that there is no market mechanism which could lead to a decentralized and effective allocation of public goods. Voting is not an ideal method of solving this problem, i.a. because its outcome can depend on the order of voted options. Alternatively, one could assume that the cost of production of public goods could be burdened on their users proportionately to utility gained from such goods. However, a rational consumer would benefit in that case from lowering her preferences in order to bear lower or even zero cost of financing the public goods which she would utilize anyway (the typical

free-rider problem). In order to induce consumers to reveal their true preferences, the so-called Groves-Clarke tax (Clarke, 1971 and Groves, 1973) might be imposed. This tax is paid only by the pivotal voter.

The Samuelson's thesis (1955) was rejected by Tiebout. In his seminal paper, Tiebout (1956) argued that there can exist effective, at least approximately, pseudo-market solutions for the allocation of local public goods. Such goods can be consumed simultaneously by citizens of a given local community rather than the whole population. A mechanism proposed by Tiebout, which leads to an effective allocation, consists in the so-called "voting by legs", i.e. moving by consumers to those communities which ensure the most appropriate, in line with their preferences, set of public goods. One of strongest critiques of the Tiebout model has been formulated by Bewley (1981) who proved that in the Tiebout model there is no Pareto-effective equilibrium. The fundamental reason is that the consumers don't know that their relocations would influence the quantity of public goods offered by local governments, which would contribute to those consumers' higher utility.

The old theories, according to Oates (2005), very often could be reduced to a choice between decentralization and centralization of power. Assuming that all politicians maximize the welfare of their voters, decentralization increases the utility of citizens. Policy can be better tailored to the needs of particular regions which differ in terms of citizens' preferences. Such a solution was called "fiscal equivalence" by Olson (1969).

On the other hand, one cannot exclude that a central government could be able to accommodate the distinctions between regions when governing them – models of such governments were presented in articles included in the so-called second generation of studies, written i.a. by: Lockwood (2002) as well as Besley and Coate (2003). The point is that goods produced in one region can exert positive or negative side effects on other regions. If this inefficiency of local government policy cannot be fixed by equalizing transfers like the Pigovian (1920) one, it will constitute an argument for centralization. Another one is due to the possible diversification of regional policy conducted by the central government.

In contrast to the above papers on local policy, in the theory of public choice politicians are allowed to have their own preferences – different than the rest of society. Politicians, including local authorities, may e.g. want to maximize budgetary expenditure in order to widen their influence. According to Brennan and Buchanan (1980), competition for votes among local governments could contribute to limiting the excessive share of state in the economy. However, Rodden (2003) found that this positive aspect of decentralization can occur only if local expenditure is financed from local taxes rather than from subsidies coming from the central budget.

Contemporary theories of fiscal federalism, although heterogeneous, usually have two common features.

Firstly, similarly to public choice theories, they assume different objectives of politicians and voters. For instance, Prud'homme (1995) showed that higher decentralization diminishes the opportunity for a central government to run active, countercyclical fiscal policy, since a central government possesses lower funds. Moreover, local authorities use to spend more money in a period just before elections, which creates a political cycle – not necessarily concurrent with the business cycle in a country.

Secondly, contemporary (second-generation) theories focus on the issue of incomplete infor-

4

mation. To this end, several studies use the principal-agent model in which the principal is the central authority (e.g. Levaggi, 2002) or voters (e.g. Tommasi i Weinschelbaum, 2007) whereas the agent is the local authorities. Elections of authorities, in turn, affected by e.g. promises made during an election campaign, were analysed by Seabright (1996) based on a model of incomplete contracts.

Another set of papers discusses the issue of hard and soft budget constraints – notions popularized by Kornai (1979, 1980). Local governments tend to exceed their budget constraints, incurring excessive debts and relying on aid from from the central budget. Central authorities do their best to persuade local governments that they tighten their spending policy or otherwise they will receive no financial support. Such behaviors have been analyzed with tools derived from game theory. As an example, Goodspeed (2002) referred in his study to the Stackelberg model, while Inman (2003) used the "prisoner's dilemma" game, which can result in bankruptcy or financial aid for local governments. It is worth adding that in order to make local budget constraints harder, one should appropriately design the tax and subsidy system, bankruptcy law and fiscal rules.

There are relatively fewer empirical studies in the literature about Polish local governments. Notably, a complex model of local government financial policy in times of substantial co-funding from EU funds was described by Sierak et al. (2013). In the context of local governments' indebtedness, it is worth mentioning the findings by Kamiński (2012), whereas in the context of monopolization of local power – by Fałkowski and Bukowska (2016). The remainder of this literature focuses usually on legal (Skuza, 2003a i 2003b; Wiewióra, 2007), financial (Karpiński, 2001; Jastrzębska, 2002; Gonet, 2004) or theoretical aspects (Guziejewska 2007 i 2008).

The present dissertation fills a gap in the research literature by being the first study to treat a Polish local government unit as an entity which maximizes its objective function and decides on levels of a range of variables subject to certain, very specifically designed constraints.

Research Objectives and Hypotheses

The objective of this PhD thesis is to assess the impact of fiscal rules on fiscal policy, including fiscal sustainability in the general government sector at the central and local level. This general objective is divided into two detailed objectives. The aim of the first part of the dissertation is to establish how – in line with the most probable scenarios – the stabilizing expenditure rule adopted in 2013 will affect the sustainability of public finances and the countercyclicality of fiscal policy in Poland. The aim of the second part of the dissertation is to formulate the optimal financial policy of communities and poviat towns and cities subject to a four-year term of office, substantial co-funding of investments from EU funds, and a binding condition relating to the individual debt ratio (IDR) or a balanced current-budget rule.

The analyses carried out in both parts of the current thesis assume that fiscal rules will constitute a binding restriction. The key question accompanying the first part is whether the SER alone is sufficient to ensure sustainability and countercyclicality of fiscal policy at the GG sector level. The issue take up in the second part is more difficult since local governments are heterogeneous, indebted to various extents, have differently developed infrastructure, different growth rates of current revenue, etc. Therefore, as opposed to the central government, there is

5

no single formula for a fiscal rule, according to which local government units could run their financial policy. This is because potential achievement of the maximal amount of expenditure permitted by the IDR does not suffice to determine the optimal level of current spending and investment expenditures. A major added value of the second part of this thesis is to propose a formula (an informal expenditure rule) describing the optimal policy, dependent on the specific characteristics of particular communities and poviat towns and cities.

In order to achieve the first detailed objective of the dissertation, stochastic simulations were carried out under the key assumption that the Polish economy will behave similarly, in terms of: inflation, interest rates, GDP and public revenue, to the economies of eurozone member states and that the forecasts produced by the Ministry of Finance will be unbiased. In this regard, the modelling approach adopted in the first part of this dissertation focuses on the stabilizing impact of the SER on the GG sector rather than on the challenge of smoothing macroeconomic fluctuations in general. We also assumed a fixed potential GDP growth path and the dependence of the output gap on the public deficit. Under those assumptions we generated a series of scenarios – sets of time series for 2014-2040 – which show how the most important macroeconomic and fiscal variables will most likely evolve over time. Simulated values of those variables were obtained from econometric models, consisting of i.a. an autoregressive term and a random component drawn from a multivariate distribution with a nonspherical covariance matrix.

This analysis provides also an answer to the questions: what is the effect of the lowering of debt thresholds in 2014 due to the reform of Open Pension Funds (OFE), and what is the effect of the modification of the nominal part of the formula in 2015? The simulation outcomes were assessed in terms of cyclicality, based on the magnitude of certain correlations, and sustainability, based on unit root tests. Finally, fiscal reaction functions were built, allowing for simultaneous assessment of sustainability and countercyclicality of policy (the discretionary one and the one resulting from automatic fiscal stabilizers) conducted according to the SER.

In the literature devoted to simulations of fiscal policy, fiscal reaction functions (FRF) were usually used for modelling the nominal balance or the primary balance (Celasun et al., 2007). In contrast, in the current PhD thesis the balance was determined by the SER and an equation which generated the public revenue level. The FRF was then estimated only after the results of the simulations had been obtained. We modelled both the immediate impact of fiscal policy on macroeconomic variables and the reverse relationship.

In line with a suggestion coming from the aforementioned paper by Celasun et al., models designed to simulate macroeconomic and fiscal variables were estimated on a sample of eurozone member states rather than focusing only on Poland's historical data. This is motivated by the fact that "in many emerging market economies, identifying stable economic relationships is a challenge: the lack of long time series combined with ongoing structural change and shifts in policy regime inevitably reduce the reliability of econometric estimates for predicting future developments." (Celasun et al., 2007, p. 409).

In order to achieve the second detailed objective of the dissertation, the determinants of optimal levels of current spending and investment expenditures of communities, poviat towns and cities were comprehensively discussed. An analysis of the local subsector of the GG sector as an aggregate would not be appropriate due to its heterogeneity: an inherent feature of local government units is their ability to form their own specific financial policy. Investigation of all local government units separately would be too complex a task, and hence in this dissertation

we concentrated on an analysis of a representative local authority who optimizes its objective function under constraints.

We built a decision model of a local authority (a community, a poviat town or a city). The model was solved in part analytically and in part – whenever obtaining analytical solutions was impossible – numerically, based on an innovative meta-algorithm taking advantage of a dozen of established optimization algorithms simultaneously. We calibrated the values of behavioral parameters in this model such that the key properties of its optimal solution were brought satisfactorily close to their empirical counterparts. Afterwards, a lot of parameter sets were drawn from specifically calibrated distributions. These theoretical distributions were constructed on the basis of Polish data from the period between 2010 and 2015. Each set of parameter values was assigned with optimal values of the current spending and investment expenditures. Relationships between the parameter values and the optimal solutions were analyzed with the help of econometric linear meta-models.

In the present PhD thesis we formulated the following hypotheses:

1. The stabilizing expenditure rule will improve the characteristics of fiscal policy in Poland:

   (a) The rule will make the fiscal policy countercyclical.
   (b) The rule will lead to lower indebtedness and will ensure sustainability of the public finances.
   (c) The rule will prevent the general government nominal deficit from exceeding the 3%-of-GDP threshold.
   (d) The lowering of debt thresholds in the correction mechanism of the SER will tighten the fiscal policy.
   (e) The replacement of inflation forecasts with the inflation target of the Monetary Policy Council will be neutral from the fiscal policy perspective.

2. Optimal financial policy of communities and poviat towns and cities depends on a number of factors:

   (a) A positive impact on the optimal level of current expenditures in relation to the current revenue is exerted by an increase in: the infrastructure-to-revenue ratio and the limit of EU co-funding.
   (b) A negative impact on the optimal level of current expenditures in relation to the current revenue is exerted by an increase in: the discount factor, the infrastructure depreciation rate, the share of own co-funding in the EU investments, the interest rate, the debt maturity rate, the debt ratio and the past current expenditure ratio.
   (c) A positive impact on the optimal level of ordinary (i.e. not financed from EU funds) investment in relation to the current revenue is exerted by an increase in: the discount factor, the infrastructure depreciation rate and the share of own co-funding in the EU investments.
   (d) A negative impact on the optimal level of ordinary investment in relation to the current revenue is exerted by an increase in: the interest rate, the debt maturity rate, the debt ratio, the past current expenditure ratio, the infrastructure-to-revenue ratio and the limit of EU co-funding.

Results and Contribution to the Literature

The objective of the first part of the current thesis was to investigate the impact of the stabilizing expenditure rule (SER) on cyclicality and sustainability of fiscal policy in Poland. With respect to cyclicality, a weak negative correlation between the cyclically-adjusted balance and the output gap was found, which would indicate either acyclicality or weak procyclicality of the future fiscal policy run in accordance with the SER. On the other hand, most of the estimated fiscal reaction functions showed a positive and moderately robust impact of the adjusted output gap on the primary balance level. This would translate into countercyclicality of fiscal policy conducted according to the SER, which partly confirms hypothesis 1a. Regarding sustainability, the fiscal reaction functions showed positive and moderately robust impact of the debt-to-GDP ratio on the primary balance level. This would be a symptom of stable fiscal policy. However, other conditions for debt stability, based on the properties of time series, were not met. Hence, hypothesis 1b was also only partly confirmed.

The stochastic simulations indicated that the GG debt-to-GDP ratio will decline, in line with the central path, from 50% in 2014 to $10 - 20\%$ in 2040, though the correction mechanism will be triggered even in the long run. The deficit will exceed 3% of GDP every 5-6 years on average. Hence, although hypothesis 1c was not confirmed, this still constitutes great improvement in comparison to the period before 2014. If the thresholds had not been lowered in 2014, then there would have been no correction in 2016-17. That, in turn, would have delayed the achievement of the medium term objective and would have extended the correction period. In spite of that, in the long run the higher thresholds are neutral. With reference to hypothesis 1d it means that the decrease of the thresholds has made Poland's fiscal policy more strict only in the short run.

The last stated hypothesis, 1e, was also not confirmed. It turns out that the replacement of the CPI inflation with the inflation target is not neutral, even in the long run. This is because the current formula imposes more restrictive policy in times of extraordinarily high inflation.

Thanks to our optimization model of local government financial policy, discussed in the second part of the dissertation, we verified the hypotheses on the impact of selected factors on the optimal level of LGU current spending and investment expenditure. We confirmed hypothesis 2a to the extent that the value of infrastructure influences positively the local government current expenditure. We could not confirm the hypothesis regarding the maximum level of EU funds.

With regard to hypothesis 2b we showed that an increase in: the infrastructure depreciation rate, the debt-to-revenue ratio and, to a lesser extent, the share of own co-funding of EU investments have a negative impact on the current expenditure in relation to the current revenue. The impact of the interest rate turned out to be negative or neutral. An increase in the discount factor exerts different impacts on the current expenditure, depending on the period in question. Moreover, one cannot generalize the observations on the debt maturity rate, because under different assumptions and during different years within the local government's 4-year term, the effect of this parameter can be positive, negative or neutral. An unexpected result was observed for the past (before the modelled period) current expenditure ratio. Higher past current expenditure turned out to narrow down the space for current expenditures at the beginning of the analysed period, but in the following year a compensation effect occurs, i.e. previous savings allow for higher expenditures than in a scenario without savings.

We also asserted, in line with hypothesis 2c, that an increase in the discount factor or the infra-

structure depreciation rate affects positively the ordinary investment in relation to the current revenue. In contrast, the parameter describing own co-funding of EU investments has approximately a neutral impact.

Likewise we confirmed hypothesis 2d about a negative impact on the ordinary investment in relation to the current revenue of an increase in: the interest rate, the debt maturity rate and the infrastructure-to-revenue ratio. We also verified positively the hypothesis about a negative impact of an increase in the limit of EU co-funding. We found again the compensation effect, this time for the debt ratio, where the negative impact was exerted only at the beginning of the modelled period. This effect occurred also for the ordinary investment ratio as the explained variable and the past current expenditure ratio as the explanatory variable; in this case it turned out to be even stronger than in the case of the current expenditure as the dependent variable. As a rule, the optimum level of the investment expenditure diminishes over time, which is a consequence of the adopted utility function. This function rewards investments made earlier, because infrastructure improved in that way is included in the utility repeatedly.

Concluding Remarks

In the following paragraphs we indicate the possible directions of development of the aforementioned models describing fiscal policy in Poland. We also formulate some reflections about the usage of those models by policy-makers.

The model designed for assessing the outcomes of the stabilizing expenditure rule can be enhanced, in the first step, by disaggregating expenditures into "flexible" categories, controlled by the politicians directly and "inflexible" ones, which are formed independently at least in the short term. For instance, one can distinguish, in an analogous manner to the model of local government policy, exogenously determined debt service costs, as well as social benefits or public pensions, which cannot be lowered easily. On the other hand, one can distinguish the flexible items, such as investments or salaries in public administration. Furthermore, separation of the expenditure of: the local government, the National Health Fund, the Bank Guarantee Fund and other non-governmental entities would allow for more precise calculations of the limit, i.e. the part of the stabilizing expenditure rule which cannot be exceeded according to the law. Thanks to this decomposition, some spending items would have to be lowered in spite of an overall increase in the level of expenditure. Additionally, the disaggregation would make modelling the impact of fiscal policy on the GDP easier. In particular, assuming that public investment is separately specified, one may consider endogenizing the potential GDP.

In a similar vein, one can further disaggregate the expenditure and the revenue in the model describing local governments' financial policy. It is worth stressing that some tasks carried out by the LGUs are assigned tasks, financed from subsidies and subventions. In the aforementioned enhanced model, funds appropriated for those tasks would be determined exogenously. The model can be also enhanced by an equation for an impact of investments on the level of infrastructure. Taking into consideration that many mayors are re-elected for consecutive terms, one may also consider extending of the decision horizon to e.g. 8 or 12 years, or even to infinity – in order to gain an interesting point of reference.

It would be also useful to verify empirically the outcomes of the simulations based on both models

of fiscal policy – conducted at the central and local level. For instance, since the simulations of government fiscal policy assume fixed values of variables until 2015, one may compare the paths of macroeconomic and fiscal variables simulated since 2016 with the actual values. Obviously, such a comparison will be more valuable in a few years, when longer time series will be available, unless the SER is withdrawn or modified. In the case of the model of local government fiscal policy, one may assess whether the implied optimal policy is indeed run and whether it fosters re-election of the authorities.

Thinking about how to use the conclusions stemming from the models specified in this thesis in practice, one should bear in mind that some of the model assumptions can diverge from reality to a lesser or greater extent. Hence, decision-makers should not use these models or the formulated conclusions without due criticism. However, specifying the decision problem with its decision variables, constraints and objective function – like in this thesis – could already make an added value to the process of designing of public policies because it would encourage to forecast multi-annual spending limits, implied by the fiscal rules, both for the central and the local government (the SER and the IDR respectively). That, in connection with the planned "fixed" expenditure, would indicate the space for new public spending items. Each proposal of an amendment generating new expenditures, whether in the central or the local government budget, would have to be compared with the above defined fiscal space, which would improve the quality of the public debate. Voters and decision-makers would become more aware of financial constraints, so their choice would become more rational.

Dominik Korniluk

10

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