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REVENUE AUTONOMY AND FISCAL SUSTAINABILITY OF LOCAL GOVERNMENTS

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1. INTRODUCTION

Sovereign debt to GDP ratios are on the rise. In advanced economies they have been rising since the 1970s and in the aftermath of the COVID-19 pandemic reached back, on average, to the World War II highs of above 120% GDP. Since 2007, with the Global Financial Crisis and Great Lockdown, they have risen by almost 50 percentage points of GDP. And emerging market economies debt ratios are at their record levels as well (Schuknecht, 2022). While interest-rate-growth differentials have been supportive of public debt sustainability in the previous decade, they are currently reversing with growing inflation and slowing economic growth. Despite that governments more often than not, benefit from favorable interest-rate-growth differentials, marginal borrowing costs often rise abruptly and sharply, just before default (Mauro and Zhou, 2020). Economies with higher initial public debts are more vulnerable to such shocks and have higher downside risks when they happen (Weicheng, Presbitero, and Wiriadinata, 2020). In the aftermath of COVID-19 lockdowns, to remain credible, governments need to design fiscal frameworks to account for and manage these fiscal risks (IMF, 2021b). Moreover, some economists believe that stabilizing inflation itself may require longer-term fiscal reforms in addition to short-term monetary policy tightening. Cochrane (2022) asserts that *"successful inflation stabilization always combines fiscal, monetary, and microeconomic reform, in a durable new regime that commits to pay its debts*" (pp. 499).

Addressing debt sustainability in Poland is of particular interest, as fiscal management has been deteriorating in recent years. First, when after the 2009 European debt crisis public debt was close to the 60% GDP constitutional debt brake, an extra-budgetary road-building fund has been expelled from the national public debt definition, payments into the private (but compulsory) funded pension pillar have been permanently reduced, sovereign bonds in the possession of these private pension funds were nationalized, and a precautionary public debt threshold suspended (FOR, 2015). Second, a decade later, when public debt during the 2020 COVID-19 crisis once again came close to the 60% GDP constitutional debt brake, pandemic expenditures were channelled through extra-budgetary funds in order to again avoid the risk of hitting the constitutional debt brake (Dudek, Kotecki, and Wojciechowski, 2021). While the full ESA-2010 compliant figures are continuously reported, much of expenditure is spent outside of the headline central government budget and the constitutional debt brake can be always avoided by manipulating the national definition of debt. Moreover, a general government expenditure rule introduced after the 2009 European debt crisis to counter the negative effects of dismantling the funded pension pillar, is currently in the process of being watered-down and the April 2022 Convergence Programme Update no longer assumes its observance.

Most theoretical and empirical research addresses general government public debt burdens without deeper consideration of how much is added by fiscal policy at central and subcentral levels of government. State and local governments can add substantially to the debt burden, particularly when fiscal frameworks are badly designed. Most notably, Chinese augmented public debt[1] has risen from below 40% GDP in 2007 (IMF, 2018) to an estimated 101.7% GDP in 2021 driven by local government explicit and off-budget borrowing, which comprised 70% of Chinese government debt in 2021 (IMF, 2022). Chinese local governments already before COVID-19 were heavily reliant on central government transfers to fill vertical fiscal gaps between their expenditures and own-source revenues. Provinces worse hit by the pandemic

[1] IMF economists calculate for China "augmented" public debt figures as a broader measure than general government debt, to account for off-budget local government borrowing through local government financing vehicles, as well as debts of government-guided funds and special construction funds (IMF, 2022).

experienced larger widening in these gaps (IMF, 2021a). This was to be expected, as debt discipline at the subcentral level is largely dependent on the amount of revenue autonomy, understood as the share of own-source revenue in subcentral revenue, and decentralization of expenditure, understood as the share of general government expenditure spent by subcentral governments.

Well-designed fiscal decentralization can improve debt-to-GDP ratios by better disciplining local government borrowing, while supporting economic growth. When local governments are autonomous in the sense of being financed primarily through local taxes instead of central government transfers, they are closely monitored by voters. In fact, such revenue autonomy can improve fiscal balances (Asatryan, Feld, and Geys, 2015), improve structural balances (Bartolini, Sacchi, Salotti, and Santolini, 2018), reduce public debt (Freitag and Vatter, 2008), and reduce spending (Mueller, Vatter, and Arnold, 2017).[2] When local governments face hard budget constraints and are fiscally dependent on attracting mobile capital and labor, they choose to improve public sector productivity (Christl, Köppl-Turyna, and Kucsera, 2020). Furthermore, Herrmann (2022) of the European Commission has recently pointed out that making local governments dependent on the strength of their economies, incentivizes them to develop the local tax base and support economic growth, i.e. by improving business climate (Blöchliger and Akgun, 2018; Bartolini, Blöchliger, and Stossberg, 2016; Weingast, 2009).

Poland is decentralized in terms of expenditure, but only to a limited extent harnesses the potential of revenue autonomy. Following the 1990 and 1999 reforms, expenditure decentralization has likely improved the delivery of public services in terms of schooling, healthcare, and transportation, but the scale of the more important revenue decentralization

[2] Much more empirical evidence on these issues is listed in the literature review in subsection 2.2.1.

is much more limited (Łaszek and Trzeciakowski, 2018; Skrok, Van Den Brink, and Aldaz-Carroll, 2018; Levitas, 2017). In fact, while many OECD economies since 1995 have increased their levels of revenue decentralization, in Poland it appears to be stagnant or declining. The recent “Polski Ład” tax reform was aimed to reduce Personal Income Tax rates, impacting revenues shared with subcentral governments. These were to be replaced in a significant part by earmarked grants, the least autonomous subcentral revenue category, and skewed public investment towards small towns and rural regions (Trzeciakowski, 2021). The reform has been subsequently scrapped and replaced by an even larger PIT reduction, which risks being detrimental to the subcentral revenue autonomy. Such tax reforms are very contentious and some have suggested that fiscal and political decentralization could be a way to reduce the temperature of partisan strife in Poland (IUS, 2019). It could also improve the allocation of government investment to regions whose public services are challenged by growing populations. This is particularly pressing in the face of recent immigrant and refugee inflows (Dziekoński, Matczak, and Trzeciakowski, 2022). Lately Israel increased the scope of revenue autonomy to better cope with the expected doubling of its population by 2040 (Kapah, 2022). Taken together, revenue autonomy emerges as an important and still understudied area of research, the impact of which on fiscal sustainability I decided to make the topic of my dissertation.

2. RESEARCH OBJECTIVE AND HYPOTHESES

Fiscal policy is usually defined as sustainable if it satisfies government’s intertemporal budget constraint. In practice, fiscal sustainability can be an elusive concept as it involves judgement as to what constitutes an acceptable strategy to satisfying the budget constraint, and assessing solvency across future states of nature is technically difficult (Celasun, Ostry, and Debrun, 2007). This is why economists have largely turned to testing whether fiscal policy is sustainable in a weaker sense of regularly responding with primary (non-interest) surpluses to increases in public debt. Such fiscal reaction functions have been first proposed by Bohn (1998). The aim of my dissertation is to extend debt sustainability analysis through fiscal reaction functions to the local government level. First, by assessing if local policies are sustainable in the sense of responding to debt increases with primary surpluses (by increasing surpluses or lowering deficits). Second, if political budget cycles and EU-funded investment drives generate non-linearities in this responsiveness. Third, exploring if revenue autonomy strengthens sustainability. The **research thesis** of the dissertation is:

Revenue autonomy has improved fiscal sustainability of municipalities and cities in Poland over the 2004-2019 period.

To fulfill this objective, an analytical framework was developed on the basis of a thorough and critical literature review. It connects in a novel way local government fiscal sustainability to the issues of revenue autonomy, political budget cycles, and European Union funded investment drives. To test mechanisms described in the analytical framework, **six specific research hypotheses** have been formulated. All of them are expressed in such a way, that their confirmation would support the research thesis. These are:

Hypothesis 1A. Cities and municipalities in Poland have behaved in line with the fiscal reaction function sustainability criterion over the 2004-2019 period.

Proving this hypothesis will confirm that local governments in Poland have been behaving sustainably in the manner proscribed by fiscal reaction functions and that this is an appropriate model for their analysis. This will likely be the most important contribution to the literature, because so far this methodology has been used only on the general, central, and state government levels. The subsequent hypotheses focus on the non-linearities in the responsiveness of primary balance to debt induced by political budget cycles and EU-funded investment drives, and in particular by revenue autonomy.

Hypothesis 1B. Revenue autonomy has strengthened fiscal sustainability of cities and municipalities in Poland over the 2004-2019 period.

This hypothesis postulates that revenue autonomy introduces a non-linear relationship into responsiveness of primary balance to debt – strengthening reactiveness. This would mean that revenue autonomy not only increases fiscal balances, lowers spending or debt levels, as previous empirical literature has shown, but in fact improves debt sustainability as defined by the fiscal reaction functions. The following hypotheses are also structured in this way, where first (A) a non-linearity with fiscal sustainability is identified, and second (B) it is expanded to revenue autonomy.

Hypothesis 2A. Political budget cycles have weakened fiscal sustainability of local governments in Poland over the 2004-2019 period.

Political budget cycles are regular fluctuations in budgetary variables induced by elections. As local politicians attempt to prove their competence with fiscal expansions, these could negatively affect not only fiscal balances, but also the responsiveness of primary balance to debt, that is sustainability in the sense of fiscal reaction functions.

Hypothesis 2B. Revenue autonomy has dampened the negative effects of political budget cycles on fiscal sustainability of local governments in Poland over the 2004-2019 period.

This hypothesis asks whether the non-linearity in the responsiveness of primary balance to debt induced by political budget cycles, is further affected by the level of revenue autonomy. When local government revenue is generated by local taxpayers instead of received as transfers from the central government, using it for electoral manipulation is likely more politically costly to executives running for re-election.

Hypothesis 3A. Public investment drives funded with European Union transfers have weakened fiscal sustainability of local governments in Poland over the 2004-2019 period.

Public investment drives tend to be financed by debt, plagued by poor analytics, and interest group politics. As such, they often lead to malinvestments with further debt and maintenance costs. Over the analyzed period European Union funds had been made available to local governments, lowering the cost of engaging in similar public investment drives. It is likely, that at least some resulted in malinvestments that weakened the responsiveness of primary balance to debt, i.e. sustainability in the sense of fiscal reaction functions.

Hypothesis 3B. Revenue autonomy has dampened the negative effects of public investment drives funded with European Union transfers on fiscal sustainability of local governments in Poland over the 2004-2019 period.

The question here, is whether the non-linearity in the responsiveness of primary balance to debt induced by local government investment drives funded with EU transfers, is further affected by the level of revenue autonomy. It is likely that EU-funded public investment drives, along with other spending, are more closely monitored by voters, when local taxes to a larger degree finance local government. Voters may be less willing to accept public investments that could make them pay higher taxes in the future to finance debt or maintenance costs.

3. DISSEERTATION STRUCTURE

All the above research hypotheses are tested in the dissertation, which is itself organized into six sections, including the introduction and conclusions. Contents of these sections are described below.

The introductory **section 1** outlines the rationale for addressing the research problem, explains what the research problem is, how it contributes to the literature, and lists specific research hypotheses.

Section 2 describes basic concepts from the literature, reviews the relevant studies, and postulates a novel framework of analyzing local government sustainability. The reviewed studies in the area of fiscal decentralization focus particularly on revenue autonomy in the context of the Brennan and Buchanan (1980) Leviathan hypothesis. Review of political budget cycles papers concentrate on subcentral governments, and in particular the limited number of studies that account for differences in revenue autonomy. The intergovernmental grants subsection examines the vast literature on fly-paper effects. The proposed analytical framework draws on these literature reviews to show how local government fiscal sustainability is affected by revenue autonomy, political budget cycles, and EU-funded investment drives.

Section 3 illustrates subcentral taxation across the OECD and in Poland, as well as describes the data sources, database construction procedure, and the resulting data sample. The discussion of subcentral taxes focuses on the types of local and shared taxes internationally and in Poland, with a particular emphasis of the controversy whether to include shared taxes in own revenue. The data sample subsection, first, overviews the OECD Fiscal Decentralization Database and domestic Ministry of Finance data sources. Second, it step-by-step explains the database construction procedure out of raw Ministry of Finance and National Electoral Commission sources. Third, it depicts the resulting data sample with descriptive statistics, discusses the choice between using fiscal data as revenue shares and per capita values, and performs stationarity tests.

Section 4 conducts preliminary data analysis comparing fiscal decentralization in Poland to its OECD peers, investigating its scope and evolution in cities and municipalities in Poland, as well as its impact on public debt dynamics. The cross-country subsection finds that, while subcentral governments in Poland today have less revenue autonomy than in most OECD member countries, back in 1995 they actually had more. The domestic subsection focuses in-depth on Polish cities and municipalities, showing that the decrease in their own-source revenue shares over the 2004-2019 had been largely driven by the introduction of the "Family 500 Plus" child benefit program, but continues to decline even when it is subtracted. Furthermore, a simple panel model shows that vertical fiscal gaps and public debt have been correlated in cities and municipalities over the 2004-2019 period.

Section 5 describes the econometric analysis. First the literature on fiscal reaction functions is reviewed. Second, the advantages of estimating them with panel data are listed, the research hypotheses are operationalized with multiple interaction variables to test the key non-linearities of local government fiscal sustainability, and the choice of the Least Squares Dummy Variable Corrected estimator is described. Fourth, panel fiscal reaction functions are estimated to test each of the research hypotheses. Fifth, robustness checks are performed by introducing time controls, removing units, and replacing primary balance with primary expenditure.

Section 6 concludes by describing the key results of the econometric analysis and previous preliminary data analysis.

4. RESEARCH METHODS AND RESULTS

Fiscal reaction functions. The specific research hypotheses have been verified by estimating panel fiscal reaction functions at local government level. Testing fiscal sustainability with fiscal reaction functions has been first proposed by Bohn (1998) and subsequently developed by many others including de Mello (2008), Mendoza and Ostry (2008), and Burger and Marinkov (2012).[3] The basic intuition behind it is that fiscal sustainability requires responsiveness to shocks. Any stable debt-to-GDP ratio can be broken by a sufficiently strong shock. However, fiscal policy can be judged sustainable, at least in a certain weak sense, when it systematically responds to debt increases with primary surpluses. In my dissertation the basic panel fiscal reaction function model takes the form of equation (1), which is estimated for cities and municipalities (unit given by *i* subscript) over a time period (year given by *t* subscript).

$$pbalance_{it} = \alpha_i + \alpha_1 \cdot pbalance_{it-1} + \alpha_2 \cdot debt_{it-1} + \alpha_3 \cdot X_{it} + \varepsilon_{it} \qquad (1)$$

where

α_i is the unit (city or municipality) fixed effect;

[3] For another recent review on fiscal reaction functions see Debrun, Ostry, Willems, and Wyplosz (2020) or D'Erasmo, Mendoza, and Zhang (2016).

pbalance is the primary (non-interest) balance;

debt is the public debt;

X is the vector of control variables;

ε is the error term.

If the estimated α_2 coefficient of lagged debt in equation (1) is positive and statistically significant, fiscal policy fulfills the sustainability criterion. In subsequent models I test non-linearities in fiscal sustainability, that is in the responsiveness of primary balance, by adding interaction terms with lagged debt, i.e. with the revenue autonomy, election year, or EU-funded investment drive variable. An example is given with the Z_{it} variable in equation (2).

$$pbalance_{it} = \alpha_i + \alpha_1 \cdot pbalance_{it-1} + \alpha_2 \cdot debt_{it-1} + \alpha_3 \cdot Z_{it} \cdot debt_{it-1} + \alpha_4 \cdot X_{it} + \varepsilon_{it} \quad (2)$$

In equation (2), the first-order derivative of fiscal reaction function at $debt_{it-1}$, that is the rate of change of $pbalance_{it}$ with respect to $debt_{it-1}$, is given by the Z_{it} variable. In other words, these interaction variables show in which direction and by how much a variable affects the responsiveness of primary balance to lagged debt.

All panel fiscal reaction functions have been estimated with the Least Squares Dummy Variable Corrected (LSDVC) estimator. It has several advantages over its counterparts. First, unlike the standard Fixed Effects estimator it is not biased in dynamic models like fiscal reaction functions (with lagged debt). Second, it remains consistent in short samples (small T) with many units (large N). Third, it is commonly used for panel fiscal reaction function estimations - out of 12 papers on the subject since 2015, 10 included the use of LSDV or LSDVC estimators.

Results. All the six specific research hypotheses have been verified and checked for robustness in a sample of 2476-2479 Polish cities and municipalities (dependent on the year) over the 2004-2019 period by estimating, in total, 50 panel fiscal reaction functions. Their results are described below:

First, cities and municipalities over the 2004-2019 period have reacted to public debt increases with higher primary surpluses, fulfilling the fiscal sustainability criterion (hypothesis 1A). Local governments over this period were responding to a 10 percentage points of revenue increase in debt by improving primary balance 2-2.5 points of revenue. This result is robust to adding time controls in the form of a time trend or year fixed effects, as well as to removing Warsaw (the capital and largest city) from the city sample and Kleszczów (highest per capita revenue municipality) from the municipality sample. As expected the general debt sustainability during this period (no major city and municipality insolvencies) is in line with debt sustainability in the sense postulated by fiscal reaction functions.

Second, revenue autonomy has been strengthening fiscal sustainability of cities and municipalities over the 2004-2019 period (hypothesis 1B). Conversely, transfer dependence and vertical fiscal gaps have been weakening sustainable responsiveness to debt increases. At its mean levels, revenue autonomy has been improving responsiveness in municipalities by 31% (insignificant result in the city sample), transfer dependence weakening in cities by 68% and in municipalities by 36%, and vertical fiscal gap weakening in cities by 84% and in municipalities by 74%. Robustness of results for revenue autonomy has been checked by adding time trend variable, year fixed effects, as well as removing Warsaw and Kleszczów from city and municipality samples. This result has been expected based on the fiscal decentralization literature, as local voters have better incentives to control local government spending of the taxes they pay than central government has in case of its transfers (in fact increased local spending is generally the purpose of central government transfers, but can be more difficult to scrutinize from above).

Third, fiscal sustainability of local governments over the 2004-2019 period was weaker in local election years indicating political budget cycles, which had no similar effect the year before or year after the election (hypothesis 2A). Responsiveness of local governments to debt was reduced in election years by about half. This effect still held in robustness check that changed primary balance to primary expenditure. Furthermore, an additional effect has been identified, in which incumbents running for reelection with central-government support demonstrate less responsive fiscal policy in their previous terms in office. This might mean, that aligned incumbents are less responsive, because they expect central government assistance if fiscal troubles arise, or that incumbents who govern less responsibly have more incentive to seek alignment with central government.

Fourth, revenue autonomy dampened the negative effect of local election years on fiscal sustainability over the period 2004-2019 (hypothesis 2B). A mean level of revenue autonomy dampens the negative effects of election years for local fiscal sustainability by about one-third. This effect is robust to exchanging primary balance for primary expenditure. Furthermore, revenue autonomy dampens the negative effects of central-government-aligned local executives on fiscal sustainability. As expected, central government transfers make it easier for local politicians to attempt election year budgetary manipulations.

Fifth, European Union financed local government investment drives in sports objects and in general reduce fiscal sustainability (hypothesis 3A). In worst cases such investments in sports objects can reduce primary balance responsiveness by one-third to three-quarters, while such general investments can reduce responsiveness to debt completely or even change its direction. This effect holds for various initial sizes of such investments in relation to local revenue. The result indicates that some of EU-funds had been malinvested.

Sixth, revenue autonomy reduces the negative effect of EU-financed investment drives on fiscal sustainability (hypothesis 3B). A mean level of revenue autonomy reduces the negative effects of EU-funded investment drives on fiscal sustainability by half to three-fourths. While EU-funds are non-repayable grants, they may require local co-financing or the funded investments may generate future maintenance costs, which local taxpayers could be unwilling to accept – if a larger part would be coming from their tax money.

The above results are in line with previous research on Polish local governments, which shows that revenue autonomy improves fiscal balance (Bukowska and Siwińska, 2019) and transfer-dependence exacerbates political budget cycles (Köppl-Turyna, Kula, Balmas, and Waclawska, 2016), but contrary to a previous EU cross-country fiscal reaction function study that found no effect of revenue autonomy on sustainability (Afonso and Hauptmeier, 2009). Unfortunately these are not directly comparable to the results here.

5. CONTRIBUTIONS TO LITERATURE

The work makes five important contributions to the literature.

First, an analytical framework has been developed based on a thorough and critical literature review. In the framework, debt sustainability in the sense of fiscal responsiveness to debt increases, which is a concept previously used only on the general, central, and state government levels, is applied to local government. Furthermore, the analytical framework connects factors which previously have been considered only separately. Namely, it sketches out how local government fiscal sustainability is impacted by:

- **Revenue autonomy**, that is the degree to which local government is financed by own-source revenue. Greater revenue autonomy increases local cost of spending, incentivizing voters to better monitor expenditure, which is one of several mechanisms found in the literature and invoked in the analytical framework. While the impact of such mechanisms on spending or budget balance is well established, previously they have not been considered in relation to local government fiscal sustainability.

- **Political budget cycles**, that is the regular cycles in budgetary categories induced by elections (Drazen, 2008). While it is well established, that political budget cycles can produce cycles in local government spending and budgetary categories, the analytical framework proposes to consider cycles in terms of fiscal sustainability. Furthermore, dependence on central government transfers, that is the lack of revenue autonomy, can lower the cost electoral manipulation attempts and produce stronger political budget cycles (Köppl-Turyna, Kula, Balmas, and Waclawska, 2016).

- **European Union funded investment drives**, that is large local government investments and their continuation over several years funded by EU-transfers. While general government level public investment drives have been previously studied in empirical literature, they have not been considered locally in the context of European Union funds. In the framework, such investment drives are expected to often result in malinvestments and be thus detrimental to fiscal sustainability. This would be consistent with general government level findings, that public investment drives tend to be debt-financed, plagued by poor analytics, incentive problems, and interest-group infested choices (Warner, 2014).

Second, to verify the above-mentioned mechanisms of the analytical framework, for the first time fiscal reaction functions have been estimated on the local government level. Previously such models have been used only on the general or central (i.e. D'Erasmo, Mendoza, and Zhang, 2016; Ciżkowicz, Rzońca, and Trzeciakowski, 2015), and state (i.e. Feld, Köhler, and Wolfinger, 2020; Mahdavi, 2014) government levels. Afonso and Hauptmeier (2009) were the only ones who had previously investigated the impact of revenue decentralization on fiscal sustainability in a fiscal reaction function, but they did this on a general government cross-country level, which did not yield clear results.

Third, the mechanisms of the analytical framework have been verified in Polish municipal and city data over the 2004-2019 period. 50 panel fiscal reaction functions have been estimated in the course of their econometric verification and robustness checks.

Fourth, to enable econometric verification, a unique municipal and city fiscal database has been constructed. Database had to be created out of raw data of over 25 million subcentral governments fiscal records from the Ministry of Finance, as well as National Electoral Commission data from 2002, 2006, 2010, 2014, and 2018 local elections, and other sources. Its development took many months of budgetary classification research, inquiries at the Ministry of Finance, downloading and converting the data, aggregating into a single database, connecting to Statistics Poland and National Electoral Commission data, aggregating according to Ministry of Finance methodology, constructing relevant variables for fiscal reaction function estimation etc. For this reason, database construction procedure has been thoroughly described, so that it can be used by other researchers in the future.

Fifth, revenue decentralization in Poland has been benchmarked in relation to other OECD members and across time. This analysis is particularly relevant for public policy in Poland with regard to decentralization – and in light of the changes and debates of last years.

Rafał Trzeciakowski

6. LITERATURE

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