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VERIFYING FISCAL DECENTRALIZATION HYPOTHESIS FOR V4 COUNTRIES

Connection between fiscal decentralization and government size is often perceived through the Leviathan hypothesis. Fiscal decentralization is considered as a limit to Leviathan. The impact of fiscal decentralization on government size in the Visegrad countries is investigated here by means of OLS models emerging from previous research on Leviathan and decentralization. The assumptions about fiscal decentralization hypothesis are partially confirmed for Slovakia and Czech Republic. For Hungary and Poland the results show independent evolution of variables in question. Keywords: Leviathan hypothesis; government size; fiscal decentralization; government expenditures; local government.

JEL codes: H31; H32; H77.

Peer-reviewed, approved and placed: 1.08.2016.

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ПЕРЕВІРКА ГІПОТЕЗИ ФІНАНСОВОЇ ДЕЦЕНТРАЛІЗАЦІЇ НА ПРИКЛАДІ КРАЇН ВИШЕГРАДСЬКОЇ ГРУПИ

У статті показано, що зв'язок між децентралізацією та розмірами держави часто розглядається через гіпотезу Левіафана. Фінансова децентралізація при цьому є обмеженням до моделі Левіафана. Вплив фінансової децентралізації на розміри держави в країнах Вишеградської групи досліджено з використанням методу найменших квадратів, розвиваючи попередні гіпотези розробників щодо Левіафана і децентралізації. Гіпотеза фінансової децентралізації є частково підтвердженою для Словаччини та Чеської Республіки. Для Угорщини та Польщі результати показують незалежну еволюцію досліджених змінних.

Ключові слова: гіпотеза Левіафана; розмір держави; фінансова децентралізація; державні витрати; місцевий уряд.

Форм. 7. Табл. 4. Літ. 14.

Ленка Маличка

ПРОВЕРКА ГИПОТЕЗЫ ФИНАНСОВОЙ ДЕЦЕНТРАЛИЗАЦИИ НА ПРИМЕРЕ СТРАН ВЫШЕГРАДСКОЙ ГРУППЫ

В статье показано, что связь между децентрализацией и размерами государства часто рассматривается через гипотезу Левиафана. Подтверждено, что финансовая децентрализация является ограничением модели Левиафана. Влияние финансовой децентрализации на размеры государства в странах Вышеградской группы исследовано с использованием метода наименьших квадратов, развивая предыдущее исследование разработчиков гипотезы Левиафана и децентрализации. Гипотеза финансовой децентрализации является частично подтвержденной для Словакии и Чешской Республики. Для Венгрии же и Польши результаты показывают независимую эволюцию исследуемых переменных.

Ключевые слова: гипотеза Левиафана; размер государства; финансовая децентрализация; государственные расходы; местное правительство.

Introduction. Leviathan hypothesis elaborated by G. Brennan and J.M. Buchanan (1980) has fallen under many investigations and is connected with fiscal decentralization as its main constraint. Fiscal decentralization hypothesis direct-

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ly refers to Leviathan hypothesis, which expresses that total government intrusion into economy should be smaller *ceteris paribus*, the greater is the extent to which taxes and expenditures are decentralized (Brennan and Buchanan, 1980: 15). Leviathan, the government, seeks to maximise its revenues through excessive tax rates, debt or money creation. It prefers centralization of government to achieve a monopoly position. G. Brennan and J.M. Buchanan discussed two ways of constraining Leviathan. Constitutional constraint through balanced budget provision and limited access of government to taxes is in empirical studies less analysed on behalf of decentralization of government spending and taxation powers. Against tax decentralization the race-to-the bottom hypothesis with under-provision of certain public goods is often argued. Contrary to G. Brennan and J.M. Buchanan, Leviathan as a mythical beast was presented in the research of W.E. Oates (1985). He stands for no place of revenue maximization hypothesis in economy. W.E. Oates (1972) confirmed the eligibility of decentralization in his decentralization theorem, but the assumption of inverse relationship between Leviathan and fiscal decentralization was not confirmed in his later research. M.L. Marlow (1988) picked up on W.E. Oates's research with results which went against Oates's. In this article the investigation by M.L. Marlow creates the basic incentive for farther research on decentralization. M.L. Marlow supported this hypothesis by the example of USA states. For the purpose of this article, the impact of fiscal decentralization on Leviathan is monitored on the Visegrad (V4) countries. In the post-communistic countries transition to market-based economies covered the related public finance reforms including fiscal decentralization. In connection with fiscal decentralization the strengthening effect on financial autonomy of local governments was expected (Horvathova et al., 2012) as well as constraining the public waste – that is constraining Leviathan.

Literature review. The relationship between fiscal decentralization and the government size was evaluated in various researches, but as S. Golem (2010) mentions, very little consensus is reached in empirical literature on this. From the older studies it is necessary to mention W.E. Oates (1985), M.A. Nelson (1986) and M.L. Marlow (1988). W.E. Oates (1985) analysed an international sample of 43 countries and two subsamples of industrialized and developing countries by means of cross section OLS estimation. He revealed there does not exist a strong, systematic relationship between the government size measured as total government revenue as a share of GDP and fiscal decentralization. Expenditure decentralization and revenue decentralization variables influenced Leviathan only in the world sample negatively and only in case when they were given to a model without control variables. Inclusion of control variables to the estimation reduced the significance of fiscal decentralization variables. M.A. Nelson (1986) made his investigation in the USA states similarly to W.E. Oates (1985) as a cross section OLS, but as a measure of Leviathan he suggested the share of state and local government tax revenues per inhabitant on per state personal income. Fiscal decentralization indicator also refers to tax revenues of sub-government as a share of total government tax revenues. His research did not support revenue decentralization as constraint to Leviathan. M.L. Marlow (1988) supported the fiscal decentralization hypothesis in his research on the USA again. He estimated the time series OLS model and defined the dependent variable as total government expenditure as a share of GNP to measure Leviathan, and preferred to quantify fiscal

decentralization as state and local government expenditures as the share in total government expenditures. The Leviathan hypothesis was supported also in the following researches using cross section OLS estimations (Joulfaian and Marlow, 1990; Joulfaian and Marlow, 1991). Additionally M.L. Marlow (1988) refuted some basic theoretical assumptions linked with decentralization; provision of pure public goods with national scope fortifies the centralization on the highest level of government, their character excludes their efficient provision on the local levels of government. The rise of social expenditures causes the rise of government expenditures and in sense of inverse relationship between government sizes and fiscal decentralization, fiscal decentralization becomes weaker. Additionally, providing public goods by different levels of government brings heterogeneous scale of public goods. The present research focuses mainly on the panel data approach as in (Fiva, 2006; Prohl and Schneider, 2009; Ashworth et al., 2012). J. Fiva (2006) analysing 18 OECD countries revealed the limiting nature of revenue decentralization on Leviathan measured again as the total government expenditure over GDP. Fiscal decentralization was measured by revenue decentralization as mentioned above, and also by expenditure decentralization but with weak results. Later some new ways to quantify the decentralization were introduced by S. Prohl and F. Schneider (2009) and J. Ashworth et al. (2012). S. Prohl and F. Schneider (2009) developed the fiscal federalism index, an indicator of constitutionally and statutorily defined fiscal and administrative autonomy of sub-national governments as a measure of decentralization. Panel data analysis of 29 countries supports the Leviathan hypothesis. Leviathan was in this case measured traditionally by total government expenditures or revenues as a share of GDP. J. Ashworth et al. (2012) detected the impact of fiscal decentralization on government growth in 28 countries using panel cointegration analysis. They supported the Leviathan hypothesis in case of long run effects of fiscal decentralization on government size. Short-term results do not confirm this hypothesis, because the raise of local government revenue or increasing expenditure decentralization causes the increase of government size measured as the total government expenditures over GDP. To measure fiscal decentralization J. Ashworth et al. (2012) created a vector of dummy variable that captures the degree of public expenditures' decentralization.

Methods and data. In this article two models (equations) are estimated by ordinary least squares (OLS). According to M.L. Marlow (1988) or W.E. Oates (1985) the dependent variable is government size (L). W.E. Oates (1985) or M.A. Nelson (1986) suggested as a Leviathan measure the tax revenue that the state extracts from economy. M.L. Marlow (1988) argued that government spending is financed from several sources, not only tax receipts. That is why Leviathan is measured by the total government expenditures. The explanatory variable is fiscal decentralization (FD) measured as the share of local government expenditures on total government expenditures. In this sense, expenditure decentralization as an indicator of fiscal decentralization could be replaced by revenue decentralization in the estimation, as in W.E. Oates (1985), but we decided to follow M.L. Marlow's (1988) methodology. That is the same motive why control variables (X) involved in estimations are GDP per capita (GDPpc) and country size measured by population (POP). Data are annual covering the period from 1995 to 2014, available from the Eurostat databases. All calculations we carried out in "Gretl".

In W.E. Oates (1985), the variables take logistic transformation introduced by R. Pindyck and D. Rubinfeld (1981), but in the same time W.E. Oates mentioned that results do not differ substantively from those if transformation is not used. Instead, M.L. Marlow (1988) applies this logistic transformation. In respecting the nature of data used in this research, logistic transformation is not indispensable here. Instead of this, logs of variable are used to rescale the values involved in estimations.

Equation (1a) shows the simple relationship between Leviathan and fiscal decentralization. In (1b) control variables are included:

$$L_t = \alpha_0 + \alpha_1 FD_t + e_t; \quad (1a)$$

$$L_t = \alpha_0 + \alpha_1 FD_t + \alpha_2 X_t + e_t. \quad (1b)$$

Equation (2a) and (2b) use the transformation of variables emulated from M.L. Marlow (1988) to reveal the influence of their annual growth. (2a) shows the simple relationship between Leviathan growth rate and fiscal decentralization rate; in (2b) transformed control variables are included:

$$Lr_t = \alpha_0 + \alpha_1 FDr_t + e_t; \quad (2a)$$

$$Lr_t = \alpha_0 + \alpha_1 FDr_t + \alpha_2 Xr_t + e_t. \quad (2b)$$

Leviathan growth rate is expressed in (2c), fiscal decentralization rate as in (2d) and control variables are transformed as in (2e)

$$Lr_t = 100 \times (\log(L_t) - \log(L_{t-1})); \quad (2c)$$

$$FDr_t = 100 \times (\log(FD_t) - \log(FD_{t-1})); \quad (2d)$$

$$Xr_t = 100 \times (\log(X_t) - \log(X_{t-1})). \quad (2e)$$

Results. M.L. Marlow (1988) brought three basic assumptions in his research: the relationship between fiscal decentralization and government size is negative, the influence of income per inhabitant is negative supporting Wagner's law and the impact of country size positive.

Results of Equation (1). Results of OLS estimations for the Visegrad countries are supporting partially the assumption about the inverse relationship between fiscal decentralization and government size. Table 1 shows that (1a) supports the Leviathan hypothesis for Slovakia, Czech Republic and Poland. In extended equation (1b) the significance of fiscal decentralization variable is reduced dramatically, except for Czech Republic. GDP per capita and country size impact responds to given assumptions in cases of Slovakia and Poland.

According to Durbin-Watson test (DW), the estimations in Table 1 suffer from serial correlation. To deal with serial correlation first differences for all variables were introduced and OLS estimations came to other results presented in Table 2. There the reduction of significance of some control variables is observable.

Equation (1a) supports the negative influence of fiscal decentralization on government size in Slovakia and Czech Republic. For Hungary and Poland the fiscal decentralization variable is not significant, additionally, R^2 feeble values show that the model is inconvenient. The results of equation (1b) support again Leviathan hypothesis for Slovakia and Czech Republic and confirm the inverse relationship between fiscal decentralization and government size. The results of Hungary and Poland esti-

Table 1. OLS models of V4 countries, author's calculations

| | Slovakia | | Czech Republic | | Hungary | | Poland | |
|--------------------|-----------|-----------|----------------|----------|----------|---------|----------|---------|
| | Eq 1a | Eq 1b | Eq 1a | Eq 1b | Eq 1a | Eq 1b | Eq 1a | Eq 1b |
| intercept | 1,446*** | -106,046* | 1,428*** | -8,278 | 1,697*** | -17,245 | 1,572*** | 5,813 |
| FD | -0,206*** | -0,031 | -0,344* | -0,373** | -0,001 | -0,114 | -0,147* | -0,014 |
| GDPpc | | -0,166** | | -0,008 | | 0,046 | | -0,074* |
| POP | | 15,940* | | 1,379 | | 2,708 | | -0,572 |
| R ² adj | 0,525 | 0,645 | 0,203 | 0,159 | -0,056 | -0,040 | 0,129 | 0,289 |
| DW | 0,903 | 1,141 | 0,936 | 0,963 | 1,101 | 1,218 | 1,365 | 1,189 |

* denotes the significance at the 0.1 level; ** 0.05 level; *** 0.01 level.

OLS, using observations 1996–2014 (T = 19).

Dependent variable: government expenditures.

Table 2. OLS models of V4 countries, data with 1st differences, author's calculations

| | Slovakia | | Czech Republic | | Hungary | | Poland | |
|--------------------|-----------|--------|----------------|-----------|---------|---------|--------|--------|
| | Eq 1a | Eq 1b | Eq 1a | Eq 1b | Eq 1a | Eq 1b | Eq 1a | Eq 1b |
| intercept | -0,003 | 0,003 | -0,002 | 0,004 | -0,003 | 0,002 | -0,004 | -0,004 |
| FD | -0,156*** | -0,092 | -0,407*** | -0,377*** | -0,077 | -0,091* | 0,089 | 0,087 |
| GDPpc | | -0,302 | | -0,230 | | -0,0180 | | 0,030 |
| POP | | 18,228 | | 1,096 | | 4,684 | | 1,048 |
| R ² adj | 0,159 | 0,246 | 0,440 | 0,417 | -0,031 | -0,152 | 0,065 | 0,052 |
| DW | 2,273 | 1,969 | 1,870 | 1,762 | 1,937 | 1,861 | 1,760 | 1,713 |

* denotes the significance at the 0.1 level; ** 0.05 level; *** 0.01 level.

OLS, using observations 1996–2014 (T = 19).

Dependent variable: government expenditures.

mations remain on impropriety of the model according to low R^2 values. Control variables of GDP per capita and country size measured by population are not significant in all cases in the question, although their signs confirm the basic assumption given above.

Results of Equation (2). As mentioned before, the difference between (1a) or (1b) and (2a) or (2b) is that (2a) and (2b) use the transformation of variables emulated from (Marlow, 1988) to reveal the influence of their annual growth. The variables are here interpreted as "rates" – Leviathan growth rate, fiscal decentralization rate, GDP per capita growth rate and population growth rate (country size growth rate).

Equation (2a) estimating the simple relationship between government size growth rate and fiscal decentralization rate shows the constraining influence of fiscal decentralization on Leviathan in case of Slovakia and Czech Republic. The problem of inapplicability of the model on the data of Hungary and Poland persists. (2b) does not give better results for Hungary and Poland. Additionally, fiscal decentralization rate in Slovakia lost its significance. The absence of significance of the control variables predominates and confirmation of population growth positive impact on the total government expenditures growth can be observed only for Czech Republic.

In this case serial correlation is not as noticeable in comparison with the results in Table 1, (see Table 3, DW test), but to enhance its results and make the models more comparable, first differences for all variables were introduced again (Table 4), while DW test indicates incoming problems with serial correlation equally in estimations of (2a) and (2b). Regardless that, the results are interpreted on favour of Leviathan hypothesis in cases of Slovakia, Czech Republic and Poland.

In both equations, (2a) and (2b), the signs of fiscal decentralization rate are negative in the estimations on Slovakia and Czech Republic. Surprisingly, they are positive for Poland. There the increase of fiscal decentralization rate causes the raise of total government expenditures growth. GDP per capita is significant in Slovakia OLS estimations in sense of Wagner's law. Population growth increases public expenditures in Slovakia and Czech Republic. Hungary resists to Leviathan hypothesis.

Conclusions. According to Leviathan hypothesis, or decentralization hypothesis, fiscal decentralization is regarded as an important instrument to limit government expenditures. In the Visegrad countries the importance of fiscal decentralization has increased in the period of their transition to market-based economies. The strengthening effect on financial autonomy of local governments was expected as well as constraining public waste. The assumption about Leviathan was examined many times and the results differ. In this paper the effects of fiscal decentralization on Leviathan were searched via OLS estimation emulated from (Marlow, 1988) research. Simple estimation investigating the impact of fiscal decentralization on government expenditures reveals the inverse relationship between these two variables in Slovakia and Czech Republic cases. Estimations including control variables as GDP per capita and country size do not improve these results, on the contrary, in the case of Slovakia the significance of fiscal decentralization variable was reduced. Dynamic versions of the equations are introducing growth rates of variables in question. Again, the simple equation and the extended equation are estimated. The support of the basic assumption is found only in the cases of Slovakia and Czech Republic. The results of Polish model are ambiguous and contradictory with the 3 basic assumptions given by

Table 3. OLS models of V4 countries, author's calculations

| | Slovakia | | Czech Republic | | Hungary | | Poland | |
|--------------------|----------|--------|----------------|-----------|---------|---------|--------|--------|
| | Eq 2a | Eq 2b | Eq 2a | Eq 2b | Eq 2a | Eq 2b | Eq 2a | Eq 2b |
| intercept | -0,262 | 0,341 | 0,253 | 0,420 | -0,309 | 0,212 | -0,356 | -0,410 |
| FDr | -0,156* | -0,092 | -2,546*** | -0,376*** | 0,077 | -0,096* | 0,089 | 0,087 |
| GDPpcr | | -0,302 | | -0,222 | | -0,020 | | 0,0296 |
| POPr | | 18,228 | | 0,145*** | | 4,684 | | 1,0483 |
| R ² adj | 0,159 | 0,246 | 0,877 | 0,996 | -0,031 | -0,152 | 0,065 | -0,052 |
| DW test | 2,273 | 1,969 | 2,155 | 1,761 | 1,937 | 1,861 | 1,760 | 1,713 |

* denotes the significance at the 0.1 level; ** 0.05 level; *** 0.01 level.

OLS, using observations 1996–2014 (T = 19).

Dependent variable: government expenditures.

Table 4. OLS models of V4 countries, data with 1st differences, author's calculations

| | Slovakia | | Czech Republic | | Hungary | | Poland | |
|--------------------|----------|----------|----------------|-----------|---------|--------|---------|--------|
| | Eq 2a | Eq 2b | Eq 2a | Eq 2b | Eq 2a | Eq 2b | Eq 2a | Eq 2b |
| intercept | -0,107 | -0,164 | -3,675 | 0,154 | 0,225 | 0,269 | -0,103 | -0,070 |
| FDr | -0,180* | -0,130* | -2,204*** | -0,291*** | -0,140 | -0,134 | 0,116** | 0,110* |
| GDPpcr | | -0,741** | | -0,352 | | -0,124 | | 0,103 |
| POPr | | 40,095** | | 0,118** | | 11,503 | | 2,171 |
| R ² adj | 0,157 | 0,528 | 0,766 | 0,993 | -0,002 | -0,036 | 0,191 | 0,132 |
| DW | 2,471 | 1,975 | 1,965 | 2,764 | 2,477 | 2,437 | 2,378 | 2,262 |

* denotes the significance at the 0.1 level; ** 0.05 level; *** 0.01 level.

OLS, using observations 1996–2014 (T = 19).

Dependent variable: government expenditures.

(Marlow, 1988). Hungary is resisting to all attempts of Leviathan hypothesis modeling. Neither the variables are significant, nor is the specification of the model appropriate.

Summarizing all the results obtained in the estimations on the Visegrad countries, only Czech Republic could be considered as a representative to support the fiscal decentralization hypothesis, or Leviathan hypothesis. Searching for Leviathan remains open for further investigation.

Acknowledgements. *This article is published under the project VEGA no. 1/0559/16.*

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