KNOWLEDGE – International Journal
Vol.34.5
September, 2019

DOES PUBLIC DEBT HAMPER ECONOMIC GROWTH: EVIDENCE FROM EUROPEAN TRANSITIONAL COUNTRIES

Liza Alili Sulejmani
Faculty of Economics and Administrative Sciences, International Balkan University, Skopje, N. Macedonia, liza.a.sulejmani@gmail.com
Armend Ademi
Faculty of Business and Economics, South East European University, N. Macedonia, armend.ademi@live.com

Abstract: Lately, there has been an increased interest among policy makers and scholars regarding the nexus between public debt and economic growth, with emphasizes on its effects on transition economies, particularly after the last global financial crisis. This paper tries to investigate the impact of public debt on economic growth in the European transition economies, for the time spin 2000-2016, by using Pooled OLS, Fixed effects, Random effects and Hausman – Taylor Instrumental variable (IV). In addition, results reveal that public debt although has positive effect on per capita growth still is statistically insignificant, whereas debt square has negative effect on per capita GDP growth. Further, gross savings, final consumption and fixed capital formation have positive effect on per capita growth, while government expenditures do not show significant impact. Moreover, such results highlight important implications for fiscal policymakers in these countries in order to foster the economic growth in the context of public debt level.
Keywords: public debt, growth, Hausman – Taylor IV, panel

1. INTRODUCTION

This paper tries to analyze the nexus between public debt and economic growth on European transition countries for the time period 2000-2016. Moreover, having into consideration the relevance of the effect of the public debt on capita per growth and the unreached consensus regarding this relationship, this paper will try to contribute to the existing empirical findings regarding the effect of public debt on transition economies in Europe rather than to solve the long existing debate. Further, to our best knowledge, this is among the first papers that try to analyze such nexus by incorporating econometric techniques such as pooled OLS, Fixed and Random effects and Hausman-Taylor instrumental variable (IV) model for these set of countries.

Due to the increased interest among policy makers and scholars regarding the nexus between public debt and economic growth the main aim of this paper is to investigate whether public debt can have a significant decline on the growth of the European transition economies, slowing down the economy of these particular countries in the long run. Under the conventional view, high debt/GDP ratio can lead to an increased aggregate demand and output in the short run, yet in the long run produces a crowding out of the private capital spending and reduced output.

However, on the other side non-linear effects of the nexus between public debt and growth can be evidenced, suggesting negative effects of the built-up public debt on growth, when a threshold point of the level of a debt is exceed. This aspect firstly was introduced by Reinhart and Rogoff (2010), estimating certain threshold of 90% of indebtedness, above which public debt would harm economic growth in advanced economies. In addition, by applying econometric techniques such as pooled OLS, Fixed and Random effects and Hausman-Taylor instrumental variable (IV) model in transitional economies in Europe, will be assessed the empirical analysis of public debt effects on growth in these countries. Moreover, results from the Hausman Taylor Instrumental Variable show that public debt although has positive effect on per capita growth but is statistically insignificant, whereas debt square has negative effect on per capita GDP growth. In addition, final consumption, gross savings and fixed capital formation have positive effect on per capita growth, while government expenditures do not show any significant impact.

Finally, the structure of this paper is as follows: the second section includes the existing relevant research in this field, methodology and empirical findings are lay out in the third section, while the last section reveals the conclusion and recommendations of the study.

2. LITERATURE REVIEW

Concerned with the lattermost question of the effect of the level of public debt on GDP growth, this paper tries to address this issue on transitional countries in Europe. Initially, the relationship of the level of public debt and economic growth is primarily investigated by Reinhart and Rogoff (2010), arguing its non-linear relationship,

characterized by a threshold effect between public debt and growth in a cross-country panel in 44 economies, categorized into four categories, debt below 30% of GDP, between 30 to 60% of GDP, between 60 to 90% of GDP, or above 90% of GDP. Main findings show that median growth rate for countries with public debt over 90% of GDP is around one percentage point yearly lower than countries with below 90%. (Reinhart and Rogoff (2010)).

Although a large body of empirical evidence can be seen to be conducted on this issue, so far a general consensus hasn't been reached among scholars. The results suggested by Reinhart and Rogoff of 90% debt threshold were supported by studies of Kumar and Woo (2010), Cecchetti et al. (2011), Checherita, Westphal and Rother (2012), and Baum et al. (2013). On the other side, authors Caner et al. (2010) and Elmeskov and Sutherland (2012) found this debt threshold to be lower, at around 70%. Further, lower debt threshold of 40 per cent has been evidenced by Hansen (2017), while Minea and Parent (2012) have estimated 115 per cent debt threshold. Almost most of the studies, are concerned supporting, questioning, or rejecting the conclusions stated in the study of Reinhart and Rogoff, R&R hereinafter. In this direction, Panizza and Presbitero (2012) have concluded that no single debt threshold exist that can separate the 'bad' from the 'good'. In addition, they claimed that R&R oversimplified the relationship between debt and GDP growth, since no possible single threshold can be applied to each country.

In addition, Chudik et al. (2015) conclude that some economies have run into debt difficulties and experienced low growth at low debt levels, while others at high levels of indebtedness for prolonged periods have grown strongly, thus the effect of debt on growth varies among countries. Dreger and Reimers (2013) study the effect of the debt ratio on GDP per capita growth rate for two groups of countries, euro-zone members and non-euro-zone European economies, and further separate the situations in sustainable and non-sustainable debt states. They utilize a pooled panel regression and also find a negative effect of the debt ratio on economic growth.

There exist plenty of empirical studies that find negative nexus between public debt and economic growth. Ferreira (2009), by performing Granger causality tests for 20 OECD countries over the time period from 1988- 2001, suggest that higher debt to GDP ratios produce negative effect on the economic growth. Ballasone et al. (2011) investigate the nexus between the ratio of public debt relative to GDP and the growth rate of real per capita income for the case of Italy during the time period 1861-2009 and suggest negative relationship between government debt and economic growth that seems to work mainly through reduced investment. Kumar and Woo (2010) empirically investigate 19 countries for the time spin 1970-2007, estimating growth regressions with the growth rate over 5 years as the dependent variable. Moreover, findings reveal negative relationship between the debt to GDP ratio at the beginning of a period and the growth rate of that period. In addition, the paper also reveals findings regarding the negative correlation between public deficits and economic growth.

Having into consideration the unreached consensus in the debt/growth nexus, this paper rather to sole will contribute to the existing literature for the European transition countries, by applying several techniques for the comparison purpose such as pooled OLS, fixed effects, random effects and at the end Hausman Taylor Instrumental Variable model.

3. RESEARCH METHODOLOGY AND DATA

This section determines the empirical model used to analyze the impact of public debt on real per capita economic growth in European transition countries over the period 1996 to 2017. Indeed, several models have been employed in this paper: Pooled OLS, Fixed and Random effects and Hausman-Taylor instrumental variables (IV) model. In addition, Hausman test is applied to determine the choice among fixed effects, random effects, and the Hausman-Taylor model.

Fixed and Random effects model

In order to eliminate the problem of mentioned heterogeneity in the pooled OLS, our paper employs more sophisticated models such as Fixed effects, Random effects and Hausman-Taylor instrumental variable (IV).

Specification of the model is as follows:

$$y_{it} = x_{it}\beta + c_i + u_{it}, \text{ for t = 1, 2 …… N} \quad (2)$$

where y_{it} is the dependent variable, x_{it}represents theexplanatory variable, c_i stands for the individual specific-effect or the unobserved effect andu_{it} represents the random error or idiosyncratic errors.

Main assumption in the model is whether first term of the decomposition c_i is correlated or not with the explanatory variables x_{it}. In addition, the term c_i is correlated with explanatory variables during fixed effect model and vice a versa in the random effect model, where the term $c_i$is not correlated with the explanatory variables.

Further, both models should take into consideration the unobservable individual-specific time-invariant effects of heterogeneity, otherwise according to Greene (2008) two main limitations might appear: correlation between c_i and the explanatory variables in the case of random effects and if yes, then it is quite difficult to estimate the time-invariant explanatory variables. Having into consideration that some variables are taken as endogenous in this paper,

neither fixed or random effects model can be appropriate, suggesting the employment of a more sophisticated model such as Hausman-Taylor instrumental variable (IV). Similar with the case of Pooled OLS, fixed and random effects model results are as well used for comparing with the Hausman Taylor Instrumental variable model results.

Hausman-Taylor model

Having into consideration the main problems, Hausman and Taylor (1981) combined both fixed effects and random effect models by assuming that some of the explanatory variables are correlated with $c_i$and some not. Thus the model identifies the explanatory variables which are correlated with c_i. In addition, the instrumental variable technique in the model eliminates the correlation between country specific effects and the error term through the information.

The specification of the model is as follows:

$$y_{it} = Z_{it}\beta + Z_i\lambda + c_i + u_{it} \quad (3)$$

Where$Z_i$represent variables that are time-invariant covariates. Further, this model decomposes X and Z into two sets of observed variables: X= [X_1, X_2,] and Z= [Z_1, Z_2,].

De facto, the main characteristic of this model is the assumption of correlation between the individual-specific effect c_i , and the sets of time-varying and the ability to identify the time-invariant repressors. In addition, it is suggested that the selection of instrumental variables is based on economic intuition.

Fixed Effects, Random Effects or Hausman-Taylor instrumented variable (IV) model?

Hausman (1978) test it is used in order to choose the appropriate model where the null hypothesis suggest that coefficients calculated by the random effects are identical as the coefficients calculated by the fixed effect estimators. If the null hypothesis is rejected, i.e. indicating insignificant p < 0.05, the random effect estimator is better than fixed effect and vice a versa. Same technique has been applied in order between random effects and Hausman-Taylor instrumental (IV). If the null hypothesis is rejected due to the insignificant p-value, one may conclude that Hausman-Taylor Instrumental (IV) estimator is more consistent and efficient than random effects estimator.

Having into consideration these facts, Hausman-Taylor instrumental IV model has been employed to determine the impact of public debt on real per capita economic growth in the particular countries, covering the time spin 1996 to 2017.

Yet, the paper tries to compare results from the pooled OLS, fixed effects, random effects and Hausman-Taylor Instrumental (IV) model. Due to the fact that some variables are endogenous, leading to biased regression coefficients, Hausman – Taylor instrumental variables model is considered to be more appropriate model than random and fixed effects models.

The specification of Hausman-Taylor is as follows:

$$y_{it} = c + BX_{it} + u_{it} \quad (5)$$

where:

-y_{it}represents the dependent variable - per capita GDP growth rate for each country i, and t represent years; C is the constant; X_{it}denotes the explanatory variable which includes lagged dependent variable, public debt and current account and exogenous variables such as public debt square, final consumption, gross savings, fixed capital formation and government expenditures.

4. EMPIRICAL FINDINGS

Results from pooled OLS, fixed effects, random effects, and the Hausman Taylor - IV equation are presented in the following table. Empirical findings reveal that Hausman-Taylor model (IV) is a better choice than fixed and random effects model. Since the result from pooled OLS estimator shows that the unobservable individual-specific effect is heterogeneous, the coefficients of this approach are biased. We estimate the results from fixed effects and random effects models that are reported in the Table no. 2. The Hausman test is used to compare the estimators from fixed and random effects (see Annexes, Table A1).

Table2. Panel regression results

Variables	**Pooled OLS**	**Fixed effects**	**Random effects**	**Hausman Taylor – IV**
Gdplag1		**0.2041***	**0.27496 ***	**0.23865 ***
		(0.000)	**(0.000)**	**(0.000)**
Public debt	**0.00057**	**-0.016544**	**-0.01831**	**0.00058**
	(0.847)	**(0.672)**	**(0.480)**	**(0.984)**

Public debt square	**-0.00024 ****	**-0.000065**	**-1.18**	**-0.00096**
	(0.129)	**(0.718)**	**(0.993)**	**(0.547)**
Final consumption	**0.20047 ***	**0.13172 ***	**0.04007 ****	**0.10328 ***
	(0.000)	**(0.022)**	**(0.136)**	**(0.016)**
Gross savings	**0.41303 ***	**0.15419 ***	**0.04089**	**0.07817 ****
	(0.000)	**(0.037)**	**(0.382)**	**(0.118)**
Fixed capital	**0.14323 ***	**0.10720 ****	**0.08837**	**0.10405 ****
	(0.041)	**(0.146)**	**(0.180)**	**(0.118)**
Current account	**-0.00024**	**-0.00014**	**-0.00005**	**-0.00011**
	(0.680)	**(0.782)**	**(0.919)**	**(0.823)**
Government expenditures	**0.11410**	**-0.04090**	**-0.05261**	**-0.07234**
	(0.158)	**(0.821)**	**(0.479)**	**(0.340)**
Constant	**-26.0483 ***	**-12.3401 ****	**-1.97357**	**- 10.0637 ****
	(0.000)	**(0.106)**	**(0.651)**	**(0.093)**
observation	**213**	**202**	**202**	**202**
R-squared	**0.6924**			
F	**65.92**	**12.28**		
Chi 2			**112.81**	**112.4**
Model	**Pooled OLS**	**FE**	**RE**	

Note: (*) statistically significant at 5% level, (**) statistically significant at 10%
Source: author's calculations.

Table no. 2 presents the empirical findings from the Hausman-Taylor estimator. Finally, Hausman-Taylor instrumental (IV) it is found to be better choice than fixed and random effects (see Table A1).

In applying Hausman-Taylor instrumental (IV) estimator, the variables that are considered to be as exogenous variables and used as their own instruments are public debt square, final consumption, gross savings, fixed capital formation and government expenditures. The variables that are considered to be endogenous and are instruments by the deviation of the individuals mean are GDP per capita first lag (gdppeclag1), public debt and current account. The initial level of per capita growth is the first lag of real per capita growth which is instrumented by the deviations of the individuals mean and it is positive. Public debt has a positive coefficient (0.000585), but due to the p-value it is insignificant. Our results are in line with Warner (1992); Savvides (1992); Hansen (2001); Kourtellos, Stengos, and Tan (2012) findings that suggest that there is no statistically significant relationship between debt and economic growth. Final consumption has positive coefficient (0.10328) and statistically significant (p=0.016) effect on real gdp per capita as expected and these results are in line with findings of Kim(2017).

Additionally, Gross savings have also positive and significant coefficients, results that are corresponding with findings of several authors such as Bacha (1990); Otani and Villanueva (1990); DeGregorio (1992); Jappelli and Pagano (1994); Krieckhaus (2002). Also, fixed capital formation with a statistically significant positive coefficient of 0.14323, shows that has a positive impact on GDP per capita. This results are consistent with findings of Kormendi & Meguire (1985); Barro (1991); Levine and Renalt (1992); Gibescu (2010). On the other hand, current account has negative but insignificant effect on per capita growth. This is due to the negative coefficient of -0.00011, however not showing to be statistically significant effect on per capita GDP. In addition, there results are consistent with Chinn and Prasad (2000); Edwards (2002); Kostakoglu and Dibo (2011) findings. Additionally, the positive coefficient of 0.11410 of Government expenditures however, claims an insignificant effect to per capita growth, due to its p = 0.340. Moreover, such results are in line with findings of Hsieh & Lai (1994); Nurudeen & Usman (2010); Attari & Javed (2013).

5. CONCLUSIONS AND RECOMMENDATIONS

This paper empirically analyzes the effects of public debt on economic growth, and the policies that affect economic growth in the European transition countries from 1996 to 2017. Having into consideration the attraction of the attention of many scholars and the importance given to the nexus of public debt and economic growth from the policymakers, it was empirically investigated the relationship of these two variables in the European transition countries and based on our knowledge, this is the first paper that tries to empirically employ these techniques for this set of countries to determine the relationship between public debt and economic growth.

Several panel data estimations has been performed regarding Pooled OLS, fixed and random effects and Hausman Taylor Instrumental variable model. Mainly the three first mention techniques are used for comparison purposes. In addition, by conducting Hausman-Taylor instrumental (IV) estimator, the variables that are considered to be as exogenous variables and used as their own instruments are public debt square, final consumption, gross savings, fixed capital formation and government expenditures. The variables that are considered to be endogenous and are instruments by the deviation of the individuals mean are GDP per capita first lag (gdppeclag1), public debt and current account. The initial level of per capita growth is the first lag of real per capita growth which is instrumented by the deviations of the individuals mean and it is positive. Public debt has a positive but insignificant effect on GDP per capita and such results are in line with Warner (1992); Savvides (1992); Hansen (2001); Kourtellos, Stengos, and Tan (2012). Final consumption has positive and statistically significant effect on GDP per capita as expected and these results are in line with findings of Kim(2017).

Additionally, Gross savings have have positive effect on GD per capita, corresponding with findings of several authors such as Bacha (1990); Otani and Villanueva (1990); DeGregorio (1992); Jappelli and Pagano (1994); Krieckhaus (2002). Also, fixed capital formation with a statistically significant positive coefficient of 0.14323, showing positive impact on GDP per capita. This results are consistent with findings of Kormendi & Meguire (1985); Barro (1991); Levine and Renalt (1992); Gibescu (2010). Current account has negative but insignificant effect on per capita growth. In addition, there results are consistent with Edwards (2002); Kostakoglu and Dibo (2011) findings.

Additionally, the positive coefficient of 0.11410 of Government expenditures however, claims an insignificant effect to per capita growth. Moreover, such results are in line with findings of Hsieh & Lai (1994); Nurudeen & Usman (2010); Attari and Javed (2013).

REFERENCES

Attari, M. I. J., & Javed, A. Y. (2013). Inflation, Economic Growth and Government Expenditure of Pakistan: 1980-2010. Procedia Economics and Finance, 5, 58–67. http://doi.org/10.1016/S2212-5671(13)00010-5.

Bacha, E. L. (1990). A three-gap model of foreign transfers and the GDP growth rate in developing countries. Journal of Development Economics, Vol. 32, pp. 279-96.

Ballasone, F., M. Francese and A. Pace (2011) "Public Debt and Economic Growth in Italy." Quaderni di StoriaEconomica / Economic History Working Papers, n. 11, October 2011, Banca d'Italia, Rome.

Barro, R.J. (1991). Economic growth in cross section of countries. Quarterly Journal of Economics, 106, 407-444.

Baum A., Checherita-Westphal C. and Rother P. (2013). Debt and growth: new evidence for the euro area, Journal of International Money and Finance, vol. 32, pp. 809–21.

Caner M., Grennes T. and Koehler-Geib F. (2010). Finding the tipping point: when sovereign debt turns bad', in Braga C. A. P., editor; and Vincelette G. A., editor. (eds), Sovereign Debt and the Financial Crisis: Will this Time be Different?, World Bank, pp. 63–75.

Cecchetti S. G., Mohanty M. S. and Zampolli F. (2011): Achieving growth amid fiscal imbalances: the real effects of debt, Federal Reserve Bank of Kansas City Proceedings, pp. 145–96.

Checherita-Westphal, C. and P. Rother (2012). The impact of High Government Debt on Economic Growth and its Channels: An Empirical Investigation for the Euro Area. European Economic Review 56(7), pp. 1392 – 1405.

Chudik, A., Mohaddes, K., Pesaran, M. H., &Raissi, M. (2015). Is there a debt-threshold effect on output growth? The Review of Economics and Statistics, 99(1), pp.135-150.

DeGregorio, J. (1992). Economic growth in Latin America. Journal of Development Economics, Vol. 39, pp. 59-84.

Edwards, S (2002). Does the current account matter? University of Chicago Press, pp 21-69

Elmeskov J. and Sutherland D. (2012). Post-crisis debt overhang: growth implications across countries, conference paper at Reserve Bank of India's second international research conference, Paris: OECD Economics Department.

Gibescu, Octavia (2010): *Does the gross fixed capital formation represent a factor for supporting the economic growth? MPRA*

Hansen, Henrik, 2001, "The Impact of Aid and External Debt on Growth and Investment: Insights from Cross-Country Regression Analysis," paper presented at WIDER Conference on Debt Relief (Helsinki: United Nations University).

Hausman, J. A., 1978. Specification Tests in Econometrics. Econometrica, 46(6), 1251-1271. http://dx.doi.org/10.2307/1913827

Hausman, J. A., and Taylor, W. E., (1981) Panel Data and Unobservable Individual Effects. Econometrica, 49(6), 1377-1398. http://dx.doi.org/10.2307/1911406

Hsieh, E., & Lai, K. S. (1994). Government Spending and Economic Growth: The G-7 Experience. Journal of Applied Economics, 26, 535– 542.

Japelli, T. & Pagano, M. (1994). Savings, growth and liquidity constraints. Quarterly Journal of Economics, Vol. 109, pp. 83-109.

Kim H (2017) The Effect of Consumption on Economic Growth in Asia. J Glob Econ 5: 259. doi:10.4172/2375-4389.1000259.

Kostakoglu, S. F. ,Dibo, M. (2011). Turkiye'de cari acık ve ekonomik buyume iliskisinin VAR yontemi ile analizi (The relationship between the current account deficit and the economic growth of Turkey: Analysis through VAR method). Anadolu International Conference in Economics II, Eskisehir, 9-11.

Kourtellos, Andros &Stengos, Thanasis& Tan, Chih Ming, (2013). "The effect of public debt on growth in multiple regimes," Journal of Macroeconomics, Elsevier, vol. 38(PA), pages 35-43.

Kumar M. S and Woo J. (2010). Public debt and growth, IMF Working paper no. 10(174), Washington, DC: International Monetary Fund.

Levine, R., & Renelt, D. (1992). A sensitivity analysis of cross-country regressions. The American Economic Review, 82(4), 942-963.

Minea, A., & Parent, A. (2012). Is high public debt always harmful to economic growth? Reinhart and Rogoff and some complex nonlinearities. CERDI, 2012.

Nurudeen, A., & Usman, A. (2010). Government Expenditure and Economic Growth in Nigeria, 1970-2008: A Disaggregated Analysis. Business and Economics Journal, 1–11.

Otani, I. & Villannueva, D. (1990). Long term growth in developing countries and its determinants: An empirical analysis. World Development, Vol. 18, pp. 769-83.

Panizza, U. and A. F. Presbitero (2013). Public Debt and Economic Growth in Advanced Economies: A Survey. Swiss Journal of Economics and Statistics 149(II), pp. 175–204.

Reinhart, C. M. and K. S. Rogoff (2010). Growth in a Time of Debt. American Economic Review 100(2), pp. 573–78

Savvides, Andreas, (1992). "Investment Slowdown in Developing Countries during the 1980s: Debt Overhang or Foreign Capital Inflows," in Kyklos, Vol. 45, No. 3, pp. 363–78.