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FISCAL DECENTRALIZATION AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM WESTERN BALKANS

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Abstract

Decentralization has been a key component in Western Balkans six (WB6 henceforth) in the transition from central governments to more decentralized economies. The question whether fiscal decentralization helps in increasing economic growth is an important issue for both policy makers and researchers as it involves allocation of a large amount of resources in one way or the other. Evidence on fiscal decentralization in WB6 is scarce, therefore this article aims to investigate that how does fiscal decentralization affect GDP growth in these countries over the period 2006-2019. This study combines three databases to construct a panel database that enables us to examine this relationship it also uses several models to test the relationship between fiscal decentralization and growth; however, the Hausman Taylor IV estimator is the main estimation strategy. The findings suggest that fiscal decentralization has a positive effect on GDP growth and the results are robust on several specifications.

Keywords: Fiscal decentralization, Western Balkan, GDP growth, transfers, revenue, expenditures, Hausman Taylor estimator

INTRODUCTION

Recently there is an increasing interest in fiscal decentralization as a major mechanism for encouraging economic growth among development specialists, economists, and governments (Bruno and Pleskovic 1996; Oates 1994). Most of developing and emerging countries have begun some form of power transfer to local governments (Dillinger 1994). The economic reasons for fiscal decentralization are based on two premises: 1) decentralization will boost economic efficiency by allowing local governments to provide better services due to proximity and informational benefits, and 2) that for the delivery of public services, competition and population movement among local governments would ensure the correct match of preferences between local communities and local governments (Tiebout 1956). Fiscal decentralization has remained a fascinating topic until now, because studies on the subject are being conducted not just from an economic standpoint, but also from political, geographic, and other viewpoints. Appropriate indicators can aid governments in comparing, diagnosing, and reforming intergovernmental fiscal systems, as well as evaluating the effectiveness of previous reforms. They can help in determining if and to what extent decentralization promotes economic growth, improves public sector efficiency, or contributes to macroeconomic stability. Many scientists have studied how fiscal decentralization affects a country's economic growth.

WB is particularly interesting context to this topic because, following the fall of communism in 1989, these countries began the shift from highly controlled and planned economies to more decentralized market-oriented economies. They have had a lot of trouble achieving the prerequisites for a successful implementation of fiscal decentralization measures (Prud'homme1995).The presence of poor legal systems, persistent financial instability, and the legacy of 40 years of central planning all posed significant challenges to the creation of viable decentralized systems. As a result, fiscal decentralization processes have been implemented, which have been criticized for their lack of transparency and a clear division of powers between the various levels of government (Rodriguez-Pose and Kroijer 2009).Therefore, this study examines the issue whether the fiscal decentralization has a positive effect on GDP growth rates in the Western Balkans countries? We use a panel data sample in the Western Balkans countries for the period from 2006 to 2019. This is a newly constructed panel dataset and new measures of fiscal decentralization as a contribution to the literature. We control for countries heterogeneity and address the potential endogeneity of fiscal decentralization by using Hauman Taylor IV estimator as the main empirical strategy.

This paper is organized as follows: the second section briefly analyzes the literature on the relationship between fiscal decentralization and economic growth; the third describes the

data. In the fourth section we discuss the empirical strategy; the fifth section reports the main findings and the last summarizes the main conclusions.

LITERATURE REVIEW

Fiscal decentralization has caught the attention of economists and governments in recent decades as a critical instrument for encouraging economic growth and development. From an economic standpoint, the earliest theoretical discussion of fiscal decentralization dates back to the mid-twentieth century. The theoretical foundations of fiscal federalism were developed by Musgrave (1959) and Tiebout (1956).There are two types of fiscal decentralization: expenditure decentralization and tax revenue decentralization. The degree of decentralization is determined by the local level's ability to make expenditure and revenue decisions independently in the geographical area for local people, without the influence of the central government. According to Slavinskaite (2016), the economic side of decentralization has traditionally been examined through the prism of fiscal federalism.

Previous research on the nexus between fiscal decentralization and economic growth is ambiguous, some authors report positive effects, some report negative effects especially in developed countries while a third strand of research report mixed effects. Most of the studies report positive relationship between fiscal decentralization and economic growth. Methodologically speaking studies reporting positive relationship can be categorized in two groups, the ones who use cross-sectional data and use simple OLS and those who use time-series and panel data and employ more advanced panel data methods. Studies that stand out from the first group include studies Lin and Liu (2000) conducted in China who report that a percentage point increase in revenue decentralization increases GDP per capita by around 0.27 percent. Almost identical results are reported by Akai and Sakata (2002), who use state-level cross-sectional data from the United States. Similarly several authors (Thiessen 2003; Ebel and Yilmaz 2002; Buser 2011) suggest that fiscal decentralization has a positive effect on GDP growth using cross-sectional data of different samples comprised from developed countries, developing countries and also mixed samples. Moreover, studies that stand out from the second group include studies Iimi (2005), who uses mixed sample of fifty-one countries from both developing and developed background, they report a positive relationship between fiscal decentralization and GDP growth. Similar findings are reported by Stansel (2005), using USA data from 1960 to 1990; Zhang and Zou (2001), using data from Indian states.

A non-negligible body of research fails to find any relationship between fiscal decentralization and GDP growth and quite a few report negative relationship. Davoodi and Zou (1998) report a negative relationship between fiscal decentralization and economic growth in a

sample of forty-six developing countries, however in a later study conducted by the same authors (Xie, Zou, and Davoodi 1999) they fail to find a relationship between fiscal decentralization and economic growth. Similarly Woller and Phillips (1998) who use longitudinal data from twenty-three developing countries reports negative relationship between fiscal decentralization and economic growth. Negative relationship between fiscal decentralization and economic growth is also reported in more recent studies (Jin and Zou 2005; Rodriguez-Pose and Ezcurra 2011; Baskaran & Feld, 2013; Gemmell, Kneller, and Sanz 2013).

When conducting an empirical investigation of the nexus between fiscal decentralization and economic growth one important issue is the data comparability and the sample used in the research. Typically previous studies focus on large samples and national data to conduct the research. The main contribution of this article is that we apply a different approach by focusing on a narrow region (Balkans) with a similar context and use data gathered from "Network of Associations of Local Authorities of South East Europe (NALAS)" for all countries in the analysis. We believe that this approach helps to minimize the biases coming from contextual differences and also those coming from data comparability. Moreover, another important contribution of this paper is that methodologically it goes beyond what is typically done in the field, because the vast majority of the research is conducted using OLS, Random and Fixed effects models while in this paper in addition to these we also use the Hausman Taylor Estimator.

METHODOLOGY

This study combines four data sources to create a panel database that contains appropriate data to answer our research questions. First, the fiscal decentralization information was obtained from "Network of Associations of Local Authorities of South East Europe (NALAS)". Second, information on the main economic indicators for Western Balkan countries is obtained from the World Bank's "World Development Indicators (WDI)" a database typically used in studies similar to this one. Third, in order to maximize the information on GDP we use quarterly GDP data, which was obtained from the "South East Europe Jobs Gateway Database" a database maintained by "The Vienna Institute for International Economic Studies (WiiW)" in cooperation with the World Bank. Finally, economic freedom data were obtained from heritage.org economic freedom index. The value of the database that this study has created is that to our knowledge it is the first database that links uses the data provided by NALAS to define several measures of fiscal decentralization and links it with quarterly data on GDP and a wide range of information on other economic indicators. The sample of this study consists of six Western Balkan countries (Albania, Kosovo, North Macedonia, Montenegro, Bosnia &

Hercegovina, and Serbia) for the period from 2006 to 2019, the choice on the period was not an arbitrary one but we where forced to restrict our analysis in this time frame because, unfortunately, there is no public information for earlier periods for our main variables of interest.

As already noted, this paper aims to explore the nexus between fiscal decentralization and economic growth. Appendix 1 contains the definitions of variables of this study. The first panel of the table contains the definitions of the dependent variables, which are two measures of GDP, the first one is GDP measured in constant 2010 US$ while the second one is GDP measured by purchasing power parity also in constant 2010 US$. The second panel of table 1 includes two measures of the variable of interest (fiscal decentralization). The first one is revenue decentralization which is defined as the local revenue over the whole public revenue and the second one are transfers which is defined as the share of central government transfers in total local revenue. Further, we include wide set of control variables such as inflation measured by GDP deflator, total investments measured by gross capital formation in constant 2010 US$, population growth measured by the natural logarithm of the population yearly in each country, economic freedom measured by heritage.org economic freedom index, employment share which is a measure of the employment to population ratio, human capital development measured by the share of at least secondary school completion, trade openness measured by the share of trade over GDP, investment in ICT measured by import of ICT per 1000 inhabitants and the total number of municipalities. It should be noted that the variable of interest and all control variables constitute lagged information (t-1).

ANALYSIS AND FINDINGS

Descriptive statistics

This section offers a description of the main characteristics of countries included in the sample from the fiscal decentralization perspective; in addition to that, this section also provides a brief descriptive analysis of the fiscal decentralization and GDP growth over the period of analysis on this study.

Table 1 reports some key characteristics of the countries in analysis, which are related to the fiscal decentralization. As we can see with a population, density of 164 inhabitants per square kilometer Kosovo is has the highest density of population among all countries in analysis followed by Albania with 100 and then North Macedonia with 81, the remaining countries span from 45 Montenegro to 79 Serbia. However when it comes to the average number of population per municipality countries are more balanced with Albania, Kosovo and Serbia ranging from around 47000 to around 48000, on the other hand North Macedonia, Montenegro and Bosnia & Hercegovina range between 24000 and 26000. Finally, when it comes to the share of population

living in capital city the results are reversed compared to above-mentioned characteristics. Montenegro has the highest share of population living in capital with almost 30 percent followed by North Macedonia, Serbia and Albania with around 24 percent, 22 percent and 20.5 percent respectively. While Bosnia & Hercegovina and Kosovo are at the bottom of the list with the smallest shares of population living in capital with around 14 percent and 11 percent respectively. Since the rest of information in the table such as population, area size and number of municipalities are broad knowledge and easily accessible by anyone we are not going to discuss them here.

Table 1: Main characteristics of the countries from the fiscal decentralization perspective

	ALB	BIH	KOS	MKD	MNE	SRB
Population (mil)	2.900	3.500	1.800	2.100	0.600	7
Population density	100	69	164	81	45	79
Area size	28.70	51.20	10.90	25.70	13.80	88.40
Nr of municipalities	61	144	38	81	25	145
Average population per municipality	47054	24417	46935	25621	24894	48286
Proportion of population living in capital	20.50	13.90	11.20	24.40	29.90	22.50
Observations	336	336	336	336	336	336

Table 2 presents descriptive statistics of this study, reporting means and standard deviations of the main variables used in the empirical analysis of this paper.

Table 2: Summary statistics

	Mean	SD	Min	Max
GDP per capita	5155.02	1287.23	2780.43	8545.48
GDP growth (%)	3.13	2.53	-5.80	8.57
Inflation (GDP Deflator)	3.24	2.97	-0.63	16.04
Investments/GDP	25.71	5.54	16.34	39.58
Population (mil)	0.00	0.00	0.00	0.00
Economic freedom	61.83	4.20	53.10	71.30
Employment share	38.44	7.89	22.49	53.39
Human capital development	83.98	8.90	60.00	97.67
Trade openness	35.09	8.13	22.08	58.66
Investment in ICT (per 1000 people)	103.80	38.22	52.50	225.84
Revenue Decentralization	15.31	5.44	4.00	29.00
Transfers	59.64	18.54	0.00	87.00
Public revenue/GDP (%)	34.59	7.32	23.00	50.00
Local revenue/GDP (%)	5.22	1.78	1.00	11.00
Observations	336			

Notes: The means are an arithmetic mean of the variables for all countries in the analysis.

Table 2 shows that the mean GDP per capita for the period from 2006 to 2019 in WB6 is around 5155$, with the lowest value being around 2800$ and the highest 8545$, this has translated into a mean GDP growth of around 3 percent for the same period, while the minimum observed growth is a GDP decrease of around 6 percent while the maximum an growth of around 8.5 percent. Moreover, the same table also reports findings on the measures of fiscal decentralization, as can be seen the mean of revenue decentralization is around 15 percent with the minimum observed mean of around 4 percent and the maximum of 29 percent, further the mean of transfers from central government towards local governments for the region is around 60 percent with the minimum being a flat 0 percent and the maximum 87 percent. The same table also reports descriptive statistics of the control variables since the findings are self-explanatory we are not going to get into detail and discuss them one by one.

Figure 1, plots the shares of fiscal decentralization over the period under investigation separately for each country in the analysis. As can be seen the left panel of the figure 1 shows shares of revenue decentralization, we can see that for the after 2008 Kosovo is the country with the most diversified local revenue among its neighbors and the trend for Kosovo continues to increase, Kosovo is followed by North Macedonia, however all other countries are almost at similar positions especially lately. Nevertheless, Bosnia & Hercegovina seems to be the country with the least diversified revenues and it exhibits a flat trend. The right panel shows the share of central government transfers towards local governments as another aspect of fiscal decentralization, once again we can see that overall Kosovo has the highest share of transfers and this share is constantly over 80 %. On contrary to Kosovo, Montenegro seems to be the country with the smallest share of transfers among its neighbors with a share spanning between 20 and around 40 %. Similar to the revenue decentralization in the case of transfers all other countries are almost at similar position, having a share of transfers between 45 and 65 %.

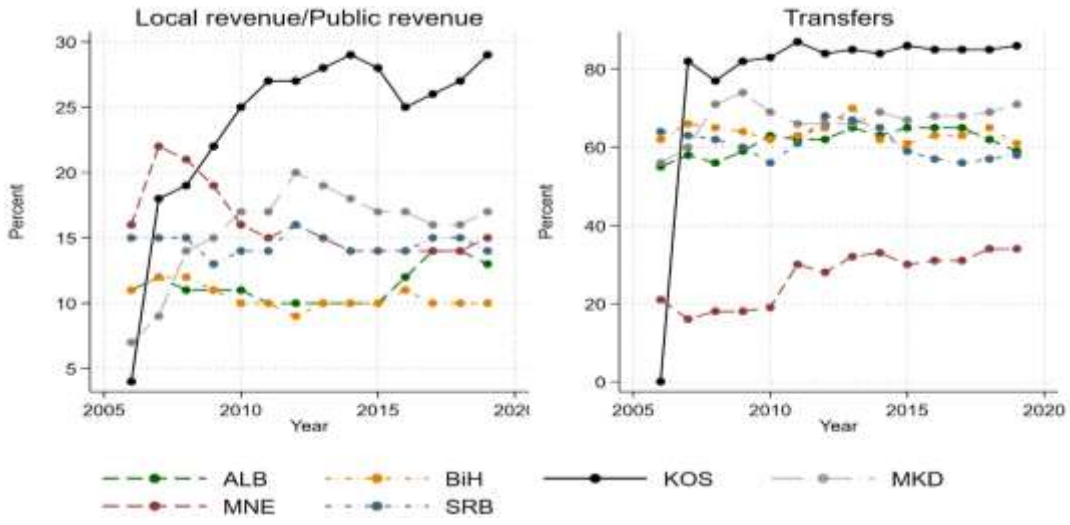

Figure 1: Revenue decentralization and transfers separately for each country

Empirical model testing

In this section, we discuss the empirical approach employed in this study. We followDavoodi and Zou (1998); Xieet al.(1999); Rodriguez-Pose and Kroijer (2009) in estimating the role of fiscal decentralization on economic growth. However, the present study differs slightly from above mentioned studies because in addition to employing fixed and random effect models we also use the Hausman-Taylor IV estimator in an attempt to deal with possible endogeneity in the fiscal decentralization. Therefore, our main strategy for estimation is the Hausman-Taylor IV estimator however, for comparison, we also report results from pooled OLS, Random and Fixed effects, we report the results of Hausman tests on the bottom of each table of the regressions.

Typically Hausman–Taylor model is more consistent and efficient than fixed and random effect estimators, especially in cases when the possibility of endogeneity is high. In our context of fiscal decentralization we believe that this variable might be highly endogenous because it could very well be the case that there is reverse causality between decentralization and growth. Therefore using the Hausman-Taylor IV estimator we deal with this issue. Another measure that we take in order to minimize the endogeneity problem is that all independent variables are lagged information (t-1) we do this based on the idea that even if the growth and fiscal decentralization are reversely correlated this year's GDP could not possibly have an impact on last year's fiscal decentralization, another argument in favor of this approach is the idea if fiscal decentralization does indeed impact GDP growth the effect could not possibly be immediate it is a rather a longer term process therefore we believe that using last year's fiscal decentralization to see whether it affects this years GDP is a solid approach which when combined with Hausman-Taylor IV estimator should at least in theory solve the endogeneity problem.

The empirical analysis of this paper aims at offering an overall view of the impact of fiscal decentralization on economic growth of WB6 countries. The proposed Hausman Taylor IV estimator takes the following form:

$$\ln(y_{it}) = \beta_0 + \ln\left(RD_{i,t-1}\right) + \boldsymbol{\gamma'X} + \boldsymbol{\mu_i} + \boldsymbol{\varepsilon_{it}} \qquad (\mathbf{1})$$

Where:

The set of outcome variable y_i captures the logarithm of the Real GDP and Real GDP measured by PPP of county *i* in year *t*. The term $\ln\left(RD_{i,t-1}\right)$ included the level of fiscal decentralization of country *i* in time *t-1*. We include a wide range of control variables measured in time t-1, which are captured by vector $\boldsymbol{\gamma'X}$ such as inflation, investment share, population growth, economic freedom, human capital development, trade openness, ICT investment, number of municipalities and the lag of dependent variable. The term $\boldsymbol{\mu_i}$captures time invariant error term which includes

the country fixed effects in order to control for country unobserved characteristics, while the term ε_{it}includes time varian error term.

Interpretation of results

Here, the main results and some robustness checks for the impact of fiscal decentralization on GDP growth are reported and discussed. As we will see in the following section we present the results for several models starting form Pooled OLS, continuing with random and fixed effects and the Hausman Taylor IV estimator as the main estimation strategy of this paper. We have decided to include several estimators because first it is a widely accepted fact that the pooled OLS is biased in a context like ours, moreover, as we have already discussed we had some concerns because of endogeneity problem also with fixed and random effect estimators, therefore we believe that Hausman Taylor IV estimator is the safest option. Hence, other estimators are used here only for comparison with Hausman Taylor estimator.

The main results of this study are reported on table 3. The empirical analysis indicates that the fiscal decentralization has a statistically significant effect on GDP growth, and a one percentage point increase in revenue decentralization is associated with a 0.427 percent (SE 0.105) increase in GDP, ceteris paribus. Interestingly, this finding differ by a wide margin depending on the estimator that is used, the effect of revenue decentralization on GDP growth is almost identical with the Hausman Taylor IV when the fixed effects estimator (0.445) is used, however it seems that the random effects model (0.824) is overestimating this effect by more than 0.5 percentage points while the pooled OLS seems to underestimate the effect down to almost zero. Therefore, the decision to apply a diverse number of estimators seems to have been the right one, because the usual methods of studying this relationship seem to produce biased estimations.

Further, most of the control variables seem to affect the GDP growth as expected in terms of both quantity and quality. As expected, investments (INV), population (POP), employment share (EMP), human capital development (HMCAP) and the number of municipalities (Nr of municip) all have a statistically significant positive impact on GDP growth, similarly inflation(INF) and trade (OPEN) seem to have a statistically significant negative impact on GDP growth. On contrary to our expectations, the effect of investments in ICT (TECH) on GDP growth seems to be close to zero and not statistically significant. Similarly, we do not find a statistically significant effect of economic freedom on GDP growth even though that the point estimate is positive. In order to check whether our results are robust, we conduct two robustness checks presented in appendix 2 and 3.

In appendix 2, we use GDP adjusted for purchasing power parity, as the table shows the results are remarkably stable especially when applying Fixed effects estimator and Hausman Taylor IV estimator. We can see that the effect remains identical in both Hausman Taylor IV estimator (0.427) and the fixed effects (0.445), on the other hand Pooled OLS and random effects models seem once again to underestimate and overestimate the effect respectably.

The final robustness check that we use is to change the fiscal decentralization indicator, in table six we use the share of transfers as a proxy for fiscal decentralization. Even though the effects are slightly larger, one percentage point increase in transfers increases the GDP by around 0.56 percent the effect remains qualitatively almost identical, however in this case it seems that the random effects also predicts the effect more precisely even though it underestimates the effect slightly. The fact that even when changing entirely the variables the effect remain almost identical gives a validity to our approach and gives us confidence that we have identified the effect correctly.

Table 3: The effect of fiscal decentralization on GDP growth

	(1) POLS	(2) RE	(3) FE	(4) Hausman-Taylor IV
log RD (t-1)	0.038	0.824***	0.445***	0.427***
	(0.048)	(0.136)	(0.115)	(0.105)
INF (t-1)	-0.003***	-0.001	-0.011***	-0.011***
	(0.001)	(0.002)	(0.002)	(0.002)
INV (t-1)	0.002***	-0.003*	0.009***	0.009***
	(0.000)	(0.001)	(0.001)	(0.001)
log POP	-0.150***	0.697***	0.436**	0.491***
	(0.015)	(0.026)	(0.181)	(0.118)
EFI	0.284***	1.059**	0.310	0.272
	(0.104)	(0.450)	(0.400)	(0.399)
EMP	-0.001	0.013***	0.009***	0.009***
	(0.000)	(0.001)	(0.002)	(0.002)
HMCAP	-0.001***	0.007***	0.007***	0.007***
	(0.000)	(0.001)	(0.001)	(0.001)
OPEN (t-1)	0.003***	-0.013***	-0.002	-0.002
	(0.000)	(0.002)	(0.002)	(0.002)
TECH (t-1)	-0.001***	0.004***	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)

log GDP (t-1)	1.146***	0.131***	0.053***	0.054***
	(0.014)	(0.016)	(0.012)	(0.012)
Nr of municip.	-0.000	0.004***	0.000	0.008***
	(0.000)	(0.000)	(.)	(0.002)
Constant	-0.957***	8.080***	14.578***	13.069***
	(0.162)	(0.433)	(2.748)	(1.678)
Observations	244	300	300	300
Groups		6.000	6.000	6.000
R^2 overall	1.000	0.991	0.897	
Within		0.564	0.750	
Between		0.999	0.890	
F-test	63537.135		85.344	90.812
Wlad test		32896.299		
Hausman test			-691.010	
Chi squared				998.929

Standard errors in parentheses $^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$

CONCLUSIONS

Fiscal decentralization provides a great opportunity to generate growth for Western Balkan countries, whom as a result of historical and political reasons are now in a unique position to turn their structural disadvantages in a benefit for their nations. The current evidence on the effect of fiscal decentralization on economic growth targeting specifically the context of Western Balkans to our knowledge is inexistent. This paper combines four databases to create a panel database that contains appropriate data to examine the effect of fiscal decentralization on GDP growth. We use several models to examine this relationship starting from e Pooled OLS, random and fixed effects however the main empirical strategy on which we rely to tackle the endogeneity issue is the Housman Taylor IV estimator. Our findings suggest that the fiscal decentralization has a large effect on GDP growth around 0.42 percent; we also show that the results remain almost unchanged despite the change in definition of GDP or fiscal decentralization. In addition to that, this paper shows the endogeneity is a serious threat in the context of the relationship between GDP growth and fiscal decentralization by showing that that the Pooled OLS underestimates the coefficients severely while random effects model tends to overestimate them.

Our findings suggest that since the dependence on local spending allocation and transfers has a positive impact on economic growth, fiscal decentralization may be used as tool to accelerate economic growth in the less developed regions in the medium term. Our findings imply that if local governments had a larger share of their own revenues and were more

responsible and accountable for with spending, they could achieve the economic efficiencies that much of the fiscal decentralization literature predicts.

This paper supports the assertion that the by allowing local governments to generate their own revenue, we can promote fiscal accountability and encourage them to deliver on their spending promises in a more transparent manner. Therefore, although they are subject to local responsibility, coordinating locally generated revenue with local spending responsibility appears to be an important task and meaningful for fiscal decentralization reforms. However, the positive correlation between local taxes and economic growth at the national level paints a more differentiated picture of fiscal decentralization in Kosovo. Namely, the ability for local governments to create their own revenue, fiscal responsibility and incentives to meet their expenditure responsibilities can bring about medium-term economic benefits and are hence important implications for the design of fiscal decentralization. This is a very relevant outcome in the case of Kosovo, as it still is in the early stages of extensive investments with the purpose to build the country.

This study has some limitations, mostly related to data, the period under study is relatively short when combined with a small number of countries in analysis this may lead to a lack of precision on the estimated coefficients. In addition to that the data on fiscal decentralization taken from NALAS are aggregated at national and year level which in our opinion loses a large amount of variation, ideally future works should consider accessing more detailed data regarding this issue.

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APPENDICES

Appendix 1: Variable's description

Variable	Definition	Data source
DEPENDENT VARIABLES		
GDP	*Real GDP measured in constant 2010 US$. In the model the we include the logarithm of the quarterly GDP data*	World Bank (WDI) &WiiW (South East Europe Jobs Gateway Database)
GDP PPP	*Real GDP adjusted for purchasing power parity measured in constant 2010 US$. In the model the we include the logarithm of the quarterly GDP data*	World Bank (WDI) &WiiW (South East Europe Jobs Gateway Database)
INDIPENDENT VARIABLES		
Revenue decentralization	*Local revenue/public revenue*	NALAS
Transfers	*Share of transfers from central government over the total local revenue*	NALAS
Inflation	*Inflation in percentage measured by GDP deflator*	World Bank (WDI)
Investment	*The share of gross capital formation on the GDP*	World Bank (WDI)
Population	*Total population yearly*	World Bank (WDI)
Economic freedom	*Economic freedom index*	Heritage.org
Employment share	*The share of employed individuals over total work force*	World Bank (WDI)
Human capital development	*Share of individuals who successfully completed at least secondary school.*	World Bank (WDI)
Trade openness	Share of trade over GDP	World Bank (WDI)
Investment in ICT	import of ICT per 1000 inhabitants	World Bank (WDI)
Number of municipalities	Number of municipalities	World Bank (WDI)

Appendix 2: The effect of fiscal decentralization on GDP growth (GDP adjusted for PPP)

	(1) POLS	(2) RE	(3) FE	(4) Hausman-Taylor IV
log RD (t-1)	0.043	0.906***	0.445***	0.427***
	(0.090)	(0.139)	(0.115)	(0.105)
INF (t-1)	-0.004***	-0.000	-0.011***	-0.011***
	(0.001)	(0.002)	(0.002)	(0.002)
INV (t-1)	0.004***	-0.000	0.009***	0.009***
	(0.001)	(0.001)	(0.001)	(0.001)
log POP	0.125***	0.827***	0.436**	0.491***
	(0.028)	(0.026)	(0.181)	(0.118)
EFI	2.480***	3.830***	0.310	0.272
	(0.196)	(0.460)	(0.400)	(0.399)
EMP	0.003***	0.016***	0.009***	0.009***
	(0.001)	(0.001)	(0.002)	(0.002)
HMCAP	-0.003***	0.005***	0.007***	0.007***
	(0.000)	(0.001)	(0.001)	(0.001)
OPEN (t-1)	-0.001	-0.014***	-0.002	-0.002
	(0.001)	(0.002)	(0.002)	(0.002)
TECH (t-1)	-0.000	0.004***	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
log GDP (t-1)	0.966***	0.082***	0.053***	0.054***
	(0.026)	(0.017)	(0.012)	(0.012)
Nr of municip.	-0.001***	0.003***	0.000	0.008***
	(0.000)	(0.000)	(.)	(0.002)
Constant	-0.881***	7.260***	15.526***	13.069***
	(0.305)	(0.442)	(2.748)	(1.678)
Observations	244	300	300	300
Groups		6.000	6.000	6.000
R^2 overall	0.999	0.991	0.912	
Within		0.562	0.750	
Between		0.998	0.908	
F-test	17587.576		85.344	90.812
Wlad test		30831.442		
Hausman test			-879.851	
Chi squared				998.929

Standard errors in parentheses

*p< 0.10, **p< 0.05, ***p< 0.01

Appendix 3: The effect of fiscal decentralization measured by transfers on GDP

	(1) POLS	(2) RE	(3) FE	(4) Hausman-Taylor IV
log Trans (t-1)	-0.025	0.471***	0.587***	0.564***
	(0.023)	(0.072)	(0.055)	(0.053)
INF (t-1)	-0.003***	0.003	-0.009***	-0.009***
	(0.001)	(0.002)	(0.001)	(0.001)
INV (t-1)	0.002***	-0.004***	0.008***	0.008***
	(0.000)	(0.001)	(0.001)	(0.001)
log POP	-0.147***	0.703***	-0.088	0.032
	(0.014)	(0.025)	(0.156)	(0.140)
EFI	0.263**	1.418***	0.352	0.335
	(0.101)	(0.428)	(0.344)	(0.344)
EMP	-0.001***	0.013***	0.006***	0.006***
	(0.000)	(0.001)	(0.002)	(0.002)
HMCAP	-0.001***	0.007***	0.005***	0.005***
	(0.000)	(0.001)	(0.000)	(0.000)
OPEN (t-1)	0.003***	-0.013***	0.001	0.001
	(0.000)	(0.002)	(0.002)	(0.002)
TECH (t-1)	-0.001***	0.005***	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
log GDP (t-1)	1.155***	0.111***	0.025**	0.027**
	(0.015)	(0.017)	(0.011)	(0.011)
Nr of municip.	-0.000***	0.004***	0.000	0.014***
	(0.000)	(0.000)	(.)	(0.003)
Constant	-1.167***	8.333***	23.143***	20.113***
	(0.169)	(0.440)	(2.402)	(2.013)
Observations	244	300	300	300
Groups		6.000	6.000	6.000
R^2 overall	1.000	0.992	0.163	
Within		0.593	0.813	
Between		0.998	0.517	
F-test	63682.507		123.820	115.247
Wlad test		33603.200		
Hausman test				
Chi squared				1267.712

Standard errors in parentheses

*p< 0.10, **p< 0.05, ***p< 0.01