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The Effect of FDI on the Relationship between Fiscal Decentralisation and Economic Growth in Vietnam: Empirical Evidence from Provincial Data

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Abstract

Fiscal decentralization not only promotes economic growth but brings more power to local governments in attracting FDI inflows as well. However, economists and policy-makers often strongly debate the influence of FDI on the fiscal decentralization-growth relationship. This paper empirically investigates the role of FDI in the relationship between fiscal decentralization and economic growth for a panel dataset of 52 provinces in Vietnam during the period 2007-2016 using the two-step GMM Arellano-Bond and FE-2SLS estimators. The estimated results confirm that fiscal decentralization and FDI significantly enhance economic growth, but their interaction terms impede growth rate. In addition, public investment is a significant determinant. These findings suggest some important policy recommendations for central governments in developing countries, especially Vietnam.

Keywords

Fiscal Decentralization, Economic Growth, FDI, Two-Step GMM Estimators, Vietnam

1. Introduction

The recent related literature shows that the design and implementation of a multi-level system of government can have significant effects on the overall distribution of public resources in the economy and so on economic efficiency, growth, and welfare [1] [2] [3]. The main arguments for fiscal decentralization leading to the improved allocation of resources are based on the assumption that fiscal de-

centralization enhances the influence of local governments over the provision of public goods and services of the public sector [4]. Fiscal decentralization also promotes FDI inflows in local regions via some different channels [5] [6] [7]. Therefore, fiscal decentralization has both direct impacts (through the appropriate and efficient distribution of public resources) and indirect effects (via attracting FDI inflows) on economic growth.

According to the main report from [8], Vietnam is an emerging economy with a relatively high degree of fiscal decentralization (9 - 10 percent). In addtion, Vietnam attracts more increasingly FDI inflows from other countries all over the world. Therefore, the primary goal of this paper is to empirically investigate the role of FDI in the relationship between fiscal decentralization and economic growth in Vietnam. We first use the two-step system GMM Arellano-Bond estimator (S-GMM) to examine the effects of fiscal decentralization, FDI and their interaction term on economic growth with control variables such as public investment, private investment, labor force, trade openness, inflation and infrastructure for balanced panel data of 52 provinces over the period 2007-2016. Then, we use the two-step difference GMM Arellano-Bond estimator (D-GMM) and the Fixed Effects-Two-Stage Least Squares estimator (FE-2SLS) to check the robustness of these estimates.

The remainder of this paper will be proceed as follows: Section 2 outlines the framework theory and literature review. The situation of fiscal decentralisation and FDI in Vietnam is presented in Section 3. Section 4 describes the empirical model and research data. Section 5 reports the estimated results and discussion, which consist of S-GMM estimates and robustness check. The final section is concluding marks and policy implications.

2. Framework Theory and Literature Review

2.1. Framework Theory

A crucial number of papers suggest the channels through which fiscal decentralization has positive effects on fiscal efficiency and economic growth [9]. First, the main theory of fiscal decentralization, the "first generation" theory developed by [10] [11], argues that fiscal decentralization boosts economic efficiency because local governments deeply perceive better local circumstances and preferences in the supply of public goods and services than central governments. These informal advantages may help local governments to deliver public goods and services at lower cost that are highly appropriate to local needs. Thus, first generation theory suggests that central governments should distribute corresponding grants to local governments. Secondly, through diversifying local output based on local needs, fiscal decentralization may increase local social welfare [12]. In cases where there are differences in local needs for public goods and services among regions, uniform distribution of public goods and services across regions may be inefficient [12]. This diversification also enables residents to move freely to the region that best meets their individual demand for public

goods and services, and lower local tax rate. Hence, a Tiebout classification (A jurisdiction is a group of individuals who collectively provide public goods for themselves exclusively—the public goods are local. Tiebout also suggested that individuals would sort into taste-homogeneous jurisdictions) of individuals into demand-homogeneous communities further improves efficiency in resource allocation. Thirdly, local governments may closely be monitored by their constituencies. Fiscal decentralization leads to greater local accountability. This greater accountability helps to enhance the efficiency in the production and supply of public goods and services [3]. In addition, fiscal decentralization reduces the relative share of unproductive component and increases the productive component in public investment because fiscal competition boosts the quality of public spending [13]. So, by changing the public investment composition toward the economic productive, fiscal decentralization can consequently foster economic growth. Finally, fiscal decentralization is connected with improved level of policy innovation, greater transparency, and better ability of governments to adapt appropriate policies to local preferences [2].

However, there also exist some mechanisms through which fiscal decentralization is detrimental to economic development. First, it is not easy to link advantageous factors of fiscal decentralization with increased economic performance specially in countries lacking the appropriate institutions, fully legal systems, and human capital, economic growth does not seem to rise as a direct result of fiscal decentralization [14]. On one hand, fiscal decentralization may negatively affect the allocation of public goods and services among regions because the mobility of households and firms can restrict attempts to redistribute effectively income. Redistribution policies may induce low income individuals to move into the jurisdiction while rich individuals (who bear a high tax rate) move out [15]. On the other hand, concentration of public goods and services in a few geographical locations may impede per capita growth because regional inequalities in healthcare, education, and infrastructure development can constrain full use of production factors [15]. In particular, fiscal decentralization may lead to a race to the top among local governments and an oversupply of tax incentives for foreign investors, restricting the investment and development of private sector [16] and make local administration reluctant to reinforce environmental policy stringency and the polluted environment casts a shadow on the economic success [17].

2.2. Literature Review

The empirical evidence on fiscal decentralization-growth nexus can be drawn from the recent literature review. First, some papers use only one measure of fiscal decentralization to examine the fiscal decentralization-growth relationship [18] [19]. [18] find the positive impact of fiscal decentralization in Spain using S-GMM for a panel data of 17 regions over the period 1970-2000. Similarly, [19] indicate a positive fiscal decentralization-growth relationship in 28 provinces in China in both short run and long run through ARDL (Autoregressive-Distributed Lag) bounds tests and PMG (Pooled Mean Group) estimators with time series

data from the period 1979-2009. They argue close relations between provincial governments and their constituents may promote to invest in human capital, and education and training at the local level, which results in a high growth rate.

On the other hand, most researchers use two measures of fiscal decentralization, revenue decentralization and expenditure decentralization, in their papers. [9] [20] both show the positive impact of revenue decentralization and the negative impact of expenditure decentralization. [20] use fixed effects for a panel data of 61 provinces in Vietnam over the period 1997-2007 while [9] apply the PMG estimator for a panel data of 23 OECD countries during the period 1972-2005. Meanwhile, [14] [21] [22] all show the negative impacts of both revenue decentralization and expenditure decentralization. [14] use fixed effects for a panel data of 16 Central and Eastern European countries from 1990 to 2004 and [21] use OLS for 21 OECD countries during the period between 1990 and 2005 while [22] apply OLS and 2SLS estimators for a panel data of 56 countries over the period 1990-2007. Conversely, [23] note the negative impact of revenue decentralization and the positive impact of expenditure decentralization for a sample cross-section data (26 provinces) in Indonesia from 1992 to 2002 via GLS estimation (fixed and random effects), but [24] reports the positive impacts of both revenue decentralization and expenditure decentralization for a panel data set of 30 provinces in China during the period of 1994-2002 with fixed effects and random effects. In the same vein, [25] show the positive impact of revenue decentralization and the insignificant impact of expenditure decentralization using fixed effects and two-step system GMM Arellano-Bond for an unbalanced panel data of 17 regions in Spain over the period of 1985-2004. More interestingly, [26] present an inverted-U-shaped relationship between fiscal decentralization and economic growth with a panel dataset of 29 provinces in China over the 1995-2014 period through a simultaneous equations system. These findings show a threshold level of fiscal decentralization below which fiscal decentralization promotes economic growth and above which fiscal decentralization impedes growth rate.

Finally, through three measures of fiscal decentralization, [27] indicates decentralization is positively related to economic growth in 20 high-income OECD countries from 1972 to 2005 using pooled OLS estimator. He also emphasizes that economic freedom boosts the positive growth effects of fiscal decentralization.

In relevance to the FDI-growth relationship, a thorough review of the literature carried out by [28] indicates 108 empirical investigations with 880 regression estimations using data from around the world. Around half of the studies find a significantly positive effect (43%), about one-fifth note a significantly negative effect (17%), and remaining report an insignificant effect (40%). First, technology transfer helps human capital accumulation which can lead to facilitate economic development [29]. Using a simultaneous equations model based on GMM estimation for a panel data of 61 provinces in Vietnam over the period 1996-2005, [29] reveal a positive two-way linkage between FDI and economic growth. Similarly, [30] find FDI inflows and human capital develop-

ment strongly affect economic growth in Malaysia over the period 1975-2010 using Johansen co-integration test and Hierarchical Multiple Regression analysis. Recently, [31] report a positive two-way relationship between FDI inflow and economic growth for Tunisia, Morocco, and Egypt from 1985 to 2011 through a simultaneous equations model and GMM estimator. Second, host countries have good opportunities to access foreign markets when FDI firms use these countries as an export platform to sell goods and services in the region. So, FDI inflows seem to offer good features such as financial resource augmentation, high level of stability, effects of positive productivity and access to foreign markets [28] [32]. [32] confirms that the relationship between FDI inflow and economic growth is a two-way by employing simultaneous system of equations for cross-country data of 124 countries during the period 1971-2010. [28] note FDI inflow positively affects economic growth by using the meta-regression analysis for a growing number of papers and a pooled OLS estimation of five-year averaged panel data for 140 countries over the period 1970-2009. Third, the positive contribution of FDI inflows to economic development in the host countries comes from an increase in national productivity by supplying new investment capitals, innovations in technology and skills in management [33]. FDI inflows can boost economic growth by crowding-in domestic investment, and via the interaction between advanced technology from FDI inflows and the host countries' human capital. [33] shows a positive co-integrating relationship between FDI inflow and growth in long run for a panel data of 18 countries in the Eurozone during the period from 2002 to 2012 via the estimation methods of Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS).

Conversely, the negative impact of FDI on economic growth is that foreign companies reduce the productivity of domestic enterprises via competition effects [34]. [34] confirms that FDI inflow has a significantly negative impact on growth a sample of 44 developing countries over the period 1970-2005 with group-mean panel dynamic OLS estimator.

In sum, no existing papers examine the role of FDI in the fiscal decentralization-growth relationship in the related literature so far. So, it is a research gap that this study will address to contribute to the literature.

3. The Fiscal Decentralisation and FDI in Vietnam

Vietnam has 4 levels of government: central, 63 provinces, 700 districts, and 11,145 communes [20]. During the period of *Doi Moi* (the period in which the economy is changed from a centralized economy to a market-oriented economy), the central government established an extensive fiscal decentralization policy to efficiently increase the distribution of public resources to local people. This policy was approved by the issuance of the 1996 State Budget Law and its revision in 1998. The share of subnational governments in total expenditure increased to 36% in 1997 and to 43% in 2001 from 26% in 1992 [35]. The issuance of State Budget Law in 2002 promoted fiscal decentralization to improve transparency and decision-making processes closer to beneficiaries. As a result, public

project selection processes in Vietnam were improved but project appraisal and implementation processes were considerably weak [36].

The central government in Vietnam plays a crucial role in spending decisions taken by each subnational government, hence the level of autonomy over spending assignment is strictly limited. The central government also determines the tax base and tax rate and administers the taxation policy; consequently, the autonomy of subnational governments over revenue assignment is similarly restricted [37]. [37] describes Vietnam as a moderately fiscal decentralized economy. Although the 2013 Constitution does not bring any change for the structure of budget system, there is a difference between rural and urban administration [38]. The expenditure of subnational governments accounts for more than half of total government expenditure. Subnational governments play a key role in public goods and service delivery. The share of subnational governments in total expenditure increased to 55.6% in 2012 from 47.5% in 2003. In comparison with other countries, this share was relatively high [8]. In 2012, 73.9% of total capital expenditure and 56.1% of total recurrent expenditure were given to subnational governments. More spending in education, health care and social security were devoted to subnational governments. Provincial governments had more autonomy for fiscal relationship (expenditure assignments and revenue sharing) with districts and communes within their jurisdiction. The main report from [8] shows that the decentralized revenue/national GDP ratio in Vietnam is relatively large (9 - 10 percent). However, the decentralized revenue in local areas constitutes a relatively small share of local GDP—approximately 7 percent over the period of 2006-2011 [8].

Vietnam needs investment capital and management technology to boost economic growth. FDI is one of good solutions. According to official data of Foreign Investment Agency—Ministry of Planning and Investment (MPI), up to 20/1/2016, the whole country has 127 new projects with a total registered capital of 1.01 billion USD (a 157.9% year-on-year increase) and 56 active projects to increase capital with total additional capital of 323.41 million (an increase of 19.2%). The disbursed capital increases 23.1% over the same period in 2015, reaching approximately 800 million USD [36]. Furthermore, through joining The Trans-Pacific Partnership (TPP), Vietnam will attract more FDI from the other members of TPP in the future.

4. Empirical Model and Research Data

4.1. Empirical Model

The following empirical model is basically relied on the analytical framework developed by [39]. However, it has been modified considerably by incorporating FDI and some other variables. The final empirical equation is as follows

$$Y_{it} = \alpha_0 + \gamma_0 Y_{it-1} + X_{it}\gamma_1' + Z_{it}\gamma_2' + \eta_i + \zeta_{it} \quad (1)$$

where subscript i and t are the province and time index, respectively. Variable Y_{it} is the natural logarithm of real GDP per capita, Y_{it-1} is proxy for initial

level of income, X_{it} is the main variables of interest (revenue/expenditure decentralization FDI, and their interaction term), Z_{it} is a set of control variables (private investment, government investment, labor force, trade openness, infrastructure, and consumer price index); η_i is an unobserved time-invariant, province-specific effect and ζ_{it} is an observation-specific error term. The coefficient γ_0 in Equation (1) will be positive if it is conditional convergent and negative if divergent [40] [41].

For Equation (1), the presence of the lagged dependent variable gives rise to autocorrelation. It can make OLS inconsistency and estimates bias for short time dimension (small T) [42]. Therefore, we decide to use the Arellano-Bond S-GMM [43] first proposed by [44]. The Arellano-Bond estimator was designed for dynamic "small-T large-N" panels [42] [45]. In the standard GMM procedure, it is essential to distinguish *instrumented variables* and *instruments*. Endogenous variables are put in the group of instrumented variables by lags of these variables [42]. Strictly exogenous regressors, as well as extra instruments, are put in the group of instrument variables and included in standard IV procedure. For exogenous variables, level and lags of them are the suitable instruments [42].

The validity of instruments in S-GMM is assessed through Sargan statistic and Arellano-Bond statistic. The Sargan test with null hypothesis H_0: the instrument is strictly exogenous, which means that it does not correlate with errors. Thus, the p-value of Sargan statistic is as big as possible. The Arellano-Bond test is used to detect the autocorrelation of errors in first difference. Thus, the test result of first autocorrelation of errors, AR (1) is ignored while the second autocorrelation of errors, AR (2), is tested on the first difference series of errors to detect the phenomenon of first autocorrelation of errors, AR (1).

To further check the robustness of estimates, we perform two ways. The first one is to use an alternative measure of fiscal decentralization in the empirical model, and the second is to apply two alternative estimators, D-GMM and FE-2SLS. FE-2SLS is proposed by [46] since it performs better if the empirical equation of interest contains endogenous explanatory variables and unobserved heterogeneity.

4.2. Research Data

The dataset is extracted from annual data of General Statistics Office of Vietnam (GSO) to accommodate the panel data of 52 provinces[1] in the period of 2007-2016. Due to data not available, 11[2] out of 63 provinces are eliminated. The

[1]Ha Noi, Vinh Phuc, Bac Ninh, Quang Ninh, Hai Duong, Hai Phong, Hung Yen, Thai Binh, Ha Nam, Nam Dinh, Ninh Binh, Cao Bang, Lao Cai, Yen Bai, Thai Nguyen, Lang Son, Bac Giang, Phu Tho, Son La, Hoa Binh, Thanh Hoa, Nghe An, Ha Tinh, Quang Tri, Thua Thien-Hue, Da Nang, Quang Nam, Quang Ngai, Binh Dinh, Phu Yen, Khanh Hoa, Ninh Thuan, Binh Thuan, Dak Nong, Lam Dong, Binh Phuoc, Tay Ninh, Binh Duong, Dong Nai, Ba Ria-Vung Tau, Ho Chi Minh City, Long An, Tien Giang, Ben Tre, Tra Vinh, Vinh Long, An Giang, Kien Giang, Can Tho, Hau Giang, Bac Lieu, and Ca Mau.

[2]Ha Giang, Bac Kan, Tuyen Quang, Dien Bien, Lai Chau, Quang Tri, Kom Tum, Gia Lai, Dak Lak, Dong Thap, Soc Trang.

definition and calculation of variables are given in Appendix A. The statistical description of all data from GSO is presented in Table 1.

The matrix of correlation coefficients is given in Table 2. All coefficients between independent variables and the dependent variable are statistically significant at least at 5%. Expenditure and revenue decentralization, FDI, trade openness, and infrastructure are positively correlated while government investment, private investment, labor force, and consumer price index are negatively associated with growth rate. In addition, the value of all correlation coefficients between independent variables is lower than 0.8, eliminating the possibility of co-linearity between these variables. However, the correlation coefficient between expenditure decentralization and revenue decentralization is 0.85, thus these two variables are separately used in the empirical equation.

Table 1. Statistical description for whole sample.

Variables	Obs	Mean	Std.Dev.	Min	Max
GDP per capita (GDP)	520	25.329	31.962	7.262	298.69
Expenditure decentralization (EXD)	520	0.989	1.142	0.249	8.534
Revenue decentralization (RED)	520	1.760	3.606	0.079	36.150
Foreign direct investment (FDI)	520	2859.9	6066.0	0.05	41349
Government investment (GINV)	520	6.446	4.488	0.831	27.274
Private investment (PINV)	520	23.111	9.586	0.731	72.830
Labor force (LABO)	520	55.765	4.890	36.621	67.396
Trade openness (OPEN)	520	87.820	117.98	1.052	894.16
Consumer price index (CPI)	520	110.46	6.325	99.2	140
Infrastructure (TELE)	520	1816.3	8401.2	29.6	85215

Source: processing by Stata software.

Table 2. The matrix of correlation coefficients.

	GDP	EXD	RED	FDI	GINV	PINV	LABO	OPEN	CPI	TELE
GDP	1.00									
EXD	0.37***	1.00								
RED	0.50***	0.85***	1.00							
FDI	0.60***	0.41***	0.42***	1.00						
GINV	−0.34***	−0.02	−0.12***	−0.18***	1.00					
PINV	−0.25***	0.07*	−0.01	−0.05	0.20***	1.00				
LABO	−0.09**	−0.17***	−0.22***	0.13***	−0.16***	0.11***	1.00			
OPEN	0.41***	0.24***	0.26***	0.49***	−0.17***	−0.05	0.09**	1.00		
CPI	−0.11***	−0.07	−0.07*	−0.05	0.08*	0.04	−0.04	−0.02	1.00	
TELE	0.54***	0.52***	0.40***	0.51***	−0.21***	0.02	0.13***	0.24***	0.01	1.00

Note: ***, ** and *denote significance at 1%, 5% and 10% respectively. Source: processing by Stata software.

5. Estimated Results and Discussion

5.1. Main Results

The estimated results derived from S-GMM are shown in Table 3. Column 3 is the full model while Column 1 and Column 2 are the reduced models without one/two variable(s), respectively. Removing some variables out of model is applied to check the reliability of the sign and significance of estimated coefficients. The results show that sign, size and significance of estimated coefficients, especially the coefficients of revenue decentralization, expenditure decentralization, FDI, and interaction terms in Table 3 are nearly unchanged.

In the estimation procedure, we detect that trade openness is endogenous, so we use the lags of trade openness as instrumented while the remaining variables (GDP per capita, expenditure decentralization, revenue decentralization, FDI, government investment, private investment, labor force, and consumer price

Table 3. Fiscal decentralization, FDI and economic growth: S-GMM, 2007-2016 dependent variable: GDP per capita.

Independent variables	Revenue decentralization			Expenditure decentralization			Average decentralization		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
GDP per capita (−1)	0.868*** (0.030)	0.878*** (0.031)	0.864*** (0.038)	0.897*** (0.026)	0.905*** (0.030)	0.894*** (0.036)	0.890*** (0.017)	0.896*** (0.029)	0.893*** (0.033)
Fiscal decentralization	10.875*** (3.450)	10.729*** (3.337)	8.699** (4.258)	81.687* (45.055)	95.622** (47.639)	104.225** (49.465)	10.610** (4.965)	10.331** (5.012)	13.065** (6.489)
FDI	0.030*** (0.007)	0.038*** (0.009)	0.031*** (0.011)	0.062** (0.028)	0.087*** (0.031)	0.092*** (0.032)	0.031*** (0.010)	0.031*** (0.011)	0.035*** (0.011)
Fiscal decen. * FDI	−0.010*** (0.003)	−0.010*** (0.003)	−0.008** (0.003)	−0.081* (0.045)	−0.095** (0.047)	−0.103** (0.049)	−0.010** (0.004)	−0.009** (0.004)	0.012** (0.0061)
Govern. Investment	−0.509*** (0.178)	−0.598*** (0.192)	−0.414** (0.202)	−0.979** (0.386)	−1.255*** (0.415)	−1.234*** (0.434)	−0.492*** (0.157)	−0.484*** (0.160)	−0.386** (0.184)
Labor force	0.181 (0.169)	0.242 (0.176)	0.220 (0.211)	−0.467 (0.297)	−0.344 (0.319)	−0.349 (0.325)	0.123 (0.149)	0.117 (0.150)	0.108 (0.193)
Trade openness	−0.029 (0.024)	−0.042 (0.026)	−0.029 (0.031)	−0.003 (0.032)	−0.029 (0.040)	−0.029 (0.038)	−0.034 (0.027)	−0.037 (0.030)	−0.039 (0.030)
Consumer price index	0.039 (0.023)	0.037 (0.023)	0.044 (0.027)	0.022 (0.026)	0.010 (0.029)	0.016 (0.030)	0.033 (0.021)	0.033 (0.021)	0.043 (0.027)
Infrastructure		−0.013 (0.010)	−0.004 (0.009)		−0.029 (0.018)	−0.031 (0.018)		−0.002 (0.009)	−0.005 (0.007)
Private investment			−0.298 (0.241)			−0.189 (0.229)			−0.203 (0.245)
Instrument	10	10	11	11	11	12	11	11	12
Province/observation	52/416	52/416	52/416	52/364	52/364	52/364	52/468	52/468	52/416
Sargan test (p-value)	0.597	0.392	0.691	0.264	0.760	0.629	0.644	0.442	0.234
Hansen test (p-value)	0.291	0.328	0.744	0.231	0.880	0.814	0.684	0.500	0.224
AR (2) test (p-value)	0.448	0.510	0.284	0.679	0.814	0.750	0.900	0.918	0.410

Note: ***, ** and *denote significance at 1%, 5% and 10% respectively; Source: processing by Stata software.

index, and infrastructure) as instruments. In order to assess the validity of these instruments and the serial auto-correlation of residuals, we performs the Sargan and Hansen tests (test of over-identifying restrictions with the null hypothesis "the instruments as a group are exogenous") as well as the Arellano-Bond test for serial correlation AR (2), which is applied to the difference residuals to purge the unobserved and perfectly auto-correlated. The results of these tests show that all null hypothesizes are accepted. Thus, instruments are appropriate and there is no phenomenon of serial correlation for residuals in second differences.

In short, the estimated results in **Table 3** show that:

1) The coefficient of first lag of real GDP per capita is significantly positive, confirming the conditional convergence of per capita income among provinces in the long term [40] [41].

2) The coefficients of revenue decentralization, expenditure decentralization and FDI are significantly positive, but the coefficients of their interaction terms are significantly negative.

3) The coefficient of public investment is significantly negative.

The positive effect of revenue decentralization is in agreement with some previous papers [9] [20] [25] while that of expenditure decentralization is similar to [23]. These results re-confirm the prior findings in [22] and [24] that revenue decentralization and expenditure decentralization both significantly foster economic growth. In line with previous literature [47] [48] [49] [50], the findings in this study show that FDI significantly boosts economic growth in Vietnam.

Unlike the effects of revenue decentralization, expenditure decentralization and FDI, their interaction terms have significantly negative impacts on economic growth. Fiscal decentralization promotes more FDI inflows into local regions [6] [7] [51]. In the same time, fiscal decentralization may trigger a race to the top among local governments to attract FDI inflows, which leads to an oversupply of tax incentives for foreign investors [16]. Therefore, in Vietnam more fiscal decentralization may lead to more power to local governments in attracting FDI inflows. In order to attract more FDI inflows for local economic development, it does not exclude the possibility that local governments in Vietnam lower the environmental standards and give tax incentives for foreign investors. The extra increase in FDI inflows from fiscal decentralization may set up "the problems of FDI enterprises in Vietnam" such as activities of transfer pricing to evade tax, activities causing environmental pollution [50], which can have a detrimental influence on local economic growth.

Contrary to some previous studies [52] [53] [54] [55], in this study public investment has a negative impact on economic growth. Poor quality of policies and institutions may be a main cause. The design, formulation, and implementation of policies cannot take account of crowding-out effect of public sector on private sector as well as can not strictly monitor and supervise the efficiency and rationality of public investment projects, so public capital spending in Vietnam impedes economic growth.

5.2. Robustness Check

5.2.1. Alternative Measure

Following [27], we use the average of revenue decentralization and expenditure decentralization as an alternative measure of fiscal decentralization (average decentralization). The fiscal decentralization-growth relationship changes when this alternative measure is used. We re-estimate Equation (1) with average decentralization. The corresponding results shown in the last 3 columns of **Table 3** confirm that the estimates with average decentralization are obviously similar to the estimates with revenue decentralization and expenditure decentralization.

5.2.2. Alternative Estimators

For the robustness of the estimation, D-GMM and FE-2SLS are applied to re-estimate Equation (1). Similar to the estimation procedure of S-GMM, we detect that trade openness is endogenous in both D-GMM and FE-2SLS. The estimated results are reported in **Table 4**. The core variables (GDP per capita (−1)),

Table 4. Fiscal decentralization, FDI and economic growth: D-GMM & FE-2SLS, 2007-2016 dependent variable: GDP per capita.

Independent variables	Revenue decentralization		Expenditure decentralization		Average decentralization	
	D-GMM	FE-2SLS	D-GMM	FE-2SLS	D-GMM	FE-2SLS
GDP per capita (−1)	0.395*** (0.185)	0.713*** (0.027)	0.040*** (0.088)	0.737*** (0.026)	0.093*** (0.183)	0.710*** (0.027)
Fiscal decentralization	44.069*** (11.028)	7.604*** (2.261)	114.25*** (33.919)	4.312 (5.220)	138.85** (54.52)	11.994*** (3.715)
FDI	0.074* (0. 041)	0.014*** (0.004)	0.097* (0.055)	0.012** (0.005)	0.143** (0.057)	0.016*** (0.004)
Fiscal decen. * FDI	−0.040*** (0.010)	−0.006*** (0.002)	−0.115*** (0.033)	−0.005 (0.004)	−0.133** (0.051)	−0.009*** (0.003)
Govern. investment	−6.602*** (2.221)	−0.565*** (0.200)	−7.490*** (2.410)	−0.530** (0.208)	−8.582*** (2.868)	−0.617*** (0.201)
Labor force	1.460** (0.643)	0.647*** (0.185)	8.057*** (2.530)	0.718*** (0.187)	8.745*** (3.208)	0.621*** (0.186)
Trade openness	−0.223 (0.136)	−0.0004 (0.005)	−0.142 (0.091)	−0.001 (0.005)	−0.085 (0.107)	−0.0003 (0.005)
Consumer price index	−0.086 (0.178)	−0.125 (0.069)	0.146 (0.355)	−0.146 (0.071)	−0.034 (0.190)	−0.111 (0.070)
Infrastructure	0.009 (0.026)	0.016** (0.006)	−0.050 (0.045)	0.011* (0.006)	−0.038 (0.031)	0.015** (0.006)
Private investment	−0.959 (0.663)	−0.271*** (0.072)	0.083 (1.465)	−0.283*** (0.073)	−1.007 (0.743)	−0.277*** (0.072)
Instrument	18	--	21	--	16	--
Province/observation	52/312	52/468	52/364	52/468	52/364	52/468
Sargan test (p-value)	0.315	0.1530	0.830	0.1447	0.610	0.1583
Hansen test (p-value)	0.152	--	0.470	--	0.537	--
AR (2) test (p-value)	0.277	--	0.415	--	0.400	--

Note: ***, ** and *denote significance at 1%, 5% and 10% respectively; Source: processing by Stata software.

revenue decentralization, expenditure revenue, average decentralization, FDI, interaction terms, and government investment) remain highly significant except that expenditure decentralization and interaction term in FE-2SLS case are no longer significant. Consistent with our S-GMM estimates, we find revenue decentralization, expenditure decentralization, average decentralization, and FDI promote economic growth, but their interaction terms reduce it. These findings are approved by battery of diagnostic tests shown at the bottom of Table 4, Sargan, Hansen, and Arellano-Bond AR (2) tests, indicating that our D-GMM estimates are largely reliable. Meanwhile, the reliability of FE-2SLS estimates is confirmed by Sargan tests.

6. Concluding Marks and Policy Implications

The study applied the two-step GMM Arellano-Bond and FE-2SLS estimators to analyze the effects of fiscal decentralization, FDI and their interaction term on economic growth for a balanced panel data of 52 provinces in Vietnam in the period of 2007-2016. The estimated results indicate that fiscal decentralization (revenue decentralization and expenditure decentralization) and FDI boost economic growth, but their interaction terms impede growth rate. In addition, public investment is a significant determinant of economic growth.

From the policy perspective, the findings suggest some important policy implications. Fiscal decentralization may promote economic growth but also bring more power to local governments in attracting FDI inflows. In its turn, an increase in FDI inflows from fiscal decentralization can be detrimental to economic growth. Therefore, central governments in developing countries should be careful and vigilant in reforming and formulating policies relating to fiscal decentralization to ensure that the attraction of FDI inflows in local regions will be effectively monitored and supervised so that these FDI inflows will have positive influences on local economic activities.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix A. Definition and Calculation of Variables

Variable	Definition	Form in Use
GDP	Real per capita gross domestic product of a province, proxy for economic growth of a province.	log
RED	Revenue decentralization, a share of provincial revenue over the sum of total revenues.	%
EXD	Expenditure decentralization, a share of provincial expenditure over the sum of total expenditures.	%
FDI	Inward foreign direct investment accumulation capital yearly.	%GDP
GINV	Public investment capital in a province.	%GDP
PINV	Private investment capital in a province.	%GDP
LABO	Labor force, a ratio between working age people (15 - 64) and total population of a province.	%
OPEN	Trade openness, a ratio between sum of exports and imports and GDP.	%GDP
CPI	Consumer price index, proxy for inflation of a province.	log
TELE	Infrastructure, the number of telephone lines per 100 people.	log

Source: General Statistics Office of Vietnam (GSO).