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Causal Linkage among Tax Revenue, Provincial Competitiveness and Economic Growth at the Provincial Level: Evidence from Vietnam

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Abstract: To investigate the role of governance and economic growth at the provincial level, this study conducted the Granger causality test for a panel data of 60 provinces in Vietnam from 2006 to 2014 and found that there is an existence of bi-directional causality linkage between provincial competitiveness (hereafter we call "governance") and economic growth. Furthermore, running a two-step system generalized method of moments estimation (SGMM), this work shows the general provincial competitiveness index and tax revenue have a significantly positive impact on economic growth at a 1% level in three models. Notably, the effects of components of tax revenue and sub-provincial competitiveness on growth are diverse. In addition, student rate, and poverty rate relate negatively to economic growth. These findings imply that policymakers should focus on the increasing provincial competitiveness index as well as setting up an effective tax collection system for rising growth. Moreover, local governors are better providing variety of career options to reduce both ratios of student and poverty for sustainable developing economies in their areas.

Keywords: Governance, tax revenue, provincial competitiveness index, economic growth, Granger causality test, SGMM.

1. Introduction

Vietnam is one of the world's developing countries. At the present time, the provincial governments in Vietnam are improving their policies to attract FDI flow. How does the authorities' capability at the provincial level affect the economy in Vietnamese provinces? Furthermore, Jenkins (2004) indicated that Vietnam has to reduce poverty in rural areas for development [1]. In addition, Acemoglu and Robinson (2012) argue that reducing the poverty rate will promote the rising of the economy [2]. Much less attention has been paid to assess the effect of the provincial competitiveness index on growth. Furthermore, in the past two decades, there has been little in the literature to shed light on the capability of provincial governance in an emerging market such as that of Vietnam, and there is a big question: "How does governance correlate to economic growth?" This study has been conducted with the research title "Causal linkage among tax revenue, provincial competitiveness and economic growth at the provincial level: Evidence from Vietnam" to answer this question.

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The research aims to: (1) Investigate the relationship between governance and economic growth for a data set of 60 provinces in Vietnam in the period 2006-2014; (2) Measure the effect of the level of governance on economic growth in the same period.

2. Literature review and analytical framework

There is little literature on the growth effect of local government's capability on issuing policies or standards. In a case study conducted in Korea, Taiwan, and Japan, Amsden (1989) postulated that economic growth relies on the way of imposing policies, standards, and taxation by the local authorities [3]. Furthemore, with a study that applied the game theory about the authorities in Colombia, Acemoglu, García-Jimeno, and Robinson (2015) argued that the competence to obey government law, the capability to provide public goods or services as well as the competence to design the regulatory standards for activities of economy, can demonstrate the capability of the authorities [4]. In a province whose authorities have a weakness in these competences, there will be a negative relationship to the economic outcome. Dincecco and Katz (2012) investigated the panel data of 11 countries in Europe at a provincial level and they argued that the authorities who are able to extract resources effectively can gain a higher economic outcome [5]. In the long term, the capabilities of government at a provincial level are key success factors in the raising up of the economy. Phan (2013) conducted an empirical research on data at a provincial level in Vietnam from 2006 to 2010 and found that the authorities who focus on improving the below sub-competitiveness index such as: land right access, minimal informal charges, and proactive leadership should affect positively the business of firms and this will indirectly increase economic growth [6]. However, his study did not consider the problems of the effect from the dependent variable of lag on present economic activities. William (2013) ran an empirical research for an American dataset and found that the big cities provide firms with huge business opportunities and also charge large payments [7]. Knutsen (2013) performed OLS, PSCE, and FE models on a panel data of Sub-Sahara countries in Africa from 1984 to 2004, and implied that the growth effect of democracy relies on the capability of authorities [8]. Consequently, in areas where government has a weak administration, but has strong democracy, it still positively relates to growth. Majid, Mohamed, Haron, Omar, and Jomitin (2014) conducted a survey on misappropriation in two city councils in Malaysia and indicated that the local authorities have a key role in the implementation of national development plans and policies, so that they take a major part in their area's economic growth [9].

Moreover, tax revenue and governance play a crucial role in an economy. The amount of tax revenue contributes a key element for creating the national budget [10]. A number of studies reported in the literature point out the complicated impact of tax revenue and governance on economic growth [10-15] Furthemore, that developing countries face the corruption problem is a major cause of tax loss [16-18]. In addition, authorities' capability is a key element for developing economies in Asean countries [3, 4, 19, 20]. Our study here suggests that the capability of governance in collecting tax revenue should affect economic outcomes in each province. Nevertheless, there are few studies which examine the linkages between governance capability and economic growth at the Vietnamese provincial level. Furthermore, this study fixes the limitation of endogenous issues by applying two-step SGMM for a dynamic panel data.

The previous literature provided the analytical framework base for the argument below: First, this work applies a causality test based on Granger's (1969) rule and follows

Hurlin (2004) and Yousefi (2015) to test the null hypothesis:

$H_0: \beta_i^{(k)} = \beta^{(k)} \; \forall_{i=1,..N}, \; \forall_{k=1,..K}$ and $H_1: \beta_i^{(k)} \neq \beta_j^{(k)}, k \in \{1, ...p\}, \exists (i,j) \in \{1, ...N\}$ [21-23]. Second, the logarithm of gross domestic product per capita (GDP per capita) represents economic growth that has been used in a large number of studies in the literature (Barro, 1991, Cooray 2009, and Acemoglu 2010) [11, 12, 14]. In addition, there is much less empirical research about the relationship between GDP per capita and a provincial competitiveness index. This work learns from studies by Anh, Thai and Thang (2007), and Phan (2013) to measure the impact of provincial competitiveness indicies [6, 24]. Third, Cooray (2009) expanded the production function based on the argument of Mankiw, Romer, and Weil (1992): $Y_t = A_t k_t^{\alpha} h_t^{\beta} \left[(g]_t e^{\mu\theta}\right)^{\gamma}$ (1), where Y denotes economic growth, A stands for technology, K is physical capital; h represents human capita, g is a government quality and θ is a level of governance quality that measures the provincial competitiveness indices [14, 25]. The paper follows the argument of Cooray (2009) and uses the student rate representing human capital that is able to be applied to new technology in an economy [14].

3. Research methodology and data

3.1. Research data

This study extracts the data of 60 provinces in Vietnam in the period 2006-2014 from the GSO website for these variables: tax revenue, structure of tax revenue, real GDP per capita and student rate. (First, we collected the number of student from college and university through the GSO website, then divided it by the total population in each province). In addition, the set of provincial competitiveness indices was provided by the Vietnam Chamber of Commerce and Industry (VCCI) with the guidance of the United States Agency for International development (USAID/Vietnam). The VCCI conducts an annual survey of private firms and FDI firms in each province. They then do a statistical analysis to gain the provincial competitiveness index overall and specific indicators. In terms of the number of provinces, although consisting of officially 64 provinces by 2014, there were some newly-merged or newly-split provinces, thus it was impossible to attain a complete set of data about those provinces. Accordingly, this research could merely work on data of 60 provinces (see Appendix A1 - List of research provinces in Vietnam).

Furthermore, the period 2006-2014 observed the United States real estate bubble burst which influenced tremendously those countries importing and exporting goods from and to America. Vietnam was also not an exception, suffering from disadvantageous influences.

Table 1. The stastical description of research variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Rgdpc (Real GDP per capita) (million VND)	540	27.182	37.589	3.76	393.93
Taxrev (Total tax revenue) (billion VND)	540	2941.204	103.944	2706.522	3327.63
FDITaxrev (Tax revenue from FDI firms) (billion VND)	528	1120.86	3600.349	0.01	34326
PINTaxrev (Personal income tax collection) (billion VND)	539	2472.969	204.23	1797.44	3075.12
ENVTaxrev (tax revenue for protection of environment (billion VND)	522	2500.735	107.797	2163.96	2864.26

Variable	Obs	Mean	Std. Dev.	Min	Max
ASSTaxrev (Tax revenue from assets) (billion VND)	524	2635.923	122.999	1970.16	3030.79
Stdrate (Student rate) (%)	540	0.040	0.127	0.000	1.172
Povrate (poverty rate) (%)	540	15.654	10.332	0.01	58.2
PVCi (General provincial competitiveness index with weighted) (Index)	540	57.000	6.078	36.759	77.197
Provincial competitiveness indexes (index) (PCI_1-PCI_{10}) (Sub-institutions)					
PCI_1	539	7.950	0.894	4.955	9.598
PCI_2	540	6.328	0.909	3.037	8.842
PCI_3	540	5.840	.844	2.457	8.854
PCI_4	540	6.330	0.953	3.243	8.943
PCI_5	540	6.004	1.129	2.638	8.929
PCI_6	540	5.555	1.494	1.753	8.858
PCI_7	540	5.055	1.3796	1.387	9.389
PCI_8	540	4.801	1.345	1.397	9.620
PCI_9	540	5.126	0.975	1.921	9.597
PCI_{10}	540	4.846	1.196	1.996	7.909

Table 1 indicates that Ba Ria - Vung Tau has a highest GDP per capita, while Ha Giang stood at the bottom of the column. On the one hand, Binh Duong gains the highest general provincial competitiveness index with 77.197 points, on the other hand the lowest point is only 36.759 (Lai Chau). In term of tax revenue, Ho Chi Minh City topped the table whilst Tuyen Quang stands at the end of the table. There is a big gap in income per head and governance quality between rich and poor provinces in Vietnam.

3.2. Research methodology

To get the first objective, the research examines the relationship among three variables such as: tax revenue, provincial competitiveness index and GDP per capita, this research follows the Hurlin (2004) to employ the Granger causality test by using the below equations [22]:

$$PVCi_{it} = \alpha_0 + \sum_{k=1}^{K} \gamma_1^{(k)} PVCi_{it-1} + \sum_{i=1}^{K} \beta_i^k Rgdpc_{it} + \epsilon_i + \varepsilon_{it} \quad (1)$$

$$Rgdpc_{it} = \alpha_0 + \sum_{k=1}^{K} \gamma_1^{(k)} Rgdpc_{it-1} + \sum_{k=1}^{K} \beta_i^k PVCi_{it} + \epsilon_i + \varepsilon_{it} \quad (2)$$

$$Taxrev_{it} = \alpha_0 + \sum_{k=1}^{K} \gamma_1^{(k)} Taxrev_{it-1} + \sum_{k=1}^{K} \beta_i Rgdpc_{it} + \epsilon_i + \varepsilon_{it} \quad (3)$$

In which:

$PVCi_{it}$ denotes the general competitiveness weighted in province i (i runs from 1 to N) at time t (t runs from 1 to T).

$Rgdp_{it}$: stands for GDP per capita of province i at time t, and $Taxrev_{it}$: total tax revenue of province i at time t.

$\epsilon_i, and\ \varepsilon_{it}$ are unobserved errors of specific characteristic in each provinces and observed error terms of the models.

First, ε_{it} can re-write: $\varepsilon_{it} = V_{it} + U_{it}$, transformed lagged dependent variable on the right hand side, which correlates with transformed error term ($U_{it} - \bar{U}_i$), this issue represents the auto-correlation phenomenon. In

addition, $Rgdpc_{it}$ also correlates with error term U_{it-1} [26]. Second, on the right hand side of the equations appears the dependent variable with first lag indicating the endogenous phenomenon too. Arrellano and Bond (1991), Baltagi (2005), d'Agostino, Dunne, and Pieroni (2012), and Sasaki (2015) indicated that a dynamic panel data technique can help the endogenous growth model be more consistent than the fixed effect model [26-29]. Furthermore, Barro (1990), Acemoglu, Johnson, and Robinson (2001) revealed that endogenous variables always appear in growth models that make OLS regression biased, and using an exogenous instrument could help regressors fix this issue [30, 31]. In addition, Windmeijer (2005) noted that the two-step GMM procedure obtains consistent and efficient parameters of estimation [32]. Due to endogenous problem of dynamic panel data as well as unbalanced data with "large N and small T", this study utilized a two-step system generalised method of moments estimation (SGMM) for a dynamic unbalanced panel data of 60 provinces in 9 years from 2006 to 2014. This method can get a smaller bias than the fixed effect method and it is a suitable test following Hansen (1982), Hsiao (2003), Baltagi (2005) and Wooldridge (2010) [26, 33, 34, 35].

To get the second research objective, this research develops the following equations:

$$\Delta Rgdp_{it} = \alpha_0 + \alpha_1 Rgdpc_{it-1} + \alpha_2 Taxrev_{it} + \alpha_3 PVCi_{it} + X_{it}\alpha_4' + \epsilon_i + \varepsilon_{it} \quad (4.1)$$

$$\Delta Rgdp_{it} = \alpha_0 + \alpha_1 Rgdpc_{it-1} + \alpha_2 Taxrev_{it} + \alpha_3 PVCi_{it} + \alpha_4 TaxrevStruct_{jit} + X_{it}\alpha_5' + \epsilon_i + \varepsilon_{it} \quad (4.2)$$

$$\Delta Rgdp_{it} = \alpha_0 + \alpha_1 Rgdpc_{it-1} + \alpha_2 Taxrev_{it} + \alpha_3 PVCi_{it} + \alpha_4 PCI_{jit} + X_{it}\alpha_5' + \epsilon_i + \varepsilon_{it} \quad (4.3)$$

$$\Delta Rgdp_{it} = \alpha_0 + \alpha_1 Rgdpc_{it-1} + \alpha_2 Taxrev_{it} + \alpha_3 DumPVCi_{it} + \alpha_4 TaxrevStruct_{jit} + X_{it}\alpha_5' + \epsilon_i + \varepsilon_{it} \quad (4.4)$$

Where:

$TaxrevStruct_{iit}$ denotes the structure of total tax revenue (see Table A2: List of structure of tax revenue); $PVCi_{iit}$ are components of provincial competitiveness index that starts at PCI_{1it} and finishes at PCI_{10it} (see Table A3: List of components of provincial competitiveness index).

X_{it} represents the control vectors such as: the student ratio and poverty rate.

$DumPVCi_{it}$ includes dummy variables (high provincial competitiveness index, which obtains the weighted provincial competitiveness index being higher than 50 points in general and the remaining index that is under 50 points is a dummy variable of low provincial competitiveness index).

These equations provide the base for analysing the growth effect of tax revenue, the general provincial competitiveness index and its subsection. To ensure the robustness of these models, this work applies the Arrelanno Bond test (AR2) to determine the rejection of null hypotheses saying auto-correlation exists in the model and the Hansen test to collect the evidence of rejecting endogenous phenomenon.

4. Empirical results

4.1. The Granger causality test

Before running the Granger (1969) test, this work performs the unit root test with Dickey and Fuller (1979) and Phillips and Perron (1988) verification and collects the results as in Table 2 [21, 36, 37].

Table 2. Unit root test results

Lags	Variables	Dickey-Fuller (F-values)				Phillip & Perron (F-value)			
		Non-trend		Trend		Non-trend		Trend	
1	Rgdpc	168.716	0.002***	158.229	0.011**	267.131	0.000***	1227.550	0.000***
2	Rgdpc	63.788	1.000	347.018	0.000***	265.744	0.000***	1192.703	0.000***
1	Taxrev	105.591	0.823	189.751	0.000***	539.200	0.000***	2022.335	0.000***
2	Taxrev	309.899	0.000***	436.632	0.000***	538.793	0.000***	1969.797	0.000***
1	PVCi	146.923	0.048**	182.845	0.000***	364.813	0.000***	426.360	0.000***
2	PVCi	1048.619	0.000***	664.582	0.000***	414.225	0.000***	594.155	0.000***

***, ** and * stand for significance at 1%, 5% and 10% respectively.

Fortunately, all variables are stationary at lag 1 or 2, so that this paper collects the value of k = 1 and 2 for computation later. To investigate the causal linkage among these variables, this study continues doing pair-wise Granger regression and gets the following findings (see Table 3).

Table 3 shows the P-value always smaller than significance at 1%, so that we can reject the null hypotheses. The finding confirms the existence of bi-direction of causal linkage among tax revenue, the provincial competitiveness index, and economic growth. The result implies that the local policy makers should be careful during the time of planning policy as well as conducting an effective taxation system.

To measure the degree of growth effect of governance, this study performs a two-step system generalized method of moments estimation for a dynamic panel data of 60 provinces and finds out the impact results as below (see Table 4). Nevertheless, to ensure the robustness of estimation, this study also conducts the linear correlation test with the null hypothesis of that being between the dependent variable and control variables in a non-linear relationship. The results show the evidence to reject the null hypothesis and indicate that estimation results are robust (see Appendix 2).

Table 3. The pair wise Granger regression results

H_0: Taxrev does not Granger cause Rgdpc	**Obs.**	**F - Stat**	**Prob.**	H_0: Rgdpc does not Granger cause Taxrev	**Obs.**	**F - Stat**	**Prob.**
Taxrev→Rgdpc	480	0.298	0.000***	***Rgdpc → Taxrev***	480	0.483	0.000***
H_0: PVCi does not Granger cause Rgdpc	**Obs.**	**F - Stat**	**Prob.**	H_0: Rgdpc does not Granger cause PVCi	**Obs.**	**F - Stat**	**Prob.**
PVCi→Rgdpc	480	1.801	0.000***	***Rgdpc → PVCi***	480	0.032	0.000***

***, ** and * stand for significance at 1%, 5% and 10% respectively.

Table 4. GDP per capita effect of tax revenue and provincial competitiveness

	(1)	(2)	(3)	(4)	(5)
	Rgdpc	**Rgdpc**	**Rgdpc**	**Rgdpc**	**Rgdpc**
L.Rgdpc(-1)	-0.916***	-0.909***	-0.952***	-0.927***	-0.927***
	(-202.94)	(-115.39)	(-82.66)	(-98.22)	(-98.23)
Taxrev	0.250***	0.087***	0.364***	0.088***	0.086***
	(29.94)	(4.07)	(11.18)	(3.75)	(3.65)
PVCi	1.255***	1.187***	2.289***		
	(14.94)	(11.24)	(5.38)		
Stdrate	-0.041***	-0.10***	-0.049**	-0.090***	-0.090***
	(-7.58)	(-9.93)	(-2.87)	(-11.37)	(-11.35)
Povrate	-2.136***	-1.404***	-2.068***	-1.466***	-1.462***
	(-20.45)	(-12.30)	(-10.94)	(-11.44)	(-11.40)
FDITaxrev		0.007***		0.008***	0.008***
		(12.77)		(11.15)	(11.22)
ENVTaxrev		0.088***		0.081***	0.081***
		(5.62)		(6.12)	(6.10)
ASSTaxrev		0.068***		0.059***	0.060***
		(4.89)		(4.55)	(4.60)
PINTaxrev		0.000		0.0008***	0.0008***
		(1.29)		(4.21)	(4.23)
PCI_1			-2.510***		
			(-3.58)		
PCI_2			5.476***		
			(3.78)		
PCI_3			-3.093		
			(-0.92)		
PCI_4			-2.291		
			(-1.35)		
PCI_5			-2.102*		
			(-2.86)		
PCI_6			-2.363***		
			(-4.48)		
PCI_7			-1.275		
			(-0.79)		
PCI_8			-0.416		
			(-0.33)		
PCI_9			-6.358***		
			(-4.87)		
PCI_{10}			-3.193***		
			(-7.63)		
HigPVCi				26.71***	
				(8.25)	
LowPVCi					-26.66***
					(-8.23)
year	11.27***	11.52***	9.640***	11.01***	11.06***
	(45.66)	(26.69)	(11.60)	(31.50)	(31.56)
_cons	-21924.4***	-22407.4***	-18885.1***	-21279.5***	-21336.0***
	(-46.24)	(-27.38)	(-11.77)	(-32.45)	(-32.45)
N. of obs.	479	454	471	454	454
N. of instruments	53	53	52	53	53
N. of groups	60	60	60	60	60
AR(2) test	0.623	0.206	0.818	0.342	0.342
Hansen test	0.138	0.104	0.306	0.122	0.122

z statistics in parentheses * $p < 0.01$, ** $p < 0.05$, *** $p < 0.001$

Table 4 shows that tax revenue and the general provincial competitiveness weighted index always have a significantly positive impact on economic growth at 1%. However, components of tax revenue affect growth diversely. The amount of tax collection from FDI firms, payment fees for purchasing oil for environment protection, and tax revenue of assets have a significantly positive impact on growth, while personal income tax revenue does not in model 2 but it positively relates to growth when dummy variables appear only. The wealthiest point is when the high provincial competitiveness index (the PVCi is higher than 50 points (the mean point of index)) has a significantly positive impact on the growth of the economy, while a low index (the PVCi is under 50 points (the mean point of index)) has an opposite effect. Second, the impact of sub-provincial competitiveness indicators on growth is complicated. The "easy access to land" affects economic growth positively. This is similar to the result of Phan (2013), whilst others negatively relate to growth [6]. For instance, a low entry cost for starting up business, an unfair competitive environment (Policy bias), sound labor training policy, and effective legal procedures for dispute resolution increasing will reduce economic growth. The findings suggest to provincial policy makers the important role of improving the general provincial competitiveness index as well as the role of collecting tax effectively. In addition, the student rate and poverty rate always are harmful for growth implying that local government should plan appropriate policies to reduce the poverty rate and to develop variety of career chances, so that high school students have a greater option for their career development instead of trying to apply to universities or colleges.

5. Conclusion and implication

Running the Granger causality test for a panel data of 60 provinces in Vietnam from 2006-2014, we found that between provincial governance and economic growth a bi-directional causality linkage exists. The result indicates that governance plays a crucial role in raising economic outcomes at the provincial level.

Second, using a two-step system generalised method of moments estimation for a dynamic panel data, this research emphasises the role of tax revenue and a general provincial competitiveness index in promoting economic growth, especially the diverse effects of components of tax revenue and sub-provincial competitiveness indicators on growth. The results suggest to policy makers that in order to develop their economies, they should focus on setting an appropriate taxation system in their areas.

Furthermore, the paper documents that the student rate and the poverty rate are two harmful variables for social development. The findings denote that provincial governments should focus on promoting career chances as well as reducing the poverty rate in order to raise the economy in their areas. Finally, the convergence appearing in all models indicating that the poor provinces should tend to grow faster than the rich provinces to catch up to the rich provinces in the future [12, 38].

This study contributes to a narrow literature on the linkage among tax revenue, provincial competitiveness, and economic growth at a provincial level. The report highlights the role of governance at the provincial level in setting up an effective taxation system as well as the promotion of a fair competitive environment in their area.

References

[1] Jenkins, R., "Vietnam in the global economy: Trade, employment and poverty", Journal of International Development, 16 (2004) 1, 13-28. https://doi.org/10.1002/jid.1060.

[2] Acemoglu, D., & Robinson, J. A., Why nations fail: the origins of power, prosperity, and poverty. Crown Publishing Group, New York: Crown Publishing Group, 2012.

[3] Amsden, A. H., Asian's next giant South Korea and late industrialization, Oxford: Oxford University Press, 1989.
[4] Acemoglu, D., García-Jimeno, C., & Robinson, J., "State Capacity and Economic Development: A Network Approach", American Economic Review, 105 (2015) 8, 2364-2409. https://doi.org/10.1257/aer.20140044
[5] Dincecco, M., & Katz, G., "State capacity and long-run performance" (BEHL working paper No. WP2013-01). APSA 2012 Annual Meeting Paper. BEHL, 2012. https://doi.org/10.2139/ssrn.2044578
[6] Phan, H. V., "Effects of changes in provincial governance on the economic performance of the business sector: An empirical study using Vietnam' s Provincial Competitiveness Index", WASEDA Business & Economic Studies 2013 No. 49, Hanoi.
[7] William, R., "Are big city businesses more profitable than other firms?", Managerial Finance, 39 (2013) 11, 1100-1119.
[8] Knutsen, C. H., "Democracy, State Capacity, and Economic Growth", World Development, 43 (2013), 1-18. https://doi.org/10.1016/j.worlddev.2012.10.014.
[9] Majid, R. A., Mohamed, N., Haron, R., Omar, N. B., & Jomitin, B., "Misappropriation of Assets in Local Authorities: A Challenge to Good Governance", Procedia - Social and Behavioral Sciences, 164 (August 2014), 345-350.
[10] Hakim, T. A., & Bujang, I., "The impact and consequences of tax revenues' components on economic indicators: Evidence from panel group data", International Trade from Economic and Policy Perspective 63 (2012), 82-95. https://doi.org/dx.doi.org/10.5772/48415
[11] Acemoglu, D., "Institutions, factor prices, and taxation: Virtues of strong states?", American Economic Review, 100 (2010) 2, 115-119. https://doi.org/10.1257/aer.100.2.115.
[12] Barro, R. J., "Economic growth in a cross section of countries", Quarterly Journal of Economics, 106 (1991) 2, 407-443. https://doi.org/10.2307/2937943.
[13] Barro, R., & Sala-i-Martin, X., "Public finance in models of economic growth", Review of Economic Studies, 59 (1992) 4, 645-661.
[14] Cooray, A., "Government Expenditure, Governance and Economic Growth", Comparative Economic Studies, 51 (2009) 3, 401-418. https://doi.org/10.1057/ces.2009.7.
[15] Helms, J. L., "The effect of state and local taxes on economic development: A meta-analysis", Review of Economics and Statistics, 67 (1985) 4, 574-582. https://doi.org/10.2307/1060685.
[16] Alm, J., Jackson, B., & McKee, M., "Institutional uncertainty and taxpayer compliance", American Economic Review, 82 (1992) 4, 1018-1026. https://doi.org/10.2307/2117358.
[17] Bird, R. M., & Martinez-Vazquez, J., "Tax effort in developing countries and high income countries: The impact of corruption, voice and accountability", Economic Analysis and Policy, 38 (2008) 1, 55-71. https://doi.org/10.1016/S0313-5926(08)50006-3.
[18] Krugman, P. R., Obstfeld, M., & Melitz, M. J., International economics theory & policy, Ninth, Boston: Pearson, 2012. https://doi.org/10987654321.
[19] Evans, P., Embedded Autonomy State and industrial transformation, Princeton, New Jersey: Princeton University Press, 1995. https://doi.org/10987654321.
[20] Johnson, C., Miti and the Japanese Miracle The Growth of Industrial Policy, California: Stanford University Press, 1982.
[21] Granger, C. W. J., "Investigating causal relations by econometric models and cross-spectral methods", Econometrica, 37 (1969) 3, 424-438.
[22] Hurlin, C., "Testing Granger Causality in Heterogenous Panel Data Models with Fixed Coefficients", LEO Documents de Recherche, 10 (January 2004). http://www.univ-orleans.fr/leo
[23] Yousefi, A., "A Panel Granger causality test of investment in ICT capital and economic growth: Evidence from developed and developing countries", Economics World, 3 (2015) 5-6, 109-127. https://doi.org/10.17265/2328-7144/2015.0506.001.
[24] Anh, V. T. T., Thai, L. V., & Thang, V. T., Provincial Extralegal Investment Incentives in the Context of Decentralisation in Viet Nam: Mutually Beneficial or a Race to the Bottom? (UNDP-Vietnam Discussion Papers on Topics Relating to Decentralisation and Economic Performance No. 5088790–1), Forum American Bar Association, Hanoi, 2007.
[25] Mankiw, N. G., Romer, D., & Weil, D. N., "A contribution to the empirics of economic growth", Quarterly Journal of Economics, May 1992, 407-437.
[26] Baltagi, B. H., Econometric analysis of panel data, West Sussex PO19 8SQ, England: JohnWiley & Sons Ltd., 2005.
[27] Arellano, M., & Bond, S., "Some tests of specification for panel carlo application to data: Evidence and an employment equations", Review of Economic Studies, 58 (1991) 2, 277-297.
[28] d'Agostino, G., Dunne, J. P., & Pieroni, L., "Corruption, military spending and growth", Defence and Peace Economics, 23 (2012) 6, 591-604.
[29] Sasaki, Y., "Heterogeneity and selection in dynamic panel data", Journal of Econometrics,

188 (2015), 236-249. https://doi.org/10.1016/j.jeconom.2015.05.002.
[30] Barro, R. J., "Government spending in a simple model of endogenous growth", Journal of Political Economy, 98 (1990) 5, S130-S125. https://doi.org/10.1086/261726.
[31] Acemoglu, D., Johnson, S., Robinson, J. A., "Colonial origins of comparative development: An empirical investigation", American Economic Review 91 (2001), 1369-1401.
[32] Windmeijer, F., "A finite sample correction for the variance of linear e cient two-step GMM estimators", Journal of Econometrics, 126 (2005), 25-51. https://doi.org/10.1016/j.jeconom.2004.02.005.
[33] Hansen, L. P., "Large sample properties of generalised method of moments estimators", Econometrica, 50 (1982) 4, 1029-1054. https://doi.org/10.2307/1912775.
[34] Hsiao, C., Analysis of panel data, Cambridge: Cambridge University Press, 2003.
[35] Wooldridge, J. M., Econometric analysis of cross section and panel data, London: MIT, 2010. https://doi.org/10.1515/humr.2003.021.
[36] Dickey, D., A., & Fuller, W., A., "Distribution of the estimators for autoregressive time series with a unit root", Journal of the American Statistical Association, 74 (1979), 427-431.
[37] Phillips, P.C.B., P. Perron, "Testing for a unit root in time series regression", Biometrika 75. (1988), 335-346.
[38] Spence, M., The next convergence, Washington: Picador, 2011.

Appendix 1

Table A1. The list of research province

Province	ID	Province	ID	Province	ID	Province	ID
An Giang	1	Dong Nai	16	Kon Tum	31	Quang Ninh	46
Bac Giang	2	Dong Thap	17	Lai Chau	32	Quang Tri	47
Bac Kan	3	Gia Lai	18	Lam Dong	33	Soc Trang	48
Bac Lieu	4	Ha Giang	19	Lang Son	34	Son La	49
Ben Tre	5	Ha Nam	20	Lao Cai	35	Tay Ninh	50
Binh Dinh	6	Ha Noi	21	Long An	36	Thai Binh	51
Binh Duong	7	Ha Tinh	22	Nam Dinh	37	Thai Nguyen	52
Binh Phuoc	8	Hai Duong	23	Nghe An	38	Thanh Hoa	53
Binh Thuan	9	Hai Phong	24	Ninh Binh	39	Tien Giang	54
BRVT	10	Hau Giang	25	Ninh Thuan	40	Tra Vinh	55
Ca Mau	11	HCMC	26	Phu Tho	41	TT-Hue	56
Can Tho	12	Hoa Binh	27	Phu Yen	42	Tuyen Quang	57
Cao Bang	13	Hung Yen	28	Quang Binh	43	Vinh Long	58
Da Nang	14	Khanh Hoa	29	Quang Nam	44	Vinh Phuc	59
Dak Lak	15	Kien Giang	30	Quang Ngai	45	Yen Bai	60

Table A2. List of structure of tax revenue

Coding	Meaning
Taxrev	Total tax revenue (Billion Vietnam dong)
FDITaxrev	Tax revenue from FDI firms (Billion Vietnam dong)
PINTaxrev	Personal income tax collection (Billion Vietnam dong)
EVNTaxrev	Oil fee for protecting environment (Billion Vietnam dong)
ASSTaxrev	Tax revenue from assets (for example car or land, etc.) (Billion Vietnam dong)

Table A3. List of sub-provincial competitiveness index

Coding	Meaning	Coding	Meaning
PCI_1 = Ent	Low entry cost for business star up	PCI_6 = Plb	Policy bias (support state firms more than private)
PCI_2 =LRgt	Easy access to land	PCI_7 = Pro	Proactive and creative provincial leadership
PCI_3 =Tran	Transparent business environment	PCI_8 = Bss	High quality business support service
PCI_4 = Inc	Minimal informal charge	PCI_9 = Lbt	Sound labor training policy
PCI_5 = Rec	Limited time for bureaucratic procedures	PCI_{10} = Lin	Fair and effective legal procedures for dispute resolution

Appendix 2
Results of linear correlation test

Rgdpc	Coef.	Std. Err.	t	P > t	[95% Conf.	Interval]
Rgdpc -1	-0.178	0.031	-5.670	0.000	-0.240	-0.116
Rgdpc	Coef.	Std. Err.	t	P > t	[95% Conf.	Interval]
PVCi(_nl_1)	0.448	0.153	2.920	0.004	0.146	0.749
Rgdpc	Coef.	Std. Err.	t	P > t	[95% Conf.	Interval]
Stdrate (_nl_1)	0.430	0.019	23.160	0.000	0.393	0.466
Rgdpc	Coef.	Std. Err.	t	P > t	[95% Conf.	Interval]
Povrate (_nl_1)	0.144	0.013	10.800	0.000	0.118	0.171
Rgdpc	Coef.	Std. Err.	t	P > t	[95% Conf.	Interval]
Taxrev (_nl_1)	-0.185	0.032	-5.730	0.000	-0.248	-0.121