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RELATIONSHIP AMONG INSTITUTIONAL QUALITY, TAX REVENUE AND ECONOMIC GROWTH AT PROVINCIAL LEVEL: EVIDENCE FROM VIETNAM

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Abstract

To investigate the relationship among institutional quality, tax revenue, and economic growth in Vietnam, this work applies the Granger test for a panel data of 60 provinces in Vietnam during the period 2006 - 2014. In addition, using the two-step system generalised method of moments estimation supports this study to evaluate the degree of impact of interaction between quality of institutions and tax revenue on economic growth in more detail. The results provide a bi-direction causal linkage among the mentioned variables and discover that tax revenue has significantly positive impacts on economic growth. On the other hand, the effect on growth of economy of the ten institutional quality indices is diverse. The data also indicated convergence in all estimation models as suggested by classical theories of economic growth.

1. INTRODUCTION

Many researches pinpoint that the effects of institutions or taxation on economic growth are quite complicated, controversial and need to be clarified (Barro, 1991; Lim & Decker, 2007; Acemoglu *et al.*, 2005*;* Acemoglu & Robinson, 2010; Acemoglu & Robinson, 2012*;* Law *et al.*, 2013; Helms, 1985; Engen & Skinner, 1996; Batina & Ihori, 2008; Hemmelgarn & Teichmann, 2013; Lien, 2015). The impact of institutions on economic growth is reliant on how institutions interact with other variables whilst how taxation affects economic growth depends on the effectiveness of the policies established by the authorities (Ogilvie & Carus, 2014; Sachs, 2003; Ahmed, 2012; Lee & Kim, 2009; Vieira *et al.*, 2012; Helms, 1985; Engen & Skinner, 1996; Batina & Ihori, 2008; Hemmelgarn & Teichmann, 2013; Canicio & Zachary, 2014.)

In addition, developing countries have to suffer from bribery and corruption which in turn contribute to the loss of tax (Richupan, 1984; Alm *et al.*, 1992; Bird, 1990 and 1992; Krugman *et al.*, 1992; Gupta, 2007; Syadullah & Wibowo, 2015; Lien, 2015.)

Furthermore, the competency of the authority proves to be the key element of the success in economic development among developing countries in South East Asia (Johnson, 1982; Amsden, 1989; Wade, 1990; and Evans, 1995) Likewise, Acemoglu *et al.* (2015) state that the efficiency of

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the authorities at provincial level, which holds a very essential role in the growth. In addition, the province, whose authorities build the good investment environment should attract more investors (Anh *et al.*, 2007).

Vietnam is a developing country and Vietnam government faces on the challenge of improving institutional quality for sustainable development. Moreover, Jenkins (2004) concludes that Vietnam should pay more attention in reducing poverty in rural area for its economic growth. Similarly, Acemoglu & Robinson (2012) also indicate that reducing poverty rate should help to increase economic outcome of a country. In other research,

Base on aforementioned arguments, with a view to elucidating how the linkage between interaction of institutions, tax revenue and economic growth is taking place at provincial level in Vietnam, this work tries to conduct the research title as "Relationship among institutions, taxation and economic growth at provincial level: Evidence from Vietnam".

The research is set out to attain these following goals:

(1) Examine the causal relationship between the interaction of sub-institution and structure of tax revenue and economic growth in 60 provinces in Vietnam in the period from 2006 to 2014.
(2) Measure the degree of effects of this interaction on economic growth during the same time.

This paper is structured as followed: Part 1 is to provide general introduction of the research, Part 2 makes mention to previous research, part 3 presents models, data, and research methodology, Part 4 shows research results, and part 5 draws the conclusion and implication.

2. LITERATURE REVIEW

Conducting the case study in Korea, Taiwan, and Japan, Amsden (1989) posited that economic activities rely on the way the authorities impose policies, standard and taxation upon the activities of private firms and grants.

With a research modeled on Game theory about the authorities in Colombia, Acemoglu *et al.* (2015) also agreed that the competence to maintain law and order, the competence to furnish products and public service as well as the competence to establish locally economic activities in one community can demonstrate the efficiency of its authority whilst there appers to have some governments lacking those competences, which accounts for the underdevelopment.

Phan (2013) similarly conducted panel data about provincial competitiveness in Vietnam (Insstitutions) during the period from 2006 to 2010. As a result, he proved that the improvement in some criteria about institutions such as the right to access land, business suport service, proactivity, and reducing of informal charges could positively affect the business performance of firms and indirectly influencing the growth of economy.

Experimenting panel data collected from corporations in America, William (2013) found out that big cities can offer more opportunities for corporations more than small cities or provinces, whereas the business charges spent in some head office in big cities is much more than that in small provinces.
Knutsen (2013) investigated the panel data of sub-Sahara countries in Africa from 1984 to 2004 with the OLS, PSCE, and FE models and indicated that the impacts of democracy on economic growth depend on capacity of local provincial authorities. Specifically, the places with weak governmental administration has strong democracy and it has a positive impact on the growth of economy, in the meanwhile, high administration in other places belittles the influence of democracy on economic growth.

Moreover, Dincecco & Katz (2012) explored the panel data of provinces from 11 countries in Europe, consequently, they have argued that modern authorities are able to exploit well and gain

positive impacts on economic activities. In long term, the governments at provicial level are key success factors to boost the economy.

Mirrlees (1971) conducted the utility function to analysis the impact of income tax and concluded that governors should face on setting up the approriate tax system focusing on diversity of income tax rate to avoid the negative impact of this tax on economy and encourage the participation of labour force.

The local authority has a key role in their area's economic growth and implementation of national development plans and government policies (Majid *et al.*, 2014).

The other arguments from previous researchers as below: the difference in interaction between institutional quality and other control variables resulted in the difference in gross domestic product (Acemoglu *et al.*, 2003 and Arnold, 2008).

From the previous research, this article summarizes the following analytical framework:

First, the causality test based on Granger (1969) rule has been exploited by many experimental researchers so as to verify whether there exists a cause-and-effect relationship among varariables following Im *et al*. (2003); Hurlin (2004); Westerlund *et al*. (2011); Guerrero & Parker (2012) and Yousefi, (2015) with null hypothesis:

$$H_0: \beta_i^{(k)} = \beta^{(k)} = 0, \qquad \forall_i = 1, \dots N, \forall_k = 1, \dots K$$
$$H_1: \beta_i^{(k)} \neq \beta_j^{(k)}, k \in \{1, \dots p\}, \exists (i, j) \in \{1, \dots N\}$$

Second, economic growth is often measured with Gross domestic products per capita (GDP per capita) (Acemoglu, 2010 and Lien, 2015). Follow Anh *et al.* (2007) and Phan (2013) this report applies the provincial comparetiveness index for measuring the institutional quality variable.

Third, the influence of institution, taxation and other control variables on economic growth differs according to their interaction with one another (Johnson, 1982; Amsden, 1989; Wade, 1990; and Evans, 1995; Phan, 2013; William, 2013; Knutsen, 2013; Acemoglu *et al.* 2015.)

In addition, Cooray (2009) developed the production function based previous researchers' argument of Mankiw *et al.* (1992):

$$Y_t = A_t k_t^{\alpha} h_t^{\beta} (g_t e^{\mu\theta})^{\gamma} \qquad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Where: Y denotes economic growth (it was computed as GDP per capita); A stands for technology (this study adds the "student rate" variable for representing of applying technology of an economy); k is a physical capital; h represents human capital; g is government quality and θ is level of government quality.

Moreover, Acemoglu (2010) indicated that the economy in elite countries (A^e) grows slower than medium countries (A^m) (The elite countries obtain the high institutional quality) and he established the following equation:

$$0 < A^e < A^m \qquad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

There is a question that what happened when impact factors on quality and on quantity of economy interact together? So that why this study try to predict the status of economy when taxes which represent an impact factor on quantity of economic outcome interacts with institutional quality standing for effect factor on quality of economy.

3. METHODOLOGY AND RESEARCH DATA

3.1. Research data

The research utilised the panel data of provincial competitiveness (institutional quality assessment) of 60 provinces throughout Vietnam during the period from 2006 to 2014. The data was extracted from Vietnam provincial competitiveness index provided by Vietnam Chamber of Commerce and Industry (VCCI) with the support of United States Agency for International Development (USAID/Vietnam).

Data related to Government tax revenue, poverty rate, and student rate was retrieved from the website of General Statistic Office of Vietnam.

In terms of the number of provinces, despite consisting of official 64 provinces by 2014, there were some newly-merged or newly-split provinces, thus it was imposible to attain complete set of data about those provinces. Consequently, this research could merely work on dataset of 60 provinces (see appendix A1 – List of 60 provinces in Vietnam).

Furthermore, the period from 2006 to 2014 witnessed the United States real estate bubble burst which affected 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
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	0.844	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 shows Ba Ria Vung Tau is a province with highest income per capita at 393.93 million VND whilst Ha Giang stood at the bottom of the colurmn. The province with the highest PVCI was Binh Duong with 77.197 points, and the lowest score, 36.759, went to Lai Chau (This index is a general index with weighted). In term of tax revenue, while Ho Chi Minh City topped the table with more than 282 thousand billions VND, Tuyen Quang obtained the least number at 277.64 billions VND. Ho Chi Minh city exceeded the table as the province with the highest collection level of Tax revenue from FDI firms, environment protection tax and tax from personal income. Ha Noi is the highest province with collection of proverty tax. As for student rate, Long An got the highest result when Hau Giang was a province with the lowest score. Eventually, the greatest poverty rate was found in Lai Chau while Ho Chi Minh City got the lowest percentage.

3.2. Research method

In order to investigate the relationship of interaction between institutions – tax revenue and economic growth, this study performs the Causality Granger test by following to the approach of Hurlin (2004) for below equations:

$$IN_{it} = \alpha_i + \sum_{k=1}^{K} \gamma_i^{(k)} IN_{jit-k} + \sum_{k=1}^{K} \beta_i^{(k)} Rgdp_{it-k} + \varepsilon_i + \epsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$$Rgdp_{it} = \alpha_i + \sum_{k=1}^{K} \gamma_i^{(k)} Rgdp_{it-k} + \sum_{k=1}^{K} \beta_i^{(k)} IN_{jit-k} + \varepsilon_i + \epsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots (4)$$

IN_{jit} [(j:1,…4), (i: 1,…N) and (t: 1, …T)] is interaction between few sub-institutions and different kind of structure of tax revenue as below:

(1) $IN_{1it} = Pv\_Hm_{it} = (PCI_9 + PCI_{10})_{it} * PINTarev_{it}$
(2) $IN_{2it} = Pv\_Cap_{it} = (PCI_1 + PCI_2 + PCI_3 + PCI_4)_{it} * ASSTarev_{it}$
(3) $IN_{3it} = Pv\_Pe_{it} = (PCI_3 + PCI_5)it * EVNTarev_{it}$
(4) $IN_{4it} = Pv\_TaFDI_{it} = (PCI_1 + PCI_6 + PCI_{10})_{it} * FDITarev_{it}$

$Rgdp_{it}$: denotes the real GDP per capita.

So to solve the dynamic unbalanced panel data with "large N and small T", this research employes two-step System Generalized method of moments estimation (SGMM). The method is expected to be a proper tool for dealing with dynamic panel data and to reduce the bias of endogenous (Hsiao, 2003; Baltagi, 2005; Wooldridge, 2010).

The equations for estimating the effects were experimented with following equations:

$$\Delta Rgdp_{it} = \alpha_0 + \alpha_1 Rgdp_{it-1} + \alpha_2 Tare_{it} + \alpha_3 PCI_{jit} + X_{it}\alpha_4' + \varepsilon_i + \epsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots (5)$$

$$\Delta Rgdp_{it} = \beta_0 + \beta_1 Rgdp_{it-1} + \beta_2 Tare_{it} + \beta_3 PVCI_{it} + \beta_4 IN_{jit} + X_{it}\beta_5' + \varepsilon_i + \epsilon_{it} \quad \ldots\ldots\ldots\ldots (6)$$

$\triangle Rgdp_{it}$ indicates the first-difference of logathim of the real GDP per capita.

PCI_{jit} representing the sub-institutions which starts with PCI_{1it} to PCI_{10it} (Appendix A2 – List of subinstitutions)

$PVCi_{it}$ is the general provincial competitiveness index (with weighted) of 60 province for annual ranking by VCCI..

X_{it} stands for control variables: student rate and poverty rate

Equation 5 aimes to measure the influence of tax revenue, and all sub-institution index on economic growth.

Equation 2.2 estimates the impact of interaction between few sub-institutions and few criteria of structure of tax revenue. For instance, the interaction between tax collection from FDI firms and two sub-institutions: PCI_6 and PCI_{10} created Pv_TaFDI variable.

Due to the purpose of this research to consider the influence of instituional criteria on various segments of taxation, those interactions were then taken into acount.

To verify the robustness of restriction of these models, this paper also applys the Hansen test in order to eliminate endogenous phenomenon when null hypothesis was accepted. In addition, it also assessed the null hypothesis of Arrelanno Bond test AR(2) to make sure that model did not contain any phenomenon of "serial auto-correlation of residuals".

4. RESEARCH FINDINGS

4.1. Results of the Granger causality test

Before the use of the Granger Causality test, this research carried out the unit root test with Dickey – Fuller test and Phillip&Perrson verification. The result are displayed in the table 2.

Table 2: The result of unit root test for dataset of 60 proovince in Vietnam from 2006 to 2014

Lags	Variables	Dickey-Fuller (F-values)				Phillip-Perron (F-value)			
		Non-trend		Trend		Non-trend		Trend	
1	Rgdp	168.716	0.002***	158.229	0.011**	267.131	0.000***	1227.550	0.000***
2		63.788	1.000	347.018	0.000***	265.744	0.000***	1192.703	0.000***
1	Pv_Hm	193.292	0.000***	91.159	0.977	411.30	0.000***	218.557	0.000***
2		279.445	0.000***	247.362	0.000***	477.671	0.000***	273.278	0.000***
1	Pv_Cap	329.478	0.000***	231.741	0.000***	327.074	0.000***	293.656	0.000***
2		235.834	0.000***	534.198	0.000***	372.425	0.000***	385.253	0.000***
1	Pv_Pe	242.369	0.000***	109.679	0.74	629.792	0.000***	631.918	0.000***
2		460.324	0.000***	265.144	0.000***	778.467	0.000***	805.809	0.000***
1	Pv_TaFDI	284.609	0.000***	184.674	0.000***	367.857	0.000***	263.931	0.000***
2		443.314	0.000***	260.116	0.000***	381.425	0.000***	327.912	0.000***

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

Table 2 illustrates that all variables have the same stationary point with a lag of 1 or 2. The unit root test results suggest that latencies in this report are computed at lag 2.

Then this paper runs Pair wise Granger Regression to reconsider the bi-direction causal linkage of each pair of variables.

Table 3: Pair wise Granger causality test

H_0: Interaction PV-Hm does not Granger cause Rgdp($\Delta\ Rgdp$)	Obs.	F – Stat	Prob.	H_0: Rgdp does not Granger cause Interaction PV-Hm ($\Delta\ Pv\_Hm$)	Obs.	F - Stat	Prob.
Pv_Hm→Rgdp	480	0.004	0.000***	Rgdp → Pv_Hm	479	-9.905	0.000***
H_0: Interaction PV-Cap does not Granger cause Rgdp ($\Delta\ Rgdp$)	Obs.	F - Stat	Prob.	H_0: Rgdp does not Granger cause Interaction PV-Cap ($\Delta\ Pv\_Cap$)	Obs.	F - Stat	Prob.
Pv_Cap→Rgdp	464	0.002	0.001***	Rgdp → Pv_Cap	464	22.786	0.000***
H_0: Interaction PV-Pe does not Granger cause				H_0: Rgdp does not Granger cause Interaction PV-Pe			

Rgdp ($\Delta\ Rgdp$)				($\Delta\ Pv\_Pe$)			
Pv_Pe→Rgdp	465	0.001	0.013**	Rgdp → Pv_Pe	465	9.484	0.006***
H_0: Interaction PV-TaFDi does not Granger cause Rgdp ($\Delta\ Rgdp$)				H_0: Rgdp does not Granger cause Interaction PV-TaFDI ($\Delta\ Pv\_TaFDI$)			
Pv_TaFDi→Rgdp	479	0.001	0.002***	Rgdp → Pv_TaFDi	479	16.967	0.001***

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

All P values are smaller than significance, so these results have enough evidence to reject null hypotheses. Consequently, the interaction of sub-institutions and Tax revenue from FDI firms, personal income tax collection, property taxation, and environmental protection tax present bi-direction causal linkage with economic growth. This finding reminds the policy planners that they should be extremely cautious when imposing those policies involved with institutions and taxation to reduce the adverse effects of this bi-directional causal linkages.

4.2. Test the degree of impact of key research variables on economic growth

In this point, the study evaluates the degree of impact of tax revenue, institutional quality indexes and its interaction on economic growth. To achieve this purpose, the research employs the two-step system generalised method of moments estimation (SGMM) for a dynamic panel data of 60 provinces in Vietnam from 2006 to 2014. The results are displayed in the below tables. In order to get a smooth and stable statistical analysis, this work takes the logarithm for the real GDP per capita and tax revenue before runing regression.

Table 4: Impact of tax revenue and each sub-institution on economic growth following the equation 2.1 (Dependent variable: △ Rgdp)

Variables	Coef.	P-value
Rgdp (-1) (Million VND)	-0.943	0.000***
Tarev	0.412	0.000***
PCI_1	1.719	0.287
PCI_2	-3.714	0.343
PCI_3	-9.991	0.255
PCI_4	-.012	0.993
PCI_5	4.189	0.061*
PCI_6	-4.16	0.000***
PCI_7	3.117	0.066*
PCI_8	1.020	0.638
PCI_9	-0.096	0.975
PCI_{10}	-0.772	0.391
Stdrate (%)	-0.072	0.145
Povrate (%)	-2.23	0.000***
year	8.186	0.000***
_cons	-16041.6	0.000***
Obs.	471	
Number of instruments	55	
Number of groups	60	
AR(2) test	0.951	
Hansen test	0.315	

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

Table 5: Impact of tax revenue and interaction of sub-institutions and sub-tax collection following the equation 2.2 (Dependent variable △Rgdp)

Variables	Coef.	P-value
Rgdp (-1) (Million VND)	-.911	0.000***
Tarev	.148	0.047**
PVCi	2.055	0.006***
Pv_Hm	-.002	0.002***
Pv_Cap	.000	0.723
Pv_Pe	-.001	0.542
Pv_TaFdi	.0004	0.020**
stdrate3	-.0547	0.404
Povrate	-2.130	0.000***
Year	14.218	0.000***
_cons	-27550.89	0.000***
Obs.	453	
Number of instruments	52	
Number of groups	60	
AR(2) test	0.862	
Hansen test	0.118	

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

Table 4 and table 5 share a consistent results about high convergence at 1%. In other words, it could be referred that mos authorities at provincial level have made efforts to innovate and build up development plans to catch up with better-off cities (Barro, 1991 and Spence, 2011).

Notably, tax revenue and general provincial comparetiveness index (PVCi) have a significantly positive impact on growth of economy. These findings indicate that the authorities at provincial level should focus on developing of suitable policies and setting up an effective taxation system following the optimal theories for the sustainable economic growth.

Furthermore, a proactive provincial leaders or authorities who design a policy for reducing infnormal charges are positive variables affecting economy. It is similar with the finding of Phan (2013). The research results contributes to the literature about that the capacity of provincial authorities plays an important role in growth of an economy.

The point of this paper is that interaction among institutional quality indexes and components of tax revenue has a different effect on growth. On the one hand, institutional quality indexes interact with amount of tax collection from FDI firms has a positive impact on economic growth in significance at 5%. Furthermore, the results cause the provincial authorities to awake to the fact that they should bring in more effective plans and policies to collect FDI corporation tax and down tax avoidance by means of transfer the prices to reinforce the economy. On the other hand, interaction of institutional quality indexes with tax revenue from personal tax collection and institutional quality indexe "government support state firms more than private firms" (PCI_6) have a significantly negative impact on growth. The finding indicates that the process of applying policies about personal taxation should be done with great meticulousness. As mentioned in the optimal taxation theory by Mirrlees (1971) up till the 21st century, it is evidence that the increase in taxation income might be able to diminish working motivation of those people with high income. Besides, it is conclusive, up to some certain extent, that the redistribution of salary can booster the inequality in payment and prohibit economic growth. These findings admend the liturerature of the challenges asking authorities at provincial have to pay more attention to balance between siociety and economy as well as that the authorities at provincial level should create fair and equal competitive environment for a pupose of improving GDP per capita.

Poverty rate, in other hand, always causes negatively impact on economic growth with significance at 1%. The finding supports argument of Jenkins 2004 and Acemoglu & Robinson 2012. Hence, the diminution of poverty has been of great demand to protect growth of economy.

5. CONCLUSION

This research with a use the Grager Causality test the relationship among institutional quality, tax revenue and economic gorwht for a panel data of 60 provinces in Vietnam indicating that there is an existing bi-directional causal relationship of each respective pair of these variables.

Second, applying the two-step system generalised method of moments estimation (SGMM), this paper has pointed out the positive impacts on the economic growth of tax revenue, amout of tax collection from FDI firms, general instituional quality index(PVCI), and institutional quality indexes of capability of authority at provincial level such as: reducing informal charges (PCI_5), provincial leaders are proactive (PCI_7). While institutional quality indexes (unfaire business environment (PCI_6), interaction of institutional quality indexes and tax collection from personel income and poverty rate have a significantly negative impact on economic growth in 60 provinces in Vietnam. The findings recommended that the provincial governments should pay more attention to building up solutions to poverty eradication and designing some approaches to improve the quality of institutions as well as conducting effective taxation system for a purpose of improving each province's the income per capita.

Notably, the outcomes gained from the process of analyzing the effect of institutions and its related criteria on taxation, which is distincly presented in part 4.2, provide a vauable lesson for policy markers in terms of establlishing legal documents related to institutions about constructing fair competitive environment, cutting off informal charges and setting up the efective solution to collect taxation from FDI firms for higher income per capita in their provinces.

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Appendix

Table A1: List of 60 Vietnamese provinces

Province	ID	Province	ID	Province	ID	Province	ID
An Giang	1	Dong Thap	17	Lam Dong	33	Son La	49
Bac Giang	2	Gia Lai	18	Lang Son	34	Tay Ninh	50
Bac Kan	3	Ha Giang	19	Lao Cai	35	Thai Binh	51
Bac Lieu	4	Ha Nam	20	Long An	36	Thai Nguyen	52
Ben Tre	5	Ha Noi	21	Nam Dinh	37	Thanh Hoa	53
Binh Dinh	6	Ha Tinh	22	Nghe An	38	Tien Giang	54
Binh Duong	7	Hai Duong	23	Ninh Binh	39	Tra Vinh	55
Binh Phuoc	8	Hai Phong	24	Ninh Thuan	40	TT-Hue	56
Binh Thuan	9	Hau Giang	25	Phu Tho	41	Tuyen Quang	57
BRVT	10	HCMC	26	Phu Yen	42	Vinh Long	58
Ca Mau	11	Hoa Binh	27	Quang Binh	43	Vinh Phuc	59
Can Tho	12	Hung Yen	28	Quang Nam	44	Yen Bai	60

Cao Bang	13	Khanh Hoa	29	Quang Ngai	45
Da Nang	14	Kien Giang	30	Quang Ninh	46
Dak Lak	15	Kon Tum	31	Quang Tri	47
Dong Nai	16	Lai Chau	32	Soc Trang	48

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, ect) (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