Fiscal Decentralization and Economic Growth Nexus: Evidence from Province-level Cross-section Data for Indonesia

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Abstract: This study explores the effect of fiscal decentralization on economic growth by adopting a production-function-based estimation framework. The empirical estimation is carried out on a sample of cross section data that comprises 26 province governments and the time series yearly data from 1992 to 2002 in the case of Indonesia. The results indicate that: first, the fiscal decentralization variables (expenditure indicator) show the positive and significant coefficients, while the revenue indicator shows the negative relationship with economic growth. Hence, several policy implications can be derived: local government should be able to increase their non-tax revenues; create conditions conducive to capital inflows; develop a clear framework for fiscal decentralization assignment such as income redistribution and borrowing.

I. Introduction

Recently, fiscal decentralization, which entails the devolution of government fiscal responsibilities to lower levels of government, has been implemented in many developed and developing countries. Among its many objectives are: to reduce the burden on central and provincial government of providing public goods and services; to increase popular participation in the

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planning and implementation of development programmes; to find a way out from central government failures to secure national objectives, from the trap of ineffective, inefficient governance, macroeconomic instability, and inadequate economic growth; to reorganize the government for the cost effective provision of public goods and services. However, most theoretical and empirical studies have focused on the effect of fiscal decentralization on economic growth. The results obtained in those studies are mixed. For example, some find that fiscal decentralization reduces provincial economic growth (see Zhang and Zou, 1998 and 2001), some find a negative relationship between fiscal decentralization and economic growth for developing countries, but no relationship exists for developed countries (see Davoodi and Zou, 1998; Zhang and Zou, 1998).

However, there are also a few studies that have been successful in verifying the potential contribution of fiscal decentralization to economic growth. For example, Oates (1985) detects a significant and robust positive correlation between fiscal decentralization and economic growth. Woller and Phillips (1997) find a statistically significant, though trivial, inverse relationship between the levels of revenue decentralization and economic growth in a sample of developed countries, and they do not find any relationship between fiscal decentralization and economic growth in a sample of less developed countries. Lin and Liu (2000) also find that fiscal decentralization has made a positive contribution to economic growth in China. Their result differs from Zhang and Zou (1998), because they use the marginal retention rate of locally collected budgetary revenues by provincial governments as a measurement of fiscal decentralization.

The empirical studies doing in cross-country analysis and in-country analysis show that the form of government (federal *vs.* unitary) plays an important role in the execution of fiscal decentralization policy. Several studies have looked into this: first, between/among countries generally (Cheema and Rondinelli, 1983; Oates, 1985; Sachs and Warner, 1995; Thiessen, 2000, 2003; and McNab, 2003); second, between/among Muslim countries (Abd. Ghafar *et al.*, 2003); third, between/among developed and less developed countries (Davoodi and Zou, 1998; Adam and Bevan, 2002); fourth, single country (Jin *et al.,* 1999; Lin and Liu, 2000); and fifth, province level (Glaeser *et al.*, 1992; Zhang and Zou, 2001; and Akai *et al.*, 2004).

This paper, consequently, asks: What would be the effect of implementing fiscal decentralization in Indonesia? Indonesia is a country with three levels of governance: provinces, regencies and municipalities. Each province is of

a different size in terms of land area population. Under such conditions, can the implementation of fiscal decentralization attain its objective of bringing prosperity to Indonesian people? Can each province with its particular local receipts generate and expand the economy? Are the other sources (such as counter balance budget and other legal local revenues) used to defray the routine expenditures or development expenditures?

In this study, the effect of fiscal decentralization on economic growth in a sample of several provinces will be explored. A province study offers several advantages: Firstly, a bigger sample of data is available at provincial level. Secondly, even though, according to the argument of Akai and Sakata (2002), using a cross-province approach may fail to capture local cultural, historical, and institutional differences between provinces. But, this panel data estimation is able to adjust for such differences and capture the local heterogeneities.

The next Section 2 of this paper presents the theoretical model. To develop the model, we will start from production-based function. Section 3 presents the data. Section 4 will pursue the estimation results. The final section reports the conclusions.

II. The Model

We adopt a production-function-based estimation framework, so production at time t can be described as:

$$Y(t) = K(t)A(t)^{\alpha}\psi^{1-\alpha} \qquad (1)$$

where Y denotes the output per capita, K the capital per capita, A the level of technology, ψ the fraction (assumed to be constant) of the population and labour force and $0<\alpha<1$. We can express equation (1) in log form and take the first order differentiation with the respect to time. The growth rate of output per capita can the be written as:

$$g(t) = y(t) = \hat{K}(t) + \alpha\hat{A}(t) \qquad (2)$$

In equation (2), the growth rate of output per capita depends on two factors: the growth rate of capital per capita and the rate of technological progress. It should be noted that the term $\hat{K}(t)$ reflects not just capital per capita but also differences in resource endowments and institutions across

provinces and over time, as well as in the other observable province-specific characteristics.

In this study, we assume that $\hat{K}(t)$ depends on a set of variables. We start from, $\hat{K}(t)$ equals to investment (*INV*), which comprises private investment (*DDI*) and public investment (*GovExp*). Both variables are financed by savings from the private sector (S_p) and the government (S_g). Hence, the saving-investment identity can be written as:

$$S_p + S_g = DDI + GovExp \tag{3}$$

However, if savings minus private investment and public investment are negative, we use foreign investment (FDI) to finance the deficits or:

$$(S_p + S_g) - (DDI + GovExp) = FDI \tag{4}$$

Therefore, equation (2) can be rewritten as follows:

$$y_{it} = \beta_t DDI_{it} + \beta_2 FDI_{it} + \beta_3 GovExp_{it} + \beta_4 A_{it} + \varepsilon_i \tag{5}$$

where i denotes province, t denotes time, y_{it} is the growth rate of per capita GDP and ε_i the unobservable individual effect. We use the *GovExp* as a proxy for fiscal decentralization measurement (FD). Hence, equation (5) can be rewritten as follows:

$$y_{it} = \beta_t FD_{it} + \beta_2 DDI_{it} + \beta_3 FDI_{it} + \beta_4 A_{it} + \varepsilon_i \tag{6}$$

We also identify other factors (as controlled variables) that can influence the economic growth. These variables are total population (*POP*) and labour force (*LF*), which are used to ascertain the impact on economic growth of urbanization and the size of the population. We also include the amount of foreign investment (*FDI*) and the amount of domestic investment (*DDI*), so as to ascertain the impact of investment on economic growth. The amount of export (*EXPORT*) and the amount of import (*IMPORT*) are used to ascertain the impact of trade policy on economic grwoth. The inflation rate (*INF*) is used to ascertain the impact of fluctuated prices on economic growth. The growth rate of the output per capita equation that includes all those exogenous variables can be written as:

$$y_{it} = \alpha_{0i} + \beta_t FD_{it} + \beta_2 DDI_{it} + \beta_3 FDI_{it} + \beta_4 EXPORT_{it} + \beta_5 IMPORT_{it} + \beta_6 INF_{it} + \beta_7 LF_{it} + \beta_8 POP_{it} + \varepsilon_{it} \quad (7)$$

In estimating equation (7), we will use four different measurements of fiscal decentralization (*FD*). This will be explained in section three.

III. The Data

To estimate equation (7), we use the General Least Square (GLS) method (with fixed and random effects). The data for this estimation cover the 26 (out of 33) provinces for the period 1992 – 2002. The reason for this selection is that the other seven provinces were only established after the local autonomy law was enacted in 2001.

The data are: (i) the gross regional domestic product (*GRDP*); (ii) the revenues and expenditure of central government (*CREV* and *CEXP*); (iii) the revenue and expenditure of local government (*LREV* and *LEXP*); (iv) the foreign direct investment (*FDI*), domestic direct investment (*DDI*), export (*EXPORT*), import (*IMPORT*), inflation (*INF*), labour force (*LF*) and population (*POP*) of local government; (v) the grant-in-aid of local government (*LGIA*); and (vi) the total expenditures for the defence and social security of Indonesia (*CDEF*). All the data are compiled from information in the Central Statistical Bureau.

Detailed explanations of the four types of fiscal decentralization indicators are as follows. First, the expenditure indicator (*EXPTOT*) is defined for each province as the ratio of local government expenditure (as the total of government expenditure at province and local levels) to total government expenditures (*EXPTOT=LEXP/CEXP*). This indicator corresponds to the best approximate measure of the allocation of authority when a local government has authority associated with its expenditure (the tax to be collected and the type of expenditure to be made).

Second, the revenue indicator (*REVTOT*) is defined for each province as the ratio of local government revenue (as the total of government revenue at province and local levels) to total government revenues (*REVTOT=LREV/CREV*). This indicator corresponds to the most approximate measure of the allocation of authority when the government that collects revenue has authority associated with its own revenue (the tax to be collected and the type of expenditure to be made).

Third, the production indicator (*EXPNDEF*) represents a decentralization measure, which is the ratio of local government expenditures to total government expenditures minus the defence and social security expenditures (*EXPNDEF=LEXP/(CEXP-CDEF*).

Fourth, the autonomy indicator (*REVGNIA*) measures the autonomy (degree of fiscal independence) of a local government in a province. For instance, even if the revenue or expenditure share of local government is small in relation to total revenues or expenditures, local government autonomy is high if all fiscal needs are financed in the local government region in which authority may be fiscally decentralized. Therefore, autonomy should be considered as one of the measures of fiscal decentralization. The autonomy indicator is defined as the ratio of local government revenues minus the grants-in-aid to total government revenues (*REVGNIA=(LREV-LGIA)/CREV*). In order to grasp authority allocation accurately, we exclude revenues financed by public debt from both province and local revenue data. Similar to Davoodi and Zou (1998) and Xie *et al.* (1999), expenditure for redeeming public debt is included in both province and local expenditure data.

The description and hypothesis of the above variables are summarized in Table 1.

IV. Estimation Results

To verify the determinants of economic growth, regression analyses were conducted on the panel data, which considered the fixed and random effects. The estimation technique with fixed effects assumes that there are two residuals or error terms. First, time effects, which are assumed to be constant for each province in each period, and, second, individual effects, which are assumed to be constant for each province in each period.

The fixed effects take into account the individuality for each province (cross sectional) and produce the various intercepts but still assume that the slope coefficients are constant across provinces. In other words, intercept value in the regression model is allowed to differ among provinces in recognition of some distinctive characteristics individual to each province. Table 2 shows the estimation result, which uses GLS estimation technique with fixed effect.

Table 1: Description of Variables

Variables	Description	Hypothesis
Y	Percentage of GRDP over Population	
EXPTOT	Ratio of local government expenditures to total government expenditures;	EXPTOT is positively related to growth
EXPNDEF	Ratio of local government expenditures to total government expenditures less defence and social security expenditures	EXPNDEF is positively related to growth
REVTOT	Ratio of local government revenues to total government revenues.	REVTOT is positively related to growth
REVGNIA	Ratio of local government revenues less grants-in-aid to total government revenues.	REVGNIA is positively related to growth
FDI	Ratio of foreign direct investment over GRDP.	FDI is positively related to growth
DDI	Ratio of domestic direct investment over GRDP.	DDI is positively related to growth
IMPORT	Ratio of imports over GRDP.	IMPORT is negatively related to growth
EXPORT	Ratio of exports over GRDP.	EXPORT is positively related to growth
INF	Real inflation	INF is negatively related to growth
LF	Growth labour force.	LF is positively related to growth
POP	Growth population.	POP is negatively related to growth

The adjusted R^2 values are quite reasonable. The reported DW-statistics show that the autocorrelation problem can be eliminated. The effect of fiscal decentralization variables (*EXPTOT* and *EXPNDEF*) show the positive and significant coefficients. Meanwhile, the variables (*REVTOT* and *REVGNIA*) show the negative relation with the growth. But, the control variables reveal that the relationship is against the original theory. The negative relationship exists for *FDI, DDI, EXPORT, IMPORT, INF* and *POP* (among others, significant at 1% level). Only the control variable *LF* is in positive relationship.

Next, the estimation technique with random effect assumes that the intercept of an individual unit is a random drawing from a much larger population with constant average value. Error component, $\varepsilon_{it.}$ represents the gap of every intercept of an individual unit from the average value. Table 3 exhibits the regression output of GLS with random effect.

Table 2: GLS Estimation Results with Fixed Effects

Variables	Model 1	Model 2	Model 3	Model 4
EXPTOT	9.6182* (3.3042)			
EXPNDEF		18.4269* (7.2400)		
REVTOT			-3.1273 (1.0013)	
REVGNIA				-13.6762* (3.9943)
FDI	-1.9183*** (1.7483)	-1.9132*** (1.7052)	-1.8856*** (1.7089)	-1.9020 (1.5138)
DDI	-0.7238 (1.1974)	-0.6742 (1.1519)	-0.6273 (1.0567)	-0.1231 (0.1988)
EXPORT	-3.6419* (5.914)	-3.5613* (5.9869)	-3.1086* (4.5130)	-3.0008* (4.5873)
IMPORT	-1.3199 (0.3449)	-0.8940 (0.2381)	-1.8811 (0.4911)	-1.1236 (0.2855)
INF	-0.2062* (11.3693)	-0.1795* (10.7895)	-0.2371* (11.9118)	-0.2666* (11.8872)
LF	0.0151 (0.5996)	0.0253 (1.0432)	0.0019 (0.0762)	-0.0033 (0.1248)
POP	-0.3402 (0.5779)	-0.4098 (0.7067)	-0.3100 (0.5390)	-0.3302 (0.5619)
N	286	286	286	286
R^2	0.2940	0.3189	0.2875	0.3132
Adj. R^2	0.2016	0.2297	0.1942	0.2233
F	14.9917	16.8523	14.5264	16.4203
P	0.0000	0.0000	0.0000	0.0000
DW	1.7163	1.7800	1.7353	1.8497
CI	22.554	21.878	22.438	24.875

Note: Figures in parentheses denote t-statistic values of the regressions coefficients; (*) indicates that the coefficient is statistically significant at 1% level; (**) Significant at 5% level; (***) Significant at 10% level

Table 3: GLS Estimation Results with Random Effects

Variables	Model 1	Model 2	Model 3	Model 4
Constant	10.1129** (2.3260)	12.3798* (2.8993)	7.1840*** (1.6611)	7.5736 (1.4921)
EXPTOT	-0.1599 (0.0826)			
EXPNDEF		0.8945 (0.4605)		
REVTOT			-1.5469 (0.7843)	
REVGNIA				-1.0081 (0.6081)
FDI	-0.1286 (0.1066)	-0.2083 (0.1726)	-0.0401 (0.0333)	-0.2022 (0.1679)
DDI	0.6360 (0.3701)	0.6941 (0.4032)	0.5372 (0.3130)	0.4726 (0.2730)
EXPORT	-2.9869* (3.2391)	-2.9857* (3.2140)	-2.9375* (3.1887)	-2.9827* (3.1250)
IMPORT	3.4682 (1.6206)	3.0177 (1.3951)	4.0213*** (1.8742)	3.9032*** (1.6508)
INF	-0.2430* (5.4585)	-0.2398* (5.3903)	-0.2468* (5.5450)	-0.2453* (5.5340)
LF	-0.0043 (0.0834)	-0.0039 (0.0765)	-0.0040 (0.0789)	-0.0053 (0.1042)
POP	-0.5093 (1.375)	-0.4959 (1.3403)	-0.5421 (1.4608)	-0.5494 (1.4733)
N	286	286	260	286
R^2	0.1216	0.1247	0.1230	0.1319
Adj. R^2	0.0963	0.0994	0.0976	0.1069
F	-	-	-	-
P	-	-	-	-
DW	1.6359	1.6402	1.6406	1.6527
CI	22.554	21.878	22.438	24.875

Note: Figures in parentheses denote t-statistic values of the regressions coefficients; (*) indicates that the coefficient is statistically significant at 1% level; (**) Significant at 5% level; (***) Significant at 10% level.

Under the random effect model, although the coefficient signs are similar to those in the fixed effect model, some variables were shown less significant. The adjusted R^2 values declined for each model. The coefficient sign for fiscal decentralization variables *EXPTOT* were no longer positive. Even though fiscal decentralization variable *EXPNDEF* shows a positive relationship, it is insignificant. This tells us that the GLS estimation technique with random effect does not produce the best estimation results.

We use the Hausman statistics to recognize the best estimation model between fixed effect and random effect. If the null hypothesis is rejected, the conclusion is that random effect estimation is less important than fixed effect in explaining the relationship among variables. Statistical Wald value, which emerges based on χ^2 distribution is 21.3969, meanwhile the critical Wald value is 21.4319 with eight degree of freedom and 5% significance level. Therefore, the null hypothesis is rejected. This supports the hypothesis that the individual error component ε_i is correlated with independent variables. Hence, the estimation results with fixed effects are better than random effect. Table 4 shows the Hausman test results using Wald statistics.

Table 4: Hausman Test with Wald Statistics

***F*-Statistic**	**Chi-Square**
21.3969 (0.000002)	21.4319 (0.000001)

Note: The figures in parentheses denote as probability

The sensitivity tests were done separately to test on the determinants of economic growth. The first test studies the relationship between dependent and control variables without being influenced by test variables (*EXPTOT, EXPNDEF, REVTOT*, and *REVGNIA*). The results, as reported in Table 5, prove that the estimated seven control variables are similar to the results presented in Table 2. This implies that the choice for the seven control variables was suitable for the model.

The second test was carried out on the sensitivity test concerning the relationship between dependent and test variables. The test was done by excluding the control variables from the original model. The aim was to verify that the result of fiscal decentralization policy, which is taken from the previous test, is not influenced by the control variable. The GLS estimation result with fixed effect shows that the coefficient signs for test variables are

similar. This proves that the determination of test variables in forming the previous model is better. The estimation result is shown in Table 6.

Table 5: The Sensitivity Test on Control Variables

Variables	Coefficient
FDI	-1.9086*** (1.7490)
DDI	-0.6733 (1.1377)
IMPORT	-1.7111 (0.4465)
EXPORT	-3.3891* (5.6528)
INF	-0.2296* (13.9500)
LF	0.0033 (0.1361)
POP	-0.3185 (0.5604)
R^2	0.2875
Adj. R^2	0.1974
F	17.0130
P	0.0000
DW	1.7180

Note: Figures in parentheses denote t-statistic value of the regression coefficient; (*) Significant at 1% level; (**) Significant at 5% level (***) Significant at 10% level

There are differences among the previous studies on the relationship between fiscal decentralization and economic growth. Xie *et al.*, (1999), Zhang and Zou (1998) and Woller and Phillips (1997) find a negative relationship while on contrary Lin and Liu (2000), and Akai and Sakata (2002) find a positive relationship. Sala-i-Martin (1997) and Levine and Renelt (1992), on the other hand, find that all of the variables have a weak relationship with economic growth, even though Levine and Renelt state that investment is the robust one. The difference in results is caused by the modelling, especially the model that includes the variable Y_{t-1} and dummy variable. To ensure consistency with the previous research, variable Y_{t-1} and dummy variable ($TIDUM^*$) are included in the model. The estimation results are shown in Table 7.

Table 6: The sensitivity analysis on Test Variables

Variable	Coefficient	R^2	R^2adjusted	P	DW
EXPTOT	14.5572* (5.1293)	0.0793	-0.0132	0.0000	1.5559
EXPNDEF	27.6536* (8.6899)	0.1511	0.0659	0.0000	1.6931
REVTOT	-0.5854 (0.2983)	0.0531	-0.0419	0.0000	1.5287
REVGNIA	-5.0514 (1.5239)	0.0567	-0.0380	0.0000	1.5558

Note: Figures in parentheses denote t-statistic value of the regression coefficient; (*) Significant at 1% level; (**) Significant at 5% level; (***) Significant at 10% level.

This estimation found that among four fiscal decentralization variables, *EXPNDEF* has the biggest effect on local growth in each province, namely around 23.3% compared to *EXPTOT* equal to 17.4% and *REVTOT* equal to 5.0%, whereas the *REVGNIA* variable has a negative effect on economic growth (-9.3%). For the previous growth variable, this variable has positive influence on economic growth. As for the *FDI* and *DDI* variables, they have a negative effect on economic growth and this does not fit the previous theory. The *IMPORT* variable also has a positive effect and *EXPORT* has a negative effect on growth. This too is a non-fit with the theory. The *INF* variable has a negative effect and this does support the theory. The variable *LF* has a negative effect, again a non-fit with the theory. The *POP* variable has a negative effect on growth and this is in line with the applicable theory.

To adjust the growth variables (control variables) in this study with the previous theory, *FDI* and *DDI* variables were changed into *INV* variable (log of ratio total foreign direct investment and domestic direct investment to Regional Gross Domestic Product), *IMPORT* and *EXPORT* variables were changed into *XREALK* variable (log of ratio total local import and total local export to Regional Gross Domestic Product), *LF* variable was excluded from the estimation, and the INF_{t-1} (lagged of log first-difference of Local Inflation Rate) was included. The estimation results are presented in Table 8.

Table 7: GLS Estimation Results with Fixed Effects (with Dummy Variables)

Variables	Model 1	Model 2	Model 3	Model 4
EXPTOT	17.4040* (4.5284)			
EXPNDEF		23.3454* (6.2791)		
REVTOT			5.0136 (1.1355)	
REVGNIA				-9.3864** (2.4383)
Y^{t-1}	0.2152* (4.1380)	0.1575* (3.0294)	0.2766* (5.3568)	0.2955* (5.6449)
TIDUM*	-5.0561* (5.8938)	-5.6867* (7.0573)	-2.9116* (2.8565)	-0.1871 (0.2560)
FDI	-1.6599 (1.6407)	-1.5872 (1.5715)	-1.7649*** (1.6566)	-1.7869 (1.4536)
DDI	-0.2951 (0.6063)	-0.1919 (0.4001)	-0.3399 (0.6922)	-0.0310 (0.0589)
IMPORT	0.1003 (0.0391)	-0.0184 (0.0072)	0.2540 (0.0930)	0.2271 (0.0713)
EXPORT	-1.3876* (3.9881)	-1.2349* (3.4728)	-1.6194* (3.4612)	-1.6888* (3.5497)
INF	-0.2214* (14.5670)	-0.2009* (13.1041)	-0.2468* (15.9701)	-0.2681* (14.7802)
LF	-0.0104 (0.4811)	-0.0083 (0.3885)	-0.0154 (0.7380)	-0.0022 (0.0935)
POP	-0.8266** (2.1351)	-0.8459** (2.3078)	-0.8159** (1.9907)	-0.7959*** (1.6686)
N	260	260	260	260
R^2	0.3958	0.4027	0.3984	0.3925
Adj. R^2	0.3014	0.3094	0.3044	0.2976
F	16.3042	16.7793	16.4812	16.0814
P	0.0000	0.0000	0.0000	0.0000
DW	2.0474	1.9814	2.1291	2.1677
CI	22.554	21.878	22.438	24.875

Note: Figures in parentheses denote t-statistic values of the regressions coefficients; (*) indicates that the coefficient is statistically significant at 1% level; (**) Significant at 5% level; (***) Significant at 10%.
Yt-1: Lag of growth rate per capita; EXPTOT: Log Ratio of local government expenditures to total government expenditures; EXPNDEF : Log Ratio of local government expenditures to total government expenditures minus defence and social security expenditures; REVTOT : Log Ratio of local government revenues to total government revenues; REVGNIA: Log Ratio of local government revenues less grants-in-aid to total government revenues; TIDUM*: Dummy variable of time; FDI: Log of ratio foreign direct investment to Regional Gross Domestic Product; DDI: Log of ratio domestic direct investment to Regional Gross Domestic Product; IMPORT: Log of ratio total local import to Regional Gross Domestic Product; EXPORT: Log of ratio total local export to Regional Gross Domestic Product; INF: Local inflation rate: LF : Log of local growth labor force; POP: Log of local growth population.

Table 8: The Best Estimation Results of GLS with Fixed Effects

Variables	Model 1	Model 2	Model 3	Model 4
EXPTOT	11.2408* (3.0179)			
EXPNDEF		17.5335* (4.9179)		
REVTOT			-4.3407 (-0.8867)	
REVGNIA				-22.9944* (4.4601)
INV	-0.0142** (2.5001)	-0.0126** (2.2385)	-0.0150** (2.5778)	-0.0127** (2.1528)
XREALK	-0.0141* (3.3663)	-0.0126* (3.1144)	-0.0157** (2.5702)	-0.0190* (3.0607)
INF	-0.2324* (16.9434)	-0.2142* (15.2232)	-0.2530* (17.7181)	-0.2811* (15.0133)
INFt-1	-0.1095* (5.4171)	-0.0982* (4.9898)	-0.1293* (6.3552)	-0.2011* (6.9916)
POP	-0.7935** (2.3231)	-0.8070** (2.4356)	-0.7564** (2.0211)	-0.6175* (1.3206)
Y^{t-1}	0.1417** (2.5736)	0.1030*** (1.8795)	0.1777* (3.2322)	0.1257** (2.3732)
TIDUM*	-4.593747* (5.5519)	-5.3569* (6.8222)	-1.8656*** (1.6724)	0.1254 (0.1653)
N	260	260	260	260
R^2	0.4363	0.4332	0.4408	0.4561
Adj. R^2	0.3540	0.3504	0.3592	0.3767
F	24.9918	24.6713	25.4529	27.0757
P	0.0000	0.0000	0.0000	0.0000
DW	1.9418	1.8878	1.9982	1.9385
CI	22.554	21.878	22.438	24.875

Note: Figures in parentheses denote t-statistic values of the regressions coefficients; (*) indicates that the coefficient is statistically significant at 1% level; (**) Significant at 5% level; (***) Significant at 10% level.

INV: Log of ratio total foreign direct investment and domestic direct investment to Regional Gross Domestic Product; *XREALK*: Log of ratio total local import and total local export to Regional Gross Domestic Product; INF_{t-1}: Lag of Local Inflation Rate; *POP*: Log of local growth population.

The remaining variables are as defined in Table 7.

This estimation also shows that among four fiscal decentralization variables, *EXPNDEF* still has the biggest effect on local growth in each province, namely around 17.53% compared to *EXPTOT* equal to 11.24% whereas the *REVTOT* variables and the *REVGNIA* variable have a negative effect on economic growth (-4.3% and -22.99%). Also there is no difference in result for the control variables (*INV, XREALK, TIDUM*, Y_{t-1}, INF, INF_{t-1}, POP*) as we compare with the result in Table 7, but all of them affect economic growth significantly. In contrast, this estimation produce the higher R^1 compared to each R^1 in Table 7 and also there was no autocorrelation problem, and the existence of a simple multicollinearity problem is confirmed.

V. Conclusions

The aim of this study was to examine the effect of fiscal decentralization on economic growth. By using the data of 26 (out of 33) provinces for the periods of 1992-2002, the estimated model produces the following results: first, the expenditures indicator positively and significantly influences economic growth both in the short and long terms. Meanwhile revenue indicators influence economic growth negatively. Second, investment is negatively related to economic growth. This implies that the investment is not efficient or for a short term, investment that has been done has no multiplier effects and have no value added. While the real export, inflation, labour force and population are negatively related to economic growth. For the lagged variable of economic growth, positive and significant relationship is reported with economic growth.

Several policy implications can be derived from these findings. First, that local government should be able to increase their non-tax revenues. Second, that there is a need to create conducive conditions for capital inflows. The availability of good infrastructure, and assurance of security and political stability are among conditions that can be expected to support local economic activities.

Third, there is also a need to develop a clear framework for fiscal decentralization assignment such as income redistribution and borrowing. Central government should carry the policy responsibility for stabilizing income redistribution. Fiscal decentralization can degrade central government expenditures and at the same time improve the expenditures of sub-national government, including the *midewind* governance like provinces and local governance like municipalities and communes. As for

borrowing, for local government with limited source of finance, there is no reason to expect that local government should escape from taking loans to fund their activities.

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