The Impact of Fiscal Desentralisation on Income Inequality and Labor Market Performance in East Kalimantan Province, Indonesia: A Structural Model Analysis

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Abstract

This paper elaborates the effects of fiscal decentralisation in Eastern region of Indonesia by taking East Kalimantan Province as focused area. The main objective of this paper is to analyse the impact of natural resource revenue and capital expenditure on welfare indicators (income inequality and labor market outcome approached by labor absorptions) directly and indirectly through sectoral economic performance. Here, structural model of econometrics technique is used to find those effects among variables. Empirical results from this research show that fiscal decentralisation is able to reduce the degree of inequality particularly from the expenditure performance rather than income side. This is indicated by the negative findings on the effects of direct capital expenditure on the Gini Index. These findings are consistent with the hypothesis and significant in terms of statistical calculations. The expenditure side is also able to increase the ability of the labor market to absorb labor force in large numbers, although not significant statistically.

Keywords: Fiscal desentralisation; income inequality; labor; Gross Domestic Product

1. Introduction

Indonesia is one of country among many countries which has implemented desentralisation process on its development since 2001. It is practiced based on National Regulation No. 33 Year 2004 and National Regulation No 32/2004. This system gives all regions (regencies and municipalities) at all provinces opportunity to receive large portion of budget from Central Government based on its natural resources and tax revenue (non-natural resources base).

This study elaborates the effects of fiscal decentralisation in Indonesia by taking Eastern Indonesia as the focus area, emphasizing on East Kalimantan province, which is one among three richest provinces in this huge country. It is interesting to connect whether the great acceptance of revenue from natural resources that owned by this province under the flag of fiscal decentralisation regulation has a positive effect for local welfare indicators. As an example, declining income inequality, rising labor market outcome performance and improving an output of economy by sector dramatically.

Empirically, the relationship between decentralization and a decrease in inequality is quite controversial. In the context of the revenue, refers to the study of Tsui (1996), Qiao et al. (2002), Rodriguez-Pose and Gill (2003), Bonet (2005), Sepulveda, et al. (2011), Pike, et al. (2012) and Nguyen, et al. (2012), they all find a negative relationship, while other studies such as from Shankar and Shah (2001), Gil, et al. (2002), Hong (2003), Baron and Meisel (2003), Kim, et al. (2003) reveal the indications that decentralisation had increased the incidence of income inequality. In Indonesia, Dyah (2010) discovers a negative result, while another study from Zakaria (2013) shows a positive results

The effect of fiscal decentralization, on the expenditure side, to the inequality of income and employment also performed. The positive effects of capital expenditure on labor market investigated by Dipendra (1998), Sodik, et al. (2007), Fan, Yu & Jitsuchon (2008), Benos (2009), Hasan (2010), Hidayat (2013) and Aladejare (2013). But the study of Bagdigen & Centitas (2003) in Turkey could not find a clear view about this issue. Meanwhile, Aritenang (2009) on the case in Indonesia has found that government spending has a negative influence on employment. It is caused by a high proportion of personnel expenditure rather than capital expenditure which is expected could be expanding the growth of economic sector / private sector inside the regions.

In the case of Indonesia, studies linking the issue of fiscal decentralisation on the level of economic progress are also made by Komarulzaman & Alisjahbana (2006). They tested the effects of revenues from natural resources and found that the revenue-sharing is contributing positively on economy. These results also support Buser (2011) and Nguyen, et al studies. (2012). Furthermore, Sinaga, et al. (2005) and Faridi (2012) find the implications of fiscal decentralisation on labor absorption is positive. On the basis of empirical studies, it is important to examine these relationship in the context of decentralised Indonesia..

Income inequality in East Kalimantan (Kaltim) seems to be the key issues worth examining further. This is due to the trend of income inequality (using the Gini index) in this region becomes increasingly prevalent,

especially in 1996 to 2009. In general, the trend of income inequality in the province of East Kalimantan moves up gradually in that year (see Figure 1).

Kaltim seems to be having a positive trend in terms of income inequality, although its performance still below the national Gini index. During 1999 and 2009 period, this index in this region always rose gradually and peaked at 2009 above national Gini index. Continuously, it decreased slowly in 2010 to 2014, indicating that there was an improvement of local welfare during that time.
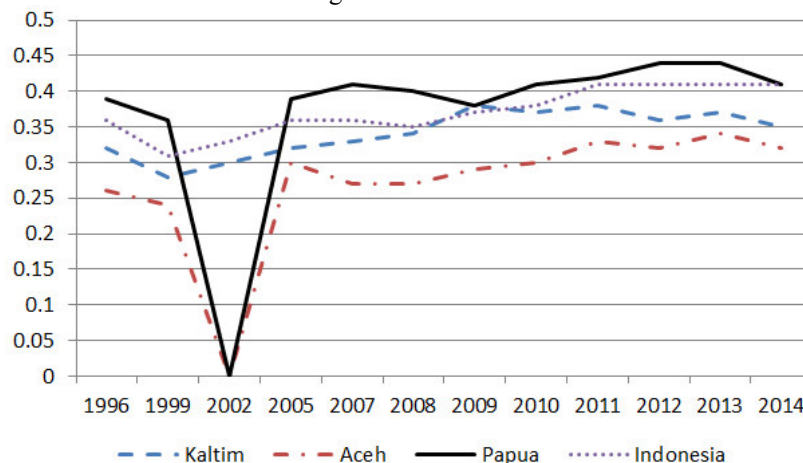

Figure 1. Trend of Income Inequality (proxied by Gini Index) in East Kalimantan and compared with Aceh, Papua, and Indonesia, during 1996-2014 period

Source: National Statistic Agency, Indonesia (Badan Pusat Statistik) (2014)

When compared to Aceh and Papua, the two rich provinces in Indonesia based on their revenue from natural resources ownership, it shows that income inequality in East Kalimantan is much better than Papua itself and nationally (Indonesia) as well. However, the rate of inequality in Kalimantan is higher than Aceh before it was declining to the 0.35 point averagely, especially during 2009-2014 period. However, in 2013, it indicates an increase, before falling again in 2014. Meanwhile, income inequality in Aceh tends to increase consistently from 2007 to 2013 (see Figure 11).

The main objective of this paper is to quantify the role of fiscal decentralisation variables (natural resource revenue and capital expenditure) in the context of regions in Indonesia and its impact on welfare indicators. Specifically, this paper has some questions: Does fiscal desentralisation has a positive impact directly to reduce income inequality and create employment opportunity for the local people in East Kalimantan Province? Does it also can accellerate the performance of all economic sectors? And do they mediate its impact on inequality and labor market outcome?

2. Methods and Analysis
2.1. Scope of Research

This research was conducted using regional databases (regency and municipality) in the province of East Kalimantan, Indonesia. Consisting of 13 regions, namely Balikpapan, Samarinda, Bontang, and Tarakan. That areas are municipality. The rest is a regency, namely Berau, West Kutai, Kutai Kartanegara, Penajam Paser Utara, Pasir, Malinau, Nunukan, and Bulungan.

We perform secondary data for this research. We construct a panel data, consisting time series data from 2001 to 2013 (13 years). For the cross section, we indicate 13 regions as mentioned above. At the end, the observation number consists 169 observations. Indonesia Database for Policy and Economic Research (INDODAPOER) published by the World Bank is taken as main source of data in this research.

INDODAPOER is a data base spesialised for Indonesia development analysis and it is downloadable. How ever, some of data are missing in accordance with their year. To handle this, we used some adjustment. First, after modifying again this data into panel structure, we then completed again a missing data based on Regional Statistic Agency (BPS) data base in 13 regions. Then, for some variables which are still "empty" for their value, we employed Interpolation Technique using Eviews program to find the missing value.

2.2. Model and Conceptual Framework

This study utilised econometric analysis approach, employing the structural path model as a technique to analyse the structural relationships among exogenous variable and endogenous. Figure 2 presents a schematic structural model of the entire relationship path variables. Consisting of exogenous variables (X1, X2, X3 and X4) and endogenous variables (Y1, Y2, Y3, Y4, and Y5). More specifically, the structure of the relationship between these variables is shown in Figure 2 below:
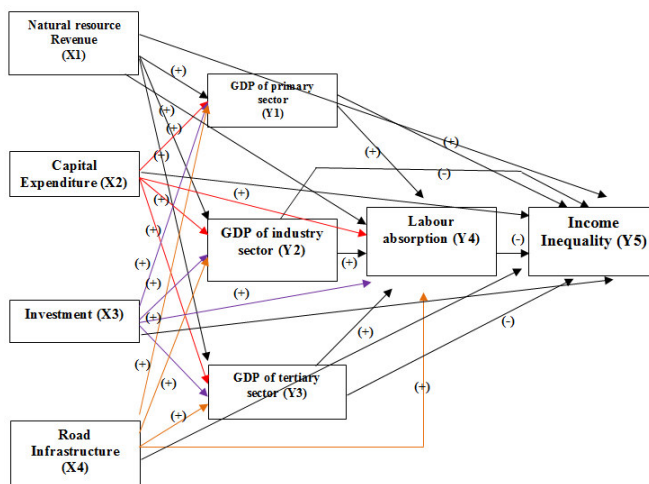
Figure 2. Model Framework and Sign Estimation (Hypothesis)

Based on Figure 2, we know that the exogenous variables (X1, X2, X3, X4) have a direct effect to the endogenous variables (Y1, Y2, Y3, Y4, Y5). We put X1 (natural resource revenue) and X2 (capital expenditure) to represent fiscal desentralisation variables, from income side and consumption/expenditure side respectively. On the other side, investment (X1) and road infrastructure (X4) act as a control variable.

Discussing about hypothesis, natural resource revenue has been estimated to have a positive sign on income inequality and labor market outcome. On the other hand, capital expenditure (also proxied fiscal issue) has a negatif sign on the first, but expected to contribute positively to the second variable (labor absorption). Investment and road are indicated to have a positive effect on both variables respectively. However, concerning the equality effect of investment, we predict that investment has a negative sign, while for the last, it is predicted to have a positive implication. Variable of Gross Domestic Product/GDP is representing economic situation for a macro view. It employs to see the indirect effect of fiscal performance mediated by three of them (primary sector, industrial sector, and tertiary sector).

Meanwhile, the mathematical functional model framework can be seen below.

$$Y_1 = f(X_1, X_2, X_3, X_4) \tag{1}$$
$$Y_2 = f(X_1, X_2, X_3, X_4) \tag{2}$$
$$Y_3 = f(X_1, X_2, X_3, X_4) \tag{3}$$
$$Y_4 = f(X_1, X_2, X_3, X_4) \tag{4}$$
$$Y_5 = f(Y_1, Y_2, Y_3, X_1, X_2, X_3, X_4) \tag{5}$$

According to the functional model above, we construct a simple relationship in a structural design analysis using econometric structural path. This model is linking an exogenous and endogenous variable structurally and simultaneously. A brief reduced form for each of this model, both direct and indirect effect, can be seen at the attachment of this paper. At the end, this model is described as follows:

$$Y1 = \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + e1 \tag{6}$$
$$Y2 = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e2 \tag{7}$$
$$Y3 = \gamma_1 X_1 + \gamma_2 X_2 + \gamma_3 X_3 + \gamma_4 X_4 + e3 \tag{8}$$
$$Y4 = \rho_1 Y_1 + \rho_2 Y_2 + \rho_3 Y_3 + \delta_1 X_1 + \delta_2 X_2 + \delta_3 X_3 + \delta_4 X_4 + e4 \tag{9}$$
$$Y5 = \theta_1 Y_4 + \vartheta_1 Y_1 + \vartheta_2 Y_2 + \vartheta_3 Y_3 + \varphi_1 X_1 + \varphi_2 X_2 + \varphi_3 X_3 + \varphi_4 X_4 + e5 \tag{10}$$

If we transform the model and use natural logarithm dan then constructing again into the equation, we find the model as follows:

$$\ln Y_1 = \ln \alpha_0 + \alpha_1 \ln X_1 + \alpha_2 \ln X_2 + \alpha_3 \ln X_3 + \mu_1 \tag{11}$$
$$\ln Y_2 = \ln \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln Y_1 + \mu_2 \tag{12}$$
$$\ln Y_3 = \ln \gamma_0 + \gamma_1 \ln X_1 + \gamma_2 \ln X_2 + \gamma_3 \ln X_3 + \gamma_4 \ln Y_1 + \gamma_5 \ln Y_2 + \mu_3 \tag{13}$$
$$\ln Y_4 = \ln \rho_0 + \rho_1 \ln X_1 + \rho_2 \ln X_2 + \rho_3 \ln X_3 + \rho_4 \ln Y_1 + \rho_5 \ln Y_2 + \rho_6 \ln Y_3 + \mu_4 \tag{14}$$
$$\ln Y_5 = \ln \theta_0 + \theta_1 \ln X_4 + \theta_2 \ln X_1 + \theta_2 \ln X_3 + \theta_4 \ln Y_1 + \theta_5 \ln Y_2 + \theta_6 \ln Y_3 + \mu_4 \tag{15}$$

Where α_0 β_0 γ_0 ρ_0, θ_0 is an intercept of each equation; and the rest parameter is act as coefficient. To calculate this model and find all the parameter including significance of variable (probability value), we utilised IBM SPSS AMOS version 22. We also performed Eviews to estimate missing value in several variables, using interpolation method.

Information on Table 1 below describes an operationalisation of all variables that are used in this analysis.:

Table 1. Description of Variable and Source

Symbol	Variabel Description	Source	Definition	Type of Variable
X1	Natural resource revenue (in IDR million)	World Bank (INDODAPOER)	Proxied by the realisation of revenue based on natural (oil & gas, coal, and forest)	Fiscal Variable/Exogenous
X2	Capital Expenditure (in IDR million)	World Bank (INDODAPOER)	Proxied by the realisation of expenditure to purchase : goods and service, capital assets	Fiscal Variable/Exogenous
X3	Investment (in IDR million)	World Bank (INDODAPOER)	Proxied by the realisation of GDP expenditure on gross fixed capital formation	Control Variable/Exogenous
X4	Road Infrastructure (in lenght)	National Statistic Agency (BPS)/ Regional Statistic Agency	Approached by the lenght of road (in kilometres) constructing by regional and province	Control Variable/Exogenous
Y1	Gross Domestic Regional Product (GDRP) of primary sector (in IDR million)	World Bank (INDODAPOER)	Approached by the value of output in each sector (agriculture, fisheries, forestry, livestock, & mining)	Endogenous Variable
Y2	Gross Domestic Product (GDP) of industry sector (in IDR million)	World Bank (INDODAPOER)	Approached by the value of output and totalled for each sector (all manufacturing industry) in each regency/municipality	
Y3	Gross Domestic Product (GDP) of tertiary sector (in IDR million)	World Bank (INDODAPOER)	Approached by the value of output in each sector (all services & trade, banking, & hospitality) each regency/municipality	
Y4	Labor market performance (in person)	World Bank (INDODAPOER)	Proxied by the number of people who have a permanent work/or employed by formal sector	
Y5	Income Inequality (Gini Index)	National Statistic Agency (BPS)/ Regional Statistic Agency	Proxied by the Gini Ratio which is formulating by the World Bank	

3. Result and Discussion

3.1. Direct Effect

From the result of our analysis using a structural econometric test (see Appendix 1), we found direct influence of exogenous variables on income inequality and labor market outcome/labor absorption (can be seen in Fig 3). The effect of fiscal decentralization variables (natural resource revenue) to the income inequality showed consistent results with the hypothesis, but not significant statistically. These results support the findings of the study Shankar and Shah (2001), Gil, et al. (2002), Hong (2003), Baron and Meisel (2003), Kim, et al. (2003), and Zakaria (2013) in the case in Indonesia.

On the other hand, the effect of capital expenditure was significant, but it was uncorrelate with the hypothesis. It obviously is contrary with the study of Dipendra (1998), Sodik, et al. (2007), Fan, Yu & Jitsuchon

(2008), Nikos (2009), Hasan (2010), Hidayat (2013) and Aladejare (2013) who has found positively the effect of this variable. Our finding supports study of Aritenang (2009) who investigated the same variable in the case of Indonesia.

Meanwhile, investment has a positive effect on inequality and this finding was consistent with the hypothesis dan significant statistically. It also occured on labor market performance regarding to the predictions as estimated previously. On the contrary, road infrastructure also affects negatively on the performance of the labor market (but insignificant in terms of probability value – see Appendix 1), while for inequality, there was a significant influence in reducing inequality.
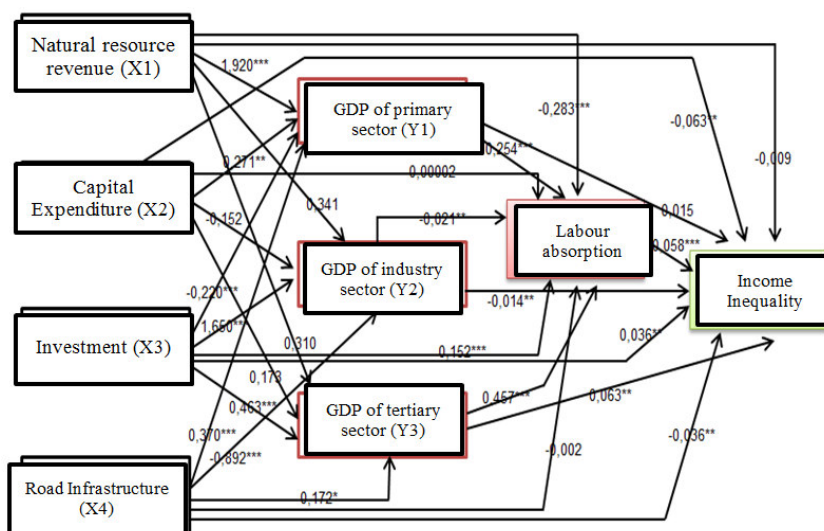

Figure 3. Estimation Result by Model Framework

Source: output result calculated using SPSS AMOS software, see full results in Appendix 2

Note: *)= significant at α = 10 %   **) = significant at α = 5 %
            ***)= significant at α = 1 %

The result of the direct impact of fiscal decentralization on economic structural change can also be seen in the results of this analysis. For example, from the revenue side, it appears that the direct effect of the natural resources revenue-sharing in all sectors had an appropriate direction similar with the hypothesis, which is positive, though only the primary sector which is statistically significant influenced by this model.

From the expenditure side, the entire sectors had same direction in terms of parameters as the revenue side, even consistently only primary sector is significantly affected in this model. Findings in the secondary sector analysis outcomes had a negative coefficient direction, contrary to the hypothesis that found positive sign, but the effect of these results is insignificant. Meanwhile, investments have a direct impact in improving the output performance of the secondary and tertiary sectors (and this supports the findings from), but it was conversely with the result of primary sector based on this evidence of analytical result using AMOS.

3.2. Indirect Effect

The results of the analysis in Table 2 showed a parameter value of the indirect effects for fiscal decentralisation on income inequality and employment through the performance of all sectors inside East Kalimantan economy. The revenue side indicated to have a negative impact, particularly if it ws mediated by labor absoprtion and industrial performance. However, this variable has positive implications if mediated by the performance of the primary sector and the tertiary sector respectively in the structure of the economy

Capital expenditure has consistently turned out to be a positive influence indirectly, either through employment (labor market outcome) or if mediated by each sector inside the economy. Investment, on the other hand, potentially can be lowering income inequality if mediated by primary sector and employment as well as the industrial performance, but it could be rising inequality as well if only mediated by the labor market and the tertiary sector, on the other side. As for the road infrastructure, it also was able to reduce inequality through tertiary sector, but it probably indicated an increase for high incidence of Gini index, especially if we mediated through the primary and secondary sectors.

Table 2. Indirect Effect on Income Inequality (Y5)

No	Indirect Effect	Parameter Value (mediated by):			
		Y4	Y1 Y4	Y2 Y4	Y3 Y4
1	Natural resource revenue (X1) ➔ Income Inequality (Y5) through:	-0.016414	0.028285	-0.00042	0.00822
2	Capital Expenditure (X2) ➔ Income Inequality (Y5) through:	0.000012	0.003992	0.00019	0.00459
3	Investment (X3) ➔ Income Inequality (Y5) through:	0.0088	-0.00324	-0,00195	0,01227
4	Road Infrastructure (X4) ➔ Income Inequality (Y5) through:	-0.000116	0.005451	0.00109	-0.00456
5	GDP of primary sector (Y1) ➔ Income Inequality (Y5) through:	0.01473			
6	GDP of industrial sector (Y2) ➔ Income Inequality (Y5) through:	-0.00122			
7	GDP of tertiary sector (Y3) ➔ Income Inequality (Y5) through:	0.026506			

Source: Calculated by authors based on Appendix 1 results

Table 3. Indirect Effect on Labor Market Outcome (Labor Absorption) (Y4)

No	Indirect Effect	Parameter Value (mediated by):		
		Y1	Y2	Y3
1	Natural resource revenue (X1) ➔ Labor absorption (Y4) through:	0,4876	-0.0071	0.1416
2	Capital Expenditure (X2) ➔ Labor absorption (Y4) through:	0,0688	0.0031	0.0790
3	Investment (X3) ➔ Labor (Y4) through:	-0,0558	-0.0337	0.2115
4	Investment (X4) ➔ Labor (Y4) through:	0,0939	0.0187	-0.0786

Source: Calculated by authors based on Appendix 1 results

4. Conclusion

This study is succeed to capture some important findings: First, we found that fiscal decentralisation in East Kalimantan was able to reduce the degree of inequality particularly from the expenditure performance rather than income. This is indicated by the negative findings on the effects of direct capital expenditure on the Gini Index. These findings are consistent with the hypothesis and significant in terms of statistical calculations. The expenditure side is also able to increase the ability of the labor market to absorb labor force in large numbers, although not significant statistically.

Indirectly, our study also found that fiscal decentralization was able to play a positive role in improving the welfare of local people through the performance of the primary sector and industrial industry compared to the tertiary sector. This was indicated by findings which was generating positive parameters indirectly if the fiscal variables multiplied by the parameter of all economic sectors directly on the welfare indicators.

At the end, the debate about whether the implementation of fiscal decentralisation has a positive contribution for local welfare based on this study can be proven, especially in the case of decentralised Indonesia (taking the case in East Kalimantan as a sample). The local government should use its power of authority to ensure the ability of budgeting concerning public spending could run rapidly focusing on improving the welfare of the poor groups and underdeveloped people. This, in the long term, is expected to reduce disparity among social level and income inequality itself which can be damaging the quality of economic growth and development entirely.

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Appendix 1:
Maximum Likelihood Estimates
Regression Weights: (Group number 1 - Default model)

			Estimate (Standardized)	Estimate (Unstandardized)	S.E.	C.R.	P	Label
Y1	<---	X1	.644	1.920	.185	10.352	***	
Y1	<---	X2	.135	.271	.125	2.168	.030	
Y1	<---	X3	-.170	-.220	.062	-3.560	***	
Y1	<---	X4	.197	.370	.091	4.060	***	
Y2	<---	X1	.059	.341	.444	.770	.441	
Y2	<---	X2	-.039	-.152	.299	-.508	.612	
Y2	<---	X3	.636	1.605	.148	10.856	***	
Y2	<---	X4	-.244	-.892	.218	-4.092	***	
Y3	<---	X1	.139	.310	.196	1.580	.114	
Y3	<---	X2	.115	.173	.132	1.310	.190	
Y3	<---	X3	.478	.463	.065	7.083	***	
Y3	<---	X4	-.122	-.172	.096	-1.783	.075	
Y4	<---	Y1	.556	.254	.021	11.978	***	
Y4	<---	X1	-.208	-.283	.064	-4.420	***	
Y4	<---	X2	.000	.000	.034	.008	.994	
Y4	<---	Y3	.746	.457	.020	22.750	***	
Y4	<---	Y2	-.091	-.021	.009	-2.397	.017	
Y4	<---	X3	.256	.152	.024	6.320	***	
Y4	<---	X4	-.002	-.002	.027	-.069	.945	
Y5	<---	Y4	.229	.058	.054	1.068	.286	
Y5	<---	Y1	.133	.015	.020	.771	.441	
Y5	<---	Y2	-.243	-.014	.006	-2.366	.018	
Y5	<---	Y3	-.408	-.063	.028	-2.231	.026	
Y5	<---	X2	-.271	-.063	.023	-2.758	.006	
Y5	<---	X3	.242	.036	.018	1.989	.047	
Y5	<---	X4	-.167	-.036	.018	-2.008	.045	
Y5	<---	X1	-.027	-.009	.046	-.202	.840	

Appendix 2:

Table. Summary of Estimation Result and Consistency (Direct Effect)

Exogenous Variables	Endogenous Variables	Predicted Sign	Estimation Result	Significant statistically
Natural resource revenue	Income Inequality	Negative	Negative	No
	Labor market outcome	Positive	Negative	Yes
	GDP of Primary Sector	Positive	Positive	Yes
	GDP of Industry Sector	Positive	Positive	No
	GDP of Tertiary Sectir	Positive	Positive	No
Capital Expenditure	Income Inequality	Negatif	Positive	Yes
	Labor market outcome	Positive	Positive	No
	GDP of Primary Sector	Positive	Positive	Yes
	GDP of Industry Sector	Positive	Negative	No
	GDP of Tertiary Sector	Positive	Positive	No
Investment	Income Inequality	Positive	Positive	Yes
	Labor market outcome	Positive	Positive	Yes
	GDP of Primary Sector	Positive	Negative	Yes
	GDP of Industry Sector	Positive	Positive	Yes
	GDP of Tertiary Sector	Positive	Positive	Yes
Road Infrastructure	Income Inequality	Negative	Negative	Yes
	Labor market outcome	Positive	Negative	No
	GDP of Primary Sector	Positive	Positive	Yes
	GDP of Industry Sector	Positive	Negative	Yes
	GDP of Tertiary Sector	Positive	Negative	Yes
GDP of Primary Sector	Income Inequality	Negative	Positive	No
GDP of Primary Sector	Labor market outcome	Positive	Positive	Yes
GDP of Industry Sector	Income Inequality	Negative	Negative	Yes
GDP of Industry Sector	Labor market outcome	Positive	Negative	Yes
GDP of Tertiary Sector	Income Inequality	Negative	Negative	Yes
GDP of Tertiary Sector	Labor market outcome	Positive	Positive	Yes
Labor market outcome	Income Inequality	Negative	Positive	Yes