



# Effect of the Resource Curse on Human Resource Development

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## Abstract

Natural resources are often considered a source of poverty, instability, and underdevelopment. The phenomena is called a “Resource Curse,” as analyzed by Auty (1993), who stated the following characteristics: (1) distortion in exchange rate or “Dutch Disease,” (2) dependency on and overconcentration of resource exports, (3) increase in rent seeking activities and related corruption, and (4) soft budget constraints and overspending, which might increase external debt. It is observed that several resource rich countries struggle with poverty and inequality, while countries with scarce natural resources such as Korea, Taiwan, Hong Kong, and Singapore were successful in developing their economies and eradicating poverty (Sacks and Warner 2001).

The literature further analyzes the various aspects of this “Resource Curse.” Many studies consider rent-seeking, corruption, and deterioration in governance because of abundant natural resources. Kahn (1984) argues that the direct inflow of income into public sectors is a major driving force behind rent-seeking activities. Other studies consider the endowment of natural resources as impediments in democratic development (Ross 2001).

Collier & Hoeffler (1998/2002) discussed

that the probability of conflict was explainable by factors of grievance and opportunity, which are influenced by the unequal endowment of natural resources. Collier also argued that the advantages of being under a democratic polity, which enjoys a 2% higher growth rate over an autocratic polity, is offset if the natural resource rent is in excess of 20% of the GNI(Gross National Income). Ross (1999) suggested that the economic performance of oil producing and exporting countries could deteriorate after the nationalization of oil related businesses due to soft budget constraints, which might cause fiscal drain. Khan (1994) also linked a rise in export revenue to the prevalence of corruption in Nigeria.

It is widely believed that an appreciation in currency through the export of resources may result in the weakening of export competitiveness of manufacturing and other non-resource commodities, resulting in “Dutch Disease.”

In short, these studies argue that resource related earnings might negatively affect economic performance and governance in many countries, especially developing ones. However, what are these mechanisms? One root cause is imbalance between the level of income and human resource development. Based on the literature and prior studies, this

study tries to explain the relationship between abundance of natural resources and underdevelopment of human capacity.

**1. Relationship between resource and governance**

We explore the correlation between resources and governance. A comprehensive indicator of governance is the “World Governance Index” (WGI) available through the World Bank database. As indicators, the WGI considers corruption control, political stability and absence of violence, government effectiveness, regulatory quality, voice and accountability, and rule of law. Corruption control represents the overall seriousness of corruption; therefore, we use it as a dependent variable, while other indicators are independent variables that represent quality of policy and institution. We exclude the rule of law to avoid collinearity; instead, we include trade openness as an important factor in determining the quality of institution. We include resource rent as an independent variable to understand if any resource factors are have enough significance to explain a degree of corruption or if there is any significant correlation between the two. Resource rent is defined as the difference between cost of extraction and total sales revenue. If a figure of resource rents is large, it means that one can get money without spending much in extracting resources. We used the figure of total natural resource rents divided by GDP (TNR/GDP). Total natural resource rents include rent from oil, gas, coal, non-fuel minerals, and forest products. Macro-economic indicators such as GDP per capita, the Gini index, and trade openness were included as independent variables. We controlled for countries from the Sub-Saharan region as a dummy variable. No lag is considered and a basic assumption is that the quality of policies and institutions may affect governance.

The equation is as follows:

$$Y_i = a + bGW_j + cTN_j + dTR + eM_j + fSSA_j + u_j$$

where Y = Control corruption of country j

WG = Independent variables of WGI

TN = Total natural resource rent

TR = Trade Openness

M = Macro-economic variables

SSA = Sub-Sahara dummy

The results of the regression are as follows:

- (1) Analyzing all independent variables, we find that the Sub-Sahara dummy, voice and accountability, and per capita GNI are significant at 1% level and government effectiveness at the 5% level.
- (2) After removing all WGI variables to avoid multicollinearity, the factors of trade openness, per capita GDP, and total natural resource rent are significant at 1% level.

Table 1. Control of Corruption (n = 145)

	(1)	(2)	(3)
GINI	0.001744 (0.295)	0.0030 (0.3488)	-0.0054 (0.3066)
Sub-Sahara	0.174079 (0.009) **	0.1103 (0.3018)	-0.442 (0.0154) *
Trade openness 2010	0.000556 (0,596)	0.0055 (0.0030) **	
Political stability	0.002485 (0.114)		
Government effectiveness	0.005935 (0,048) *		
Regulatory quality	-0.00312 (0.114)		
Voice & accountability	0.687508 (0.000) **		
GDP per capita	1.1E-05 (0.000) **	0.0000 (0.0000) **	
Total natural resource rent	-0.00316 (0.154)	-0.0197 (0.0000) **	-0.0269 (0.0000) **
(P-value)	* < 0.05 ** < 0.01		

(3) When only the variables of GINI, Sub-Sahara dummy, and total natural resource rent are considered, the Sub-Sahara dummy and total natural resource rent are significant at the 5% and 1% level, respectively.

Therefore, a preliminary estimation concludes that, similar to prior literature, resource rent is negatively affecting governance. This is undoubtedly the most important aspect of the resource curse.

**2. Effect of oil and mineral resources on human development**

(1) Regression analysis

One of stereotypical discourse on resource rich countries is that the population is lazy . Abundant revenue from resource exports support welfare programs, governments provide public sector jobs, and immigrant workers from poorer countries work in construction, services, and other blue-collar jobs. This results in a relaxed attitude and an inability to work hard and develop human resources. If this hypothesis is true, there exists a “resource curse” in the development of human resources in such countries.

We use adult literacy rate (total) as a dependent variable and GINI, GNI per capita, and total natural resource rent as independent variables. The data are obtained from the World Bank database. A hypothesis is as follows:

$$L_j = a + bGINI_j + bGNI_j + cTN_j + u_j$$

L = Adult Literacy Total

The regression result is shown in Table 2  
Unarguably, the level of income (per capita

Table 2

变数	(1)	(2)	(3)
GINI index (World Bank estimate)	-0.0382 (0.8485)	-0.1288 (0.5559)	
GNI per capita (constant 2005 US\$)	0.0019 (0.0000)	**	
Total natural resources rents (% of GDP)	-0.1331 (0.3375)	-0.3024 (0.0417)	-0.2947 * (0.0466) *
(P-value) *<0.5 **<0.01			

GINI) is the most important determinant. Even this simple examination tells us that there is a certain relationship between human resource development and natural resources.

(2) Indexation of income and human resource

For further analysis of this relationship, we consider it necessary to classify the countries by their economic patterns, reflecting various “dependency” on natural resources. To achieve this, we classified countries and created an INDEX of life expectancy at birth (e) and adult literacy total (l) divided by income (y = per capita GNI), converted to common logarithm. This is similar to how the UNDP’s Human Development Index compares income levels (using a logarithm of per capita income).

$$INDEX(e_j, l_j) = \frac{(e_j, l_j)}{\log y_j}$$

The INDEX is an indicator of the high, low, or average proportions of health and education in each country compared to its income. If the INDEX figure of a certain resource rich country is disproportionately low, it is assumed that a resource curse of human resource development exists.

Table 3 shows the average figures by groups.  
Income figure is expressed in US dollar at

<sup>1)</sup> For example, “Idle kingdom, Saudi Arabia’s youth employment woes go far deeper than most realized.” <http://foreignpolicy.com/2011/07/19/idle-kingdom/> (16 Jan 2016)

Table 3. Average of per capita income, life Expectancy, adulty, Literacy and their indexation by groups (n = 176)

	Per Capita Income (US\$)	Life Expectancy (Years)	Adult Literacy (%)	INDEX Life Expectancy	INDEX Adult Literacy
Oil Exporting ALL	6,054	66.1	82.9	18.9	23.4
Oil Exporting Former Socialist	4,555	67.6	99.6	18.9	27.9
Oil Exporting Others	6276	65.9	80.2	18.9	22.7
Other Resource (Mineral) exporting	1603	58.1	69.1	20.2	23.1
OECD	37204	79.9	99.9*	17.5	22.0
High Income	14097	75.9	96.2	18.5	20.8
Middle Income	4352	73.6	99.3	20.3	25.8
Low Income	1141	65	78.9	22.4	26.3

current prices of the average between 2002 and 2011. Life expectancy at birth and adult literacy are averages of the same period. First, we classified the countries by income level. Countries exporting resources were reclassified as oil exporting countries and mineral resource exporting countries if the relative size of exports exceeds 20% of GDP. Oil exporting countries are further classified into two categories: former socialist (the Soviet bloc and Eastern Europe) and others. Data are obtained from the World Bank database (September 2013) and the classification criteria by country income is based on that of the World Bank.

We first compared the life expectancy and literacy of oil exporting countries (except former socialist countries) with those of middle and low

Income countries (Table 4). The average figures for oil exporting countries (except former socialist countries) are significantly lower than those of middle income countries, despite their average per capita income being \$6276 against \$4352 of middle income countries. While there are no significant differences between these countries and low income countries, as the average figures are almost the same, the INDEX figures show that there are significant differences between oil exporting countries (except former socialist countries) and both middle income and low income countries in both life expectancy and literacy. We conclude that resource curse on health and education exists for oil exporting countries (except former socialist countries). The former socialist oil exporting countries perform relatively better in health and education, due to the lasting effect of the developmental policies of socialist era governments, prioritizing health, education, and infrastructure. This observation requires further exploration.

Table 5 shows a similar analysis for mineral exporting countries

The average per capita income of mineral exporting countries is \$1603, which is slightly higher than that of low-income countries at \$1141. It is natural that there is a significant difference

Table 4. Average Difference between Oil exporting countries (except former socialist countries) and both middle and low-income countries

	Middle Income Countries	Low Income countries
Life Expectancy	0.0004**	0.3558
Literacy	0.0026**	0.3793
INDEX Life Expectancy	0.0100**	0.0000**
INDEX Literacy	0.0020**	0.0082**
P-value *<0.5 **<0.01		

Table 5. Average difference between mineral exporting countries and both middle and low-income countries

	Middle Income Countries	Low Income countries
Life Expectancy	0.0000**	0.0000**
Literacy	0.0003**	0.0247**
INDEX Life Expectancy	0.4340	0.0012**
INDEX Literacy	0.0796	0.0334*
P-value *<0.5 **<0.01		

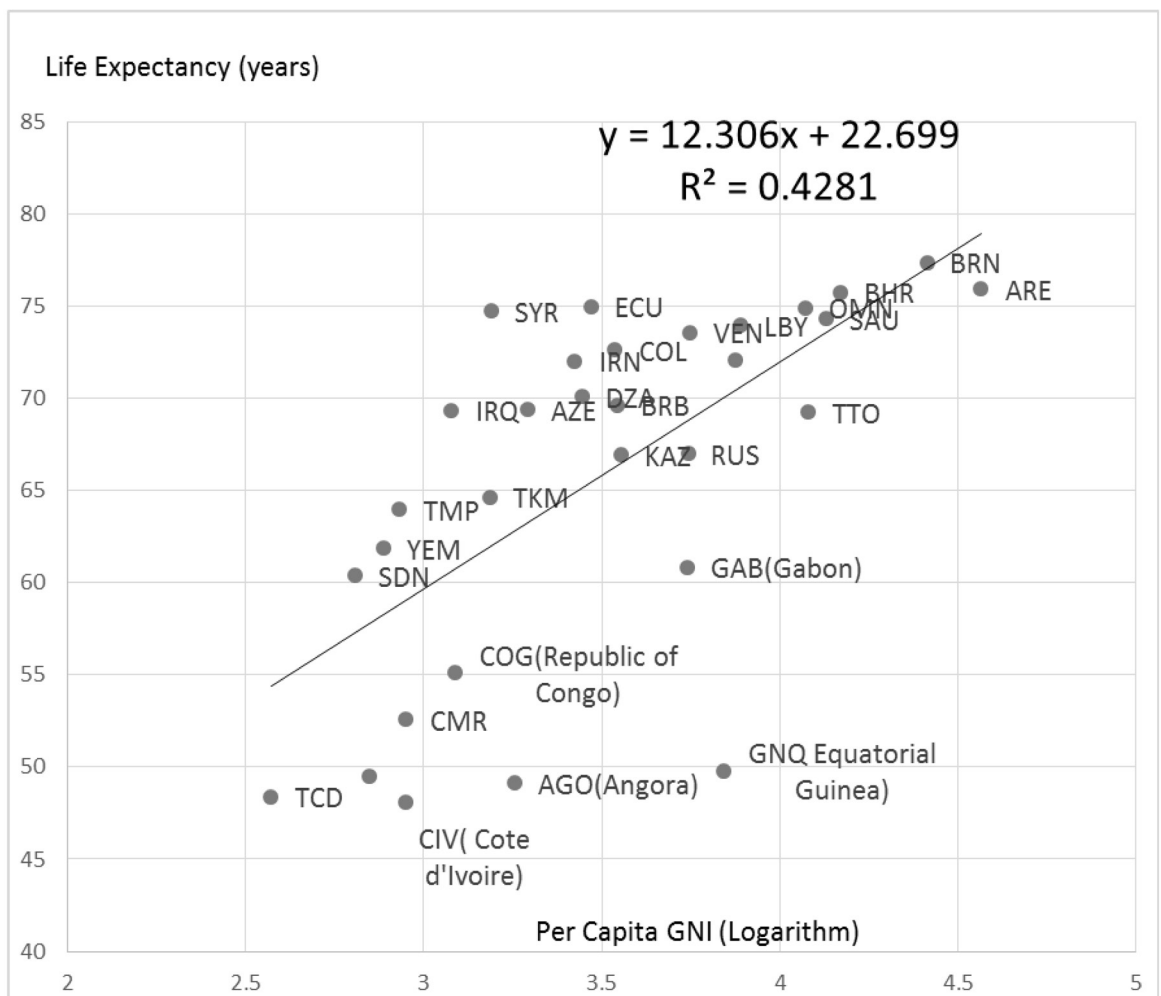


Figure 1. Linear Regression of Oil Exporting Countries on Life expectancy

when compared with middle-income countries, in averages of both health and education indicators. Notably, both the average and INDEX figures for this group are significantly lower than that of low-income countries in health and education.

The analysis suggests that the resource curse exists in human resource development, represented by the health and education sectors. The level of human resource development in oil exporting countries is the same as in low-income countries, which is disproportionately lower than the level suggested by the per capita income. The level of human resource development in the mineral exporting countries is even lower than that of the low-income countries, which is disproportionately lower than the level suggested by the per capita income.

We also find some regional tendency in these disproportionate developments.

Figure 1 shows the regression of life expectancy and per capita income (Logarithm). The more a country is far “south-east” from the regression line, the disproportionately lower its life expectancy. From figure 1, we can identify GNQ (Equatorial Guinea), AGO (Angora), CIV (Cote d’Ivoire), NGA (Nigeria), GBA (Gabon), etc., as countries in this category.

Figure 2 is a similar exercise for adult literacy and per capita income (Logarithm). We identify DZA (Algeria), SAU (Saudi Arabia), and ARE (United Arab Emirates) as disproportionate countries. Figures 3 and 4 show regression of life expectancy and adult literacy, respectively, with per capita GNI (Logarithm) of mineral exporting countries.

### (3) Implications of the disproportionate development between human resource and income

Even with clear evidence of disproportionate

development between human resource and income, one may question, “So what?” An answer to this fundamental question is that the very objective of development is human resource development. Not having achieved this level of human resource development, despite the requisite income levels indicates a developmental failure.

There are some alternative interpretations. A disproportionately low literacy level in some oil exporting countries may underpin what we call the “Rentier States” hypothesis. The huge inflow of oil money functions as a disincentive for both employment and education. In some oil exporting countries, this disincentive may have impeded industrial development along with the “Dutch disease” phenomena. Youth face unemployment in some gulf countries. In addition, the falling price of oil during 2014 and 2015 and perhaps beyond is posing fiscal problems for these states. Therefore, disproportionate development is throwing up some urgent challenges.

In case of mineral exporting countries, the highly disproportionate one are concentrated in Sub-Saharan Africa. Some have been devastated by long civil conflicts or threat of war and disintegration. As Collier & Hoeffler (2004) noted, natural resource with higher rent is a factor that leads countries into conflict.

Economic diversification and exiting a resource “mono-culture” is necessary; therefore, developing human resources is crucial toward achieving it. However, resource rich countries are plagued by several factors that work as disincentives to human resource development, and it is a serious dilemma.

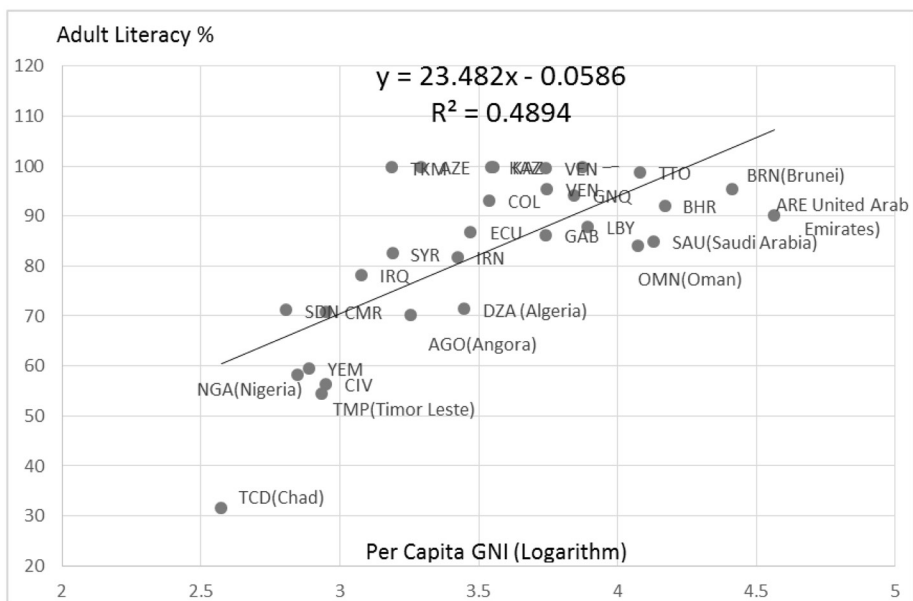


Figure 2. Linear Regression of Oil Exporting Countries on Adult Literacy

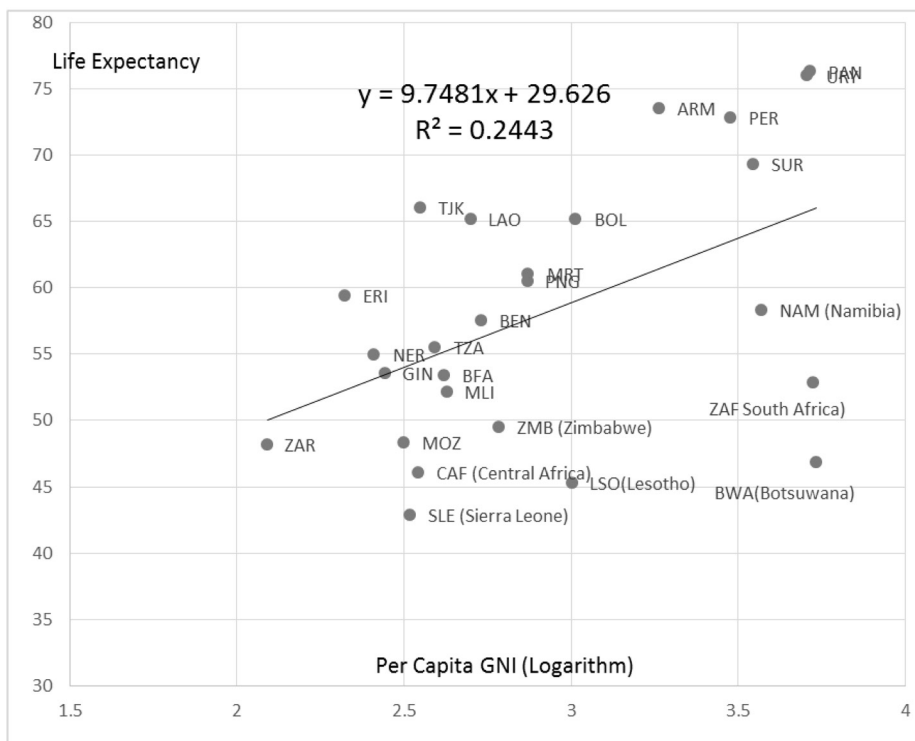


Figure 3. Linear Regression of Mineral Exporting Countries on Life expectancy

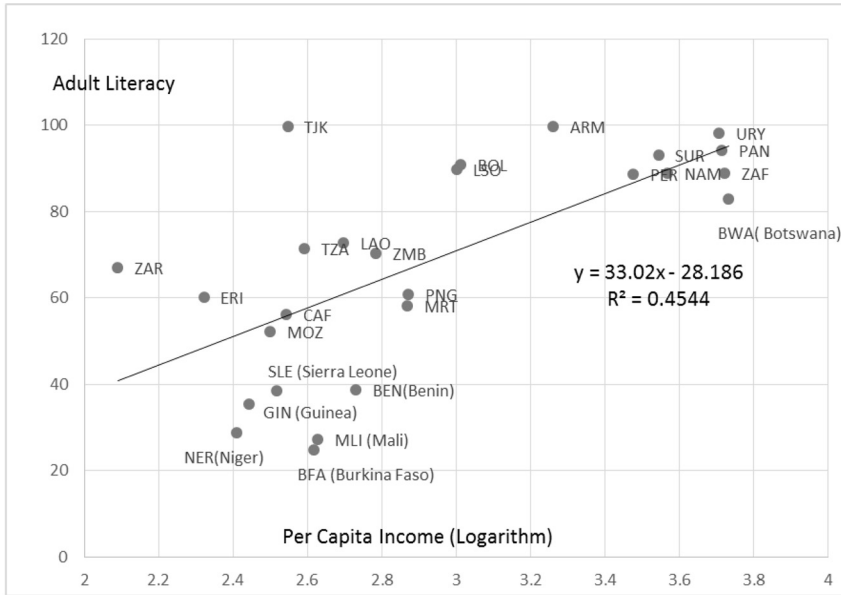


Figure 4. Linear Regression of Mineral Exporting Countries on Adult Literacy

Table 6. Indonesia and Nigeria

	Indonesia	Nigeria
Area	1,905 thousand km <sup>2</sup>	923 thousand km <sup>2</sup>
Population (2013)	248 million	169 million
GDP (2013)	870 billion US\$	522 billion US\$
GDP per capita (2013)	3510 US\$	3082 US\$

In the final section of this article, we glance at the economic progress of Indonesia, which was forced out of resource dependency and followed other Asian countries towards industrialization.

**4. Policy implications of “moving out of resource curse”: Indonesia and Nigeria**

Both Indonesia and Nigeria are large countries. The comparison is shown in table 6.

Both countries are oil-producing countries. From the 1960s through the 1980s, Indonesia was plagued by corruption, dictatorship, and nepotism,

which has resulted in the country lagging behind other South East Asian countries in industrialization and economic development. Nigeria too was in a similar situation during this time. The differences between the two countries are as follows:

- (1) Share of oil exports in the Indonesian economy declined after the 1990s, whereas that of Nigeria remained constant until the early years of the 21st century.



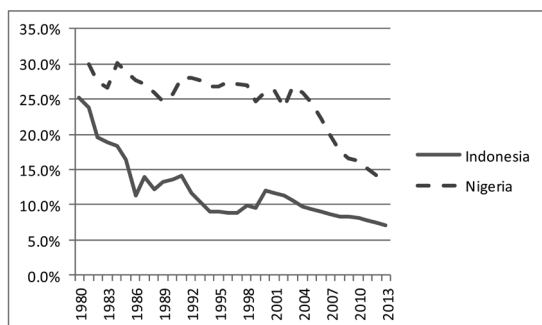


Figure 5. Share of Mining Sector (including oil) in GDP

(2) Share of manufacturing in GDP was increased in Indonesia during 1980s and 1990s while remained at same level in Nigeria

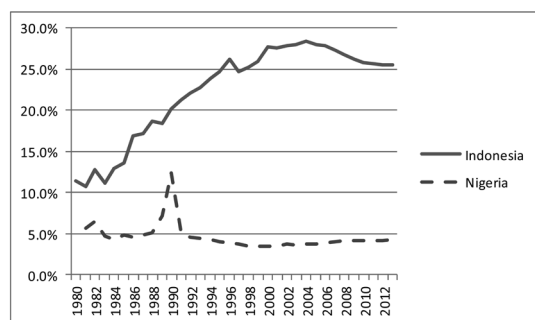


Figure 6. Share of Manufacturing Sector in GDP

(3) Improvement of social indicators such as adult literacy and life expectancy in Indonesia are observed while not in Nigeria

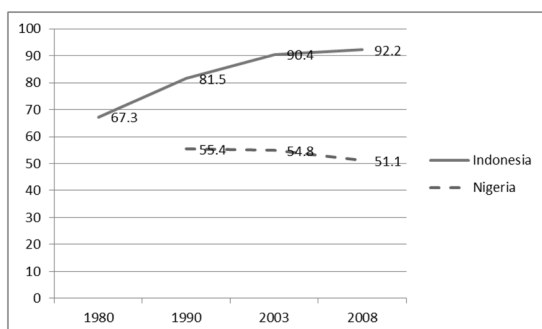


Figure 7. Adult Literacy Total

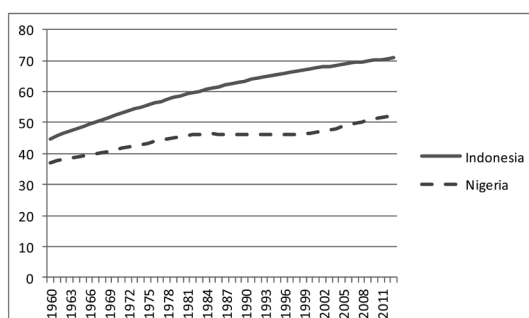


Figure 8. Life Expectancy

(4) Per capita GDP growth of Indonesia is higher than that of Nigeria after 1980

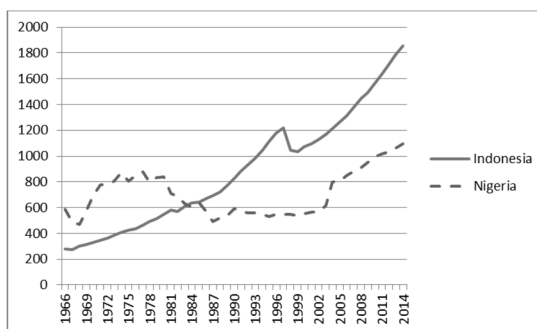


Figure 9. Per Capita GDP (2005 Price)

The difference in development performance between Indonesia and Nigeria can be explained by their dependence on oil. Indonesian development in the 1990s is assessed as a “process of moving away from resource dependency.” Development of a diversified economy fostered human resource development, and this in turn created conditions for diversified development. Therefore, the causal relationship is a mutual one. This process was triggered by exogenous factors such as the drying up of existing oil fields and stagnant oil prices. The Indonesian example implies that external factors are very important. Although the recent fall in oil prices is proving difficult for oil producing and exporting countries, it is their best chance for

economic diversification. Human resource development must have the highest priority in the developmental policies of countries facing the resource curse.

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