Natural Resource Abundance and Economic Growth Revisited: Latin America and Developed Countries from a Comparative Perspective

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Ⅰ. Introducción

From 1970 to 2005, Latin American countries had very disappointing performance in terms of economic growth. The well-known article by Sachs and Warner (1995) presents the reasons for poor economic growth in Latin America by providing evidence of the negative relation between resource-based exports and economic growth rates. In fact, most Latin American countries were dependent on exporting primary products in 1970. The export share of primary goods for all Latin American countries was more than 50 percent to total exports. Of 21 Latin American countries, 15 had more than 80 percent of primary export ratios. This evidence suggests that the Latin American continent

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as a whole was concentrating on producing primary goods; in other words, they had not developed other sectors, such as the manufacturing industry, for export purposes. Previous research by Hausmann et al. (2005) provided that when an economy concentrates on the agricultural sector, it hurts economic growth. They explain that primary commodities are low-productivity goods, and thus concentrating on the agricultural sector does not help the economy perform better.

There are countries, however, especially developed countries, that have abundant natural resource endowments, nevertheless have good economic performance. Therefore, natural resource abundance may not always have a negative effect on economic growth. These different outcomes can be caused by the difference in quality of institutions, human capital, savings, and capital formation. Better institutional quality may lead to better use of the resources obtained through the export of natural resources and accelerate the formation of human as well as physical capital, which may lead to higher economic growth. The purpose of this paper is to investigate whether this is true.

This paper is organized as follows: in Section 2, we review the literature on issues of natural resources and economic growth, and at the end of this section, we discuss the limits of the existing literature. In Section 3, a theoretical framework is suggested, and in Section 4, empirical analysis and interpretation of the results are presented. In Section 5, we conclude with some policy implications and recommendations.

Ⅱ. Literature Review

Recent studies on the role of natural resources have proven a surprising phenomenon of economic development. The big-push logic

and the Dutch Disease theory are the two main, contrasting pillars in the natural resource literature.

The big-push literature supports the positive role of natural resource booms. The big-push logic suggests that natural resource booms provide the catalysts for poor countries to overcome the fixed costs of industrialization (Rosenstein-Rodan 1961; Murphy et al. 1989). Contrarily, the Dutch Disease theory demonstrates the negative aspects for economic growth of exporting natural resources. The idea of Dutch Disease is that abundant natural resources or natural resource booms move resources away from the manufacturing sector, which is characterized by externalities in production, after which the shrinkage of the manufacturing sector can lead to a socially inefficient decline in growth (Sachs and Warner 1995, 1999).

Prominent evidence is provided by Sachs and Warner (1995). With the data of 95 countries between 1970 and 1989, they found that a unit standard deviation increase in the share of primary exports in 1971 would be associated with a reduction in annual per capita growth of a little less than 1 percent per year.

In addition, Wheeler (1984) and Sachs and Warner (1996) confirmed this notion by analyzing the case of sub-Saharan Africa and finding that the natural resource endowments are negatively correlated with economic performance. Also, attempts to account for the negative correlation between the economic growth and resource endowment with Latin American countries' samples have been implemented by many economists.

Barbier (2002), for instance, presented that the abundance of land and natural resources available in most Latin American countries do not necessarily lead to sustained economic growth or benefits for the region. To overcome this problem, Barbier emphasized more targeted policies to generate direct incentives for improved rural resource management.

Leamer et al. vet al. (1999), has shown the reasons for slow economic growth in Latin America in connection with the development of natural

resource-intensive sectors and its impacts on inequality. The conceptual framework of their paper is that natural resource exploitation requires physical capital, not human capital, in a community. As a result, when the community produces labor-intensive manufactures, large numbers of illiterate workers in the community are poorly prepared for jobs, experiencing higher income inequality for long periods. The concern, in this case, is the inability of the community (or a country) to jump from resource exploitation to skill- and capital-intensive manufacturing that produces positive externalities.

Sachs and Warner (1999) demonstrates with the case of seven Latin American countries that when tradable manufactures exhibit increasing returns to scale, a resource boom can frustrate growth via the Dutch Disease phenomenon. In their paper, they suggest two possible results of a resource boom. On the one hand, the resource booms, for instance, in Bolivia, Mexico, and Venezuela, did not permanently raise the level of per-capita GDP, and were followed by a growth slowdown rather than an increase. On the other hand, the resource boom in Ecuador appears to have raised the level of GDP initially, but was not followed by faster growth.

Most of the previous research, however, remains silent on the following question: Why has not every resource-dependent country shown slow or negative economic growth? In fact, there are some resource-dependent countries that have shown success in economic growth apart from those that have experienced a failure in economic growth. Australia, Cyprus, Greece, Iceland, Ireland, New Zealand, Norway, and Singapore are examples of these success stories. Although all of these countries have had or once had resource-dependent export structures, they have not become poor, nor experienced recessions during recent decades. Rather, they have grown to the status of developed countries, driving expectations for the Dutch Disease theory to be defeated. In contrast, the cases of Latin American countries, all of

which have abundant resources, fit into the Dutch Disease theory or so-called the 'natural resource curse'.

There are a few papers explaining the reasons for these diverging experiences. Mehlum et al., (2006) found the origin of the different performances via the quality of institutions. Wantchekon (1999) compared the cases of Nigeria and Norway to account for the different impacts of natural resource dependence; however, his research was focused on the effects on democratic governance and political instability, not economic growth. As a matter of fact, their arguments are limited by the way in which they focus on only institutional quality, ruling out other possibilities.

The purpose of the empirical test in this paper is not only to identify the root of the dichotomic phenomena in association with exporting abundant natural resources, but also to provide reasons in relation to institutional quality and capital accumulation. In this regard, in the next section we suggest the theoretical framework to identify these consequences and provide the methodology for empirical analysis.

Ⅲ. Theoretical Framework

Sachs and Warner have provided the empirical results, showing the inverse relationship even after controlling for other relevant characteristics of the economies, such as initial income level, trade policies, openness, and investment. Based on their analysis, we extended the period to 1970–2005 to see consistency over a longer period. The regression equation is estimated using the cross-sectional data analysis as follows:

$$GROWTH_{(Y2005-Y1970)/Y1970} = \beta_0 + \beta_1 lnGDPC_{70} + \beta_2 PRIM_{70} + \varepsilon_1 \quad (1)$$

GROWTH $_{(Y2005-Y1970)/Y1970}$ refers to the growth of per capita GDP during 1970–2005, and $\ln GDPC_{70}$ refers to GDP per capita in natural logarithm in 1970. $PRIM_{70}$ refers to the share of primary exports in 1970. The result is very supportive of Sachs and Warner. As summarized in Table 1, the regression shows the negative association between economic growth and export ratio of natural resources, controlling the initial GDP per capita. The regression implies that an increase of 1 percentage point of primary export share in 1970 is associated with a reduction of 17.1 percentage points of per capita GDP growth over a 35-year period. Hence, the assertion that having abundant natural resources is a curse is strengthened.

〈Table 1〉 The correlation between resource abundance and growth of per capita GDP

	Growth of per capita GDP 1970–2005
$\ln GDPC_{70}$	-1.607*(-1.685)
$PRIM_{70}$	-17.181***(-4.148)
Constant	33.058***(3.993)
Adjusted R^2	0.18
Number of observations	74

Notes: a) The sample consists of 74 countries, including 21 Latin American countries.
b) t-values in parentheses.
c) ***, **, * indicate coefficient estimates statistically significant at 1%, 5%, 10% levels, respectively.
d) This regression matches the regression done by Sachs and Warner (1999). The results are, however, not identical, because (1) it takes a different period, 1970–2005, extending the periods of 1970–1989, and (2) it takes the share of primary export in 1970 as an independent variable, instead of the share of primary exports to GDP in 1971.
Source: World Economic Outlook Databases, UN COMTRADE.

To explain the reasons of the negative association, Kiminori Matsuyama (1992) provides a formal model of the "linkage approach." Of the agriculture and manufacturing sectors, the latter is characterized by learning-by-doing that is external to the firm, but internal to the manufacturing sectors. The former, however, pushes the economy away

from manufacturing, thus lowering the economic growth. Matsuyama stresses the importance of the expansion of the manufacturing sector for a higher growth rate of the economy. Furthermore, the recent empirical analysis by Barbier (2002) found a negative correlation between agricultural land expansion and lower levels of GDP per capita in the long term. The author argues that, when natural resource assets are not properly managed for maximizing rents or the rents are not being invested in the economy, the generated effect is short-lived, even if a country is in a favorable situation with, for example, resource booms, terms of trade, and price soring.

There is a missed point, however. How can the cases of Australia, Cyprus, Greece, Iceland, Ireland, New Zealand, Norway, and Singapore be explained? These are countries that have had rapid economic growth over the last few decades in spite of having resource-dependent export structures. The average per capita growth of these eight countries during 1970–2005 was 18.12 percent, while that of the world was 10.18 percent and that of the Latin America was 5.5 percent. These eight countries and Latin America were all natural resource-dependent countries, but the results on economic growth after 35 years were dichotomic. How can this be explained?

Considering these eight countries, it is found that they are all classified as developed countries, in other words, higher-income countries. In this regard, the first hypothesis in this paper is that export of primary goods is helpful to economic growth when a country has a higher income level, but harmful when it has a lower income level, such as the levels in Latin American countries. Thus, in the regression, the interaction variable of primary export share with per capita GDP will be added as follows:

$lnGDPC_{70} * PRIM_{70}$

= (log of per capita GDP in 1970) X (export share of primary goods in 1970)

On the other hand, we can also test to see whether export of primary goods has a positive effect on economic growth in developed countries, but a negative effect in Latin American countries. For this, the regression will include a regional dummy to explore the interaction of export share of primary goods and regional differences. The regional dummy can be replaced by dummies of developed countries, Latin American countries, or others. The corresponding variable is as follows:

$D_{region} * PRIM_{70}$
= (Regional dummy variable) X (export share of primary goods in 1970)

To identify the reasons for the various experiences among resource-rich countries, it is argued that the variance of growth among resource-rich countries is primarily due to how resource rents are distributed via the institutional arrangement by Mehlum et al. (2006.) They suggest that the resource curse weakens as institutional quality increases. They make a distinction between producer-friendly institutions and grabber-friendly institutions. Grabber-friendly institutions can be bad for growth when rich resources attract scarce entrepreneurial resources out of productive activity and into unproductive activities. However, with producer-friendly institutions, resource abundance attracts entrepreneurs into productive activity, ultimately leading to higher growth. For analysis, they used the interaction term (= resource abundance X institutional quality) and found that institutions are decisive for the resource curse. Yet, the interaction quality index they used is an unweighted average of five institutional indices. In this paper, individual institutional quality indices are regressed in the form of an interaction variable of the institution and resource abundance as to see each effect on economic performance. The new variable is as follows:

INST * $PRIM_{70}$
= (Institutional quality index) X (export share of primary goods in 1970)

High quality of institution can be one of the primary factors in managing the income from exporting abundant resources efficiently and effectively. Wantchekon (1999) emphasizes that, when the state institutions are weak and budget procedures either lack transparency or are discretionary, resource windfalls tend to generate and consolidate incumbency advantages and increase sociopolitical instability. His focus, however, is on the relationship between resource abundance and governance. The focus in this paper is to see the relationship between resource abundance and economic growth. Thus, the hypothesis of this paper is that if a country has a high quality of institution, managing the income from the export of natural resources is more efficient and more effective, and thereby helps to accelerate economic growth, even if they increase the export ratio of natural resources.

The last assumption is that resource export can have a positive effect on economic growth, particularly when capital accumulation is high. Capital accumulation, in this regard, includes human capital, savings, and capital formation.

First, in terms of human capital, it is hard for the resource-based economies to satisfy a high level of human capital because, generally, primary industries based on exploitation of natural resources, such as agriculture and mining, do not require skilled labor, high technology, or much capital. This explains why Africa concentrates on exporting unprocessed primary products. It is because Africa has "comparative advantage" via low levels of education and abundant natural resources (Wood et al. 2001). This combination impedes the development of Africa's manufacturing sector, but allows it to maintain and even concentrate more on a resource-dependant export structure. Gylfason (2001) also provides two reasons for the inverse relationship between

natural capital and human capital. One reason is that, because too many people become locked in low-skill-intensive and natural resource-based industries, they fail to advance their or their children's educations. Another reason is that the authorities of resource-rich countries become overconfident and thus overlook the need for good economic policies and good education. Consequently, natural resource abundance in underdeveloped countries lets the governments of those countries concentrate on exporting resources that only require low-skilled labor, and then people do not need higher education and the countries lack higher-skilled labor. With an abundance of low-skilled labor and natural resources, they will concentrate more on resource-based industries. As a result, the vicious cycle continues. In order to overcome this vicious cycle in resource-abundant countries, a good quality of human capital must be achieved. In this way, the resource-rich countries can jump to higher levels of development. Following this logic, for those countries that have low-quality human capital, such as Latin American countries, it would be hard for them to overcome the vicious cycle, and thus they remain poor; whereas, for those that have high-quality human capital, such as developed countries, it would be possible for them to jump to higher-level economies by overcoming the vicious cycle.

Second, in terms of physical capital such as savings and capital formation, such a vicious cycle in relation to human capital applies. To overcome the vicious cycle, Leamer et al. (1999) suggested also building a high level of capital accumulation. Their argument is that, when capital accumulation is very substantial, the resource-rich countries can produce sophisticated and capital-intensive manufactures such as machinery and chemicals, which have positive externalities for the economies. As such, not only is human capital accumulation needed to jump to a higher level of development, but physical capital accumulation also needs to be considered.

Thus, the last hypothesis in this paper is that the export of natural resources can help economic growth, particularly when capital accumulation is higher. The related equation is as follows:

$CAPITAL * PRIM_{70}$
= (Capital accumulation) X (export share of primary goods in 1970)

In the following section, we will also present an empirical analysis that explores the interaction between capital accumulation and export share of primary goods on economic growth.

IV. Empirical Results

IV.1. The Interaction Effect with GDP per capita and Regional Dummies

While Table 1 presents the basic framework of the regression of this paper, this section investigates in more detail the different effects of natural resource abundance on different economies. Table 2 shows a set of cross-country regressions for the period of 1970–2005. The data of the export share of primary goods is based on the UN COMTRADE dataset. Primary products include fuels and non-fuel products. Fuels correspond to SITC 3 and non-fuel primary products correspond to SITC 0, 1, 2, 4, and 68. With the extension of the time horizon, the sample in the regression includes up to 74 nations. To maximize the number of observed countries, the sample includes the data from the years following and proceeding 1970 and 2005, respectively, because of some unavailable data for those years. All regressions include the initial GDP per capita in natural logarithm and the initial export share of the primary products as control variables. What is more, the interaction variables are added to the basic regression; and the interaction variables

are multiplied by the export share of primary products in 1970 with GDP per capita or regional dummy variables. The dummy variables are for developed countries, Latin American countries, African countries, developing Asian countries, and Middle East countries, which are expressed as Developed, Latin, Africa, Asia Devel, and Mid East, respectively.

〈Table 2〉 Interaction of resource abundance with per capita GDP and regional dummies

Dependent Variable: Per Capita Growth, 1970–2005				
Variable	***Model 1***	***Model 2***	***Model 3***	***Model 4***
(Constant)	88.284***	42.819***	31.076***	44.765***
	(3.818)	(5.529)	(3.810)	(5.053)
$lnGDPC_{70}$	-9.088***	-3.511***	-1.407	-3.752***
	(-2.950)	(-3.659)	(-1.501)	(-3.345)
$PRIM_{70}$	-82.448***	-17.039***	-14.549***	-2.028
	(-3.176)	(-4.595)	(-3.424)	(-0.376)
$lnGDPC_{70}$*$PRIM_{70}$	8.982**			
	(2.545)			
$D_{Developed}$*$PRIM_{70}$		17.312***		
		(4.341)		
D_{Latin}*$PRIM_{70}$			-5.176**	-16.480***
			(-2.058)	(-4.245)
D_{Africa}*$PRIM_{70}$				-16.953***
				(-3.635)
$D_{Asia\ Devel}$*$PRIM_{70}$				-15.518***
				(-3.041)
$D_{Mid\ East}$*$PRIM_{70}$				-10.276**
				(-2.193)
Adjusted R^2	0.23	0.34	0.21	0.32
Number of obs.	74	74	74	74

Notes: a) t-values in parentheses.
b) ***, **, * indicate coefficient estimates statistically significant at 1%, 5%, 10% levels, respectively.
Source: World Economic Outlook Databases, UN COMTRADE.

In Model 1 of Table 2, an interaction variable of $lnGDPC_{70}$*$PRIM_{70}$ is added, and this variable allows us to see the interaction between GDP per capita in 1970 and the primary export share in 1970. While the result of the regression in Table 1 shows the negative effect of the export of primary products on economic growth over a 35-year period, the estimated coefficient of model 1 in Table 2 indicates that the negative effects of the natural resource export on economic growth can disappear if GDP per capita in 1970 is large enough (the threshold of $LnGDPC_{70}$ is 9.179 (=82.448/8.982).) In reality, however, by looking at the data of GDP per capita in 1970, there exists no country that reaches such a high value of GDP per capita. Nevertheless, the regression implies that the higher level of GDP per capita in 1970 could reduce the negative effects of economic growth, caused by exporting primary products. Therefore, the results show that export of primary goods is helpful to economic growth when a country has a higher income level, but is harmful when it has a lower income level, as the Latin American countries do.

Models 2, 3, and 4 of Table 2 are regressions including regional dummy variables. They are, at the same time, interaction variables multiplied by primary export share in 1970. Model 2 reports estimation results, using the dummy of developed countries. This has a surprising result; when a country is categorized in the developed group, the effect of exporting primary products becomes positive by 0.273 (= -17.039+17.312) percentage points. Although the effect is too small to be statistically significant, the result implies that the negative effects of resource abundance disappear in more-developed countries. On the other hand, when not categorized in a developed countries group, the effect of exporting primary products is significantly negative, decreasing 17.039 percentage points of economic growth.

Model 3 presents the interaction influences between the Latin American dummy and resource exports in 1970. The estimated coefficient of the interaction variable shows a different result from the case of developed countries. The interaction variable shows that, if

classified in Latin America (D_{Latin}=1), a unit increase of export share of primary goods deteriorates the economic performance by 19.725 percentage points (= -14.549 - 5.176); on the other hand, if not classified in Latin America (D_{Latin} =0), it deteriorated by 14.549 percentage points. Here, the reduced negative effect, compared to the former case, is, to some extent, due to inclusion of developed countries group.

The model 4 of Table 2 presents the estimation of the regression including the dummies of all developing countries groups, including Latin American countries. All interaction variables in the regression are significant and the coefficient of the estimation implies that the economic development of Latin America and Africa becomes more frustrated when there is increased dependence on exporting primary products than that of developing Asian countries or Middle East groups.

In short, when a country is classified in the more-developed countries group, the negative effect of exporting abundant natural resources disappears; however, when classified in the Latin American countries group, increasing export of primary products becomes significantly negative to economic growth. Additionally, it is confirmed that, not only in Latin American countries, but also in developing countries such as Africa, developing Asia, and the Middle East, the rising export share of primary goods is harmful to their economic growth.

IV.2. Institutional Effect

In the previous econometric analysis, the question of whether the different levels of GDP per capita or groups of countries can be affected differently by exporting primary goods in relation to their economic growth has been explored.

In this section we will find the determinant factors that drive the variance of economic results among resource-rich countries. By what factors can export of primary products become positive or negative to

the growth? If this empirical experiment could find the factors that interact negatively (positively) with the variable of $PRIM_{70}$, the finding will provide useful suggestions for Latin America and other developing countries to decrease (increase) the negative (positive) effect by exporting natural resources for their economic growth.

Mehlum et al. (2006) were one step ahead and, using interaction terms for their analysis, found that institutions are determinants for the resource curse; however, because their empirical test is regressed with an unweighted average of five institutional indices, it is hard to determine the comparative importance among the indices and the degree of effect by each institutional factor.

Thus, in this paper an interaction variable "$INST_{t,}$*$PRIM_{70}$" is added and the variable "INST(INSTITUTION)" will be replaced by other institutional factors: for example, government effectiveness, regulatory quality, rule of law, and control of corruption. Table 3 displays the estimation results of the regression.

〈Table 3〉 Interaction of resource abundance with institutions

Dependent Variable: Per Capita Growth, 1970–2005				
Variable	***Model 1***	***Model 2***	***Model 3***	***Model 4***
(Constant)	31.964***	22.854***	49.26***	46.439***
	(3.796)	(2.706)	(5.859)	(5.511)
lnGDPC$_{70}$	-2.046*	-0.656	-4.018***	-3.692***
	(-1.983)	(-0.644)	(-3.806)	(-3.508)
PRIM$_{70}$	-19.407***	-12.820**	-29.889***	-26.873***
	(-4.117)	(-2.526)	(-6.245)	(-5.899)
Govn't effectiveness*PRIM$_{70}$	0.127**			
	(2.594)			
Regulatory quality*PRIM$_{70}$		0.012		

		(0.229)		
Rule of law96*PRIM$_{70}$			0.211***	
			(3.832)	
Control of corruption*PRIM$_{70}$				0.183***
				(3.494)
Adjusted R^2	0.19	0.11	0.34	0.32
Number of obs.	71	72	73	69

Notes: a) t-values in parentheses.
b) ***, **, * indicate coefficient estimates statistically significant at 1%, 5%, 10% levels, respectively.
Source: World Economic Outlook Databases, UN COMTRADE.

All the regressions in Table 3 show that the PRIM$_{70}$ variable remains significant, controlling other interaction variables. The LnGDPC$_{70}$ variable is also robustly significant in all the regressions except for model 2. The interaction variable of "Regulatory quality*PRIM$_{70}$" in model 2 is also not statistically significant. Other interaction variables such as "Govn't effectiveness*PRIM$_{70}$", "Rule of law96*PRIM$_{70}$", and "Control of corruption*PRIM$_{70}$" have positive relations, though small, with economic growth, having the estimated coefficients statistically significant. The results indicate that the effect of exporting primary products have difficulty becoming positive to economic growth even if a country has high quality of government effectiveness, rule of law, or control of corruption. For instance, even if a country gets 100 points (the highest possible) in the institutional indices, the coefficient of PRIM$_{70}$, which is "$\beta_2+\beta_3 INSTt$", cannot become positive. The results only show that the negative effect of primary dependence can, instead, be decreased if a country has high-quality institutions.

IV.3. Capital Accumulation Effect

The last assumption that resource exports have a positive effect on economic growth, particularly when capital accumulation is high, is tested and displayed in Table 4. All regressions in Table 4 show that $LnGDPC_{70}$ and $PRIM_{70}$ are statistically and robustly significant.

〈Table 4〉 Interaction of resource abundance with capital accumulation

Dependent Variable: Per Capita Growth, 1970–2005				
Variable	***Model 1***	***Model 2***	***Model 3***	***Model 4***
(Constant)	43.113***	69.245***	45.239***	47.566***
	(4.052)	(5.626)	(5.009)	(4.789)
lnGDPC$_{70}$	-3.594***	-6.525***	-3.343***	-3.392***
	(-2.771)	(-4.227)	(-3.104)	(-2.963)
PRIM$_{70}$	-23.869***	-43.815***	-29.161***	-27.272***
	(-4.126)	(-5.365)	(-4.932)	(-4.698)
Humancapital70*PRIM$_{70}$	2.181***			
	(3.041)			
Humancapital85*PRIM$_{70}$		3.442***		
		(3.587)		
Capital form*PRIM$_{70}$			0.426**	
			(2.185)	
Savings*PRIM$_{70}$				0.197*
				(1.820)
Adjusted R^2	0.22	0.34	0.29	0.27
Number of obs.	56	57	61	61

Notes: a) T-ratios in parentheses.
b) ***, **, * indicate coefficient estimates statistically significant at 1%, 5%, 10% levels, respectively.
Source: World Economic Outlook Databases, UN COMTRADE.

Human capital-related regressions in models 1 and 2 present that the hypothesis of this paper is confirmed; if a country has a substantially high quality of human capital, the negative effect of exporting natural resources becomes positive. The thresholds of the human capital index are 10.94 (=23.869/2.181) for 1970 and 12.72 (=43.815/3.442.) for 1985. Of the observations in the regression sample, only Ireland had higher indices than the thresholds for the years of 1970 and 1985; those are 15.447 and 12.794, respectively. This successfully explains how Ireland, as a resource-rich country in 1970, has had such rapid economic growth over 35 years. Therefore, the hypothesis is confirmed that higher (lower) quality of human capital can (cannot) increase economic growth even if a country is dependent on exporting natural resources.

In terms of Capital formation and Savings, even though the results are not as positive as those of Human capital, they are statistically significant. The regression results show that, similar to the case of institutions, the negative effect of resource exports barely becomes positive to economic growth, even if a country has a large savings or high capital formation. Nevertheless, the results imply that if a country has large savings or capital formation, it reduces the negative effects on economic growth.

Ⅴ. Conclusion

By taking the basic framework of Sachs and Warner (1995), this paper starts by examining the consistency of their results with the longer period of 1970 to 2005, instead of 1970 to 1989. The findings in this paper highlight once more the views of Sachs and Warner: that there is a negative relationship between economic growth and a high ratio of natural resource exports. Thus, this paper supports the idea of Dutch Disease.

The additional findings, however, illustrate that the idea of Dutch Disease does not fit in every case. By using the interaction variables of $LnGDPC_{70}$ and $PRIM_{70}$, the regression results show that the inverse relation of resource export to economic growth can be reversed if GDP per capita in 1970 is large. The threshold of GDP per capita, however, is too high, so that in reality, there is no country that satisfies the requirement. Nevertheless, it is interpreted that higher per capita GDP can reduce the negative effect of natural resources on economic growth. And also, by using the interaction variables of regional dummies multiplied by $PRIM_{70}$, this paper has explored the idea that, in the case of more developed countries, the negative effect of exporting primary goods disappears; however, in the case of Latin American countries, the negative effect becomes even stronger than for any other regions. Additionally, it is found that the harmful effects are also demonstrated in other developing regions such as Africa, developing Asian countries, and the Middle East.

These varying consequences are the result of the different levels of institutions and capital accumulation. In terms of human capital, the hypothesis is successfully confirmed that if a county has a substantially high quality of human capital, the negative effect of natural resources on economic growth becomes positive. Ireland is the satisfying case. If a country has a low quality of human capital, however, the negative effects of natural resources on economic growth remain. The regression with interaction variables of government effectiveness, rule of law, control of corruption, savings, and capital formation shows that if a country has high quality in those indices, the negative effects of natural resources to growth are reduced, but have difficulty becoming positive to growth.

국문초록

본 논문은 자원부국들의 천연자원 수출이 각기 다른 경제적 영향을 보이는 이유에 대해 연구하였다. 가령 라틴아메리카의 경우 다른 자원부국들과는 달리 저조한 경제성장을 보였다. 이에 대해 선행연구에서는 천연자원의 풍요가 오히려 경제성장에 부정적인 영향을 준다고 논증한 바 있다. 그러나 본 연구에서는 1인당 국민소득이 어느 수준 이상일 경우 천연자원 수출과 경제성장 간의 역의 상관관계가 존재하지 않음을 보이고 있다. 분석에 따르면, 1인당 국민소득이 낮은 라틴아메리카 국가들의 경우 풍부한 천연자원이 경제성장에 부정적인 영향을 미치는 반면, 1인당 국민소득이 높은 선진국의 경우 이러한 음의 효과가 나타나지 않았다. 이같이 천연자원 수출이 자원부국들 간 서로 다른 영향을 보인 이유는, 정부의 효율성, 법치, 부패통제 등 '제도의 질'이 낮은 라틴아메리카의 경우 천연자원 수출로 얻은 자원을 비효율적으로 활용하여 인적·물적 자원을 축적하지 못했으며, 이로 인해 궁극적으로 저조한 경제성장을 이루게 되었다는 데 있다.

Key Words: Export of Natural Resources, Latin America, Developed Countries, Interaction Variable, Institutions, Capital Accumulation / 천연자원 수출, 라틴아메리카, 선진국, 교차항, 제도, 자본축적

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References

Barbier, Edward B.(2003), "Explaining agricultural expansion, resource booms and growth in Latin America", *Environment, Development and Sustainability,* No. 5, pp. 437–458.

Guerson, Alejandro, James Parks and Mónica Parra Torrado(2007), "Export Structure and Growth: A Detailed Analysis for Argentina", *World Bank Policy Research,* Working Paper 4237.

Gylfason, Thorvaldur(2001), "Natural resources, education, and economic development", *European Economic Review,* Vol. 45, pp. 847–859.

Hausmann, Ricardo, Jason Hwand, and Dani Rodrik(2005), "What you export matters", *National Bureau of Economic Research*, Working Paper 11905.

Leamer, Edward E., Hugo Maul, Sergio Rodriguez and Peter K. Schott(1999), "Does natural resource abundance increase Latin American income inequality?", *Journal of Development Economics,* Vol. 59, pp. 3–42.

Matsuyama, K.(1992), "Agricultural Productivity, Comparative Advantage, and Economic Growth", *Journal of Economic Theory,* Vol. 58, pp. 317–334.

Mauro, Paulo(1995), "Corruption and Growth", *The Quarterly Journal of Economics*, Vol. 110, No. 3, pp. 681–712.

Mehlum, Halvor, Karl Moene and Ragnar Torvik(2006), "Institutions and the resource curse", *The Economic Journal,* Vol. 116, pp. 1–20.

Murphy, K., A. Schleifer, and R.W. Vishny(1989), "Industrialization and the big push", *Journal of Political Economy,* Vol. 97, No. 5, pp. 1003–1026.

Rosenstein-Rodan, P.(1961), "Notes on the theory of the Big Push", in *Economic Development for Latin America* (ed.), New York: St. Martin's Press.

Sachs, Jeffrey D. and Andrew M. Warner(1995), "Natural resource abundance and economic growth", *National Bureau of Economic Research*, Working Paper 5398.

Sachs, Jeffrey D. and Andrew M. Warner(1996), "Sources of Slow Growth in African Economies", *Journal of African Economies*, Vol. 6, No. 3, pp. 335–76.

_____(1999), "The big push, natural resource booms and growth", *Journal of Development Economics,* Vol. 59, pp. 43–76.

Wantchekon, Leonard(1999), "Why do resource dependent countries have authoritarian governments?", *Preliminary Paper*, Yale University.

Wheeler, David(1984), "Sources of stagnation in sub-Saharan Africa." *World Development,* Vol. 12, No. 1, pp. 1–23.

Wood, Adrian and Jörg Mayer(2001), "Africa's export structure in a comparative perspective", *Cambridge Journal of Economics,* Vol. 25, pp. 369–394.