

Are the Countries with Abundant Natural Resources Really Cursed?

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Recently, some empirical studies have pointed out that there is a negative relationship between the natural resource abundance and the economic growth among the developing countries. However, all of those studies included the data from 1980s when the primary product prices experienced sharp declines.

We additionally looked at the data from 1990s and found out that there is no relationship between the natural resource abundance and the economic growth.

It often seems to be argued and believed that the abundance of the natural resources in a developing country may actually harm the nation's economic development instead of helping it. Actually, Sachs and Warner [9] found a negative relationship between the exports of primary products in the year 1970 and the growth rates in developing economies over the period of 1970's and 1980's. Afterwards Gylfason [3] did similar analysis over the period from 1965 to 1998, even though he used the 'share of the natural capital in national

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wealth' instead of the exports of primary products. It seems that most of the literature is just accepting this negative relationship argued by Sachs and Warner [9] and by Gylfason [3].

There have been many studies trying to establish this negative relationship between the abundance of the natural resources and the economic growth in developing countries. For example, some economists argue that exporting lots of primary products would hurt the terms of trade for industrial products. Other economists argue that the money from the export of the primary product will make the county corrupt.

These explanations seem to explain nicely the difficulties that resource rich developing countries are facing. However, at the same time we often hear that many of the developing countries are desperate to promote savings and foreign investments for their economic growths. Actually, there are many resource poor developing countries who think that money from natural resources would be able to boost their economic growths. From this point of view, the countries with abundant natural resources should be better positioned for economic growth than the countries without much of the natural resources.

In short, at the theoretical level we cannot conclude whether abundant natural resources are blessings or curses to the developing countries.

One characteristic that the previous empirical studies had in common was that they used the data from 1970s and 1980s.

Here, we will argue that the Sachs and Warner [9]'s strong results may reflect mainly the fact that most of the natural resource prices have been decreasing during the time that they have analyzed by showing that we actually cannot find any relationship between the exports of primary products and the growth rates in 1990's when the natural resource prices were stable compared with 1970's and 1980's.

I. Regression

In this section we will try to do the same analysis as in Sachs and Warner [9], but for an extended period. We used data on 76 developing countries over the period of 1975~1998 from 'World Development Indicators [12]¹⁾ and did the same empirical analysis as Sachs and Warner [9].

The model is as follows.

$$\frac{1}{T} \sum_{n=1}^T y_n^i = a_0 + a_1 PE^i + \log(Y_0^i) + a^i V^i + e_i$$

Here, the dependent variable is the annual economic growth in country i between time $t = 1$ and $t = T$ (in this case, 1975 and 1998). PE^i is the variable measuring the natural resource abundance of the country i , Y_0^i is the initial income in country i , and V^i is the vector of other variables effecting the economic performance of country i .

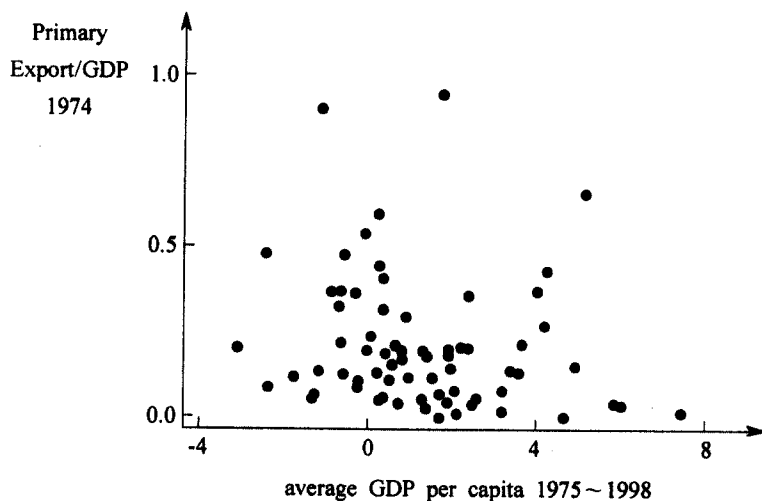
(Figure 1) shows the scatter-plot of the economic growths per capita from 1975 to 1998 and natural resource abundance as measured by the share of primary exports in GDP in 1974. The figure covers 76 countries.

We start with a series of regressions that are mainly designed to demonstrate that the inverse association obtained after controlling a number of other independent variables. In the first regression, we have regressed the growth in GDP per capita on the log of initial GDP per capita and the share of primary exports in GDP in 1974.

The regression 1.1 shows that a higher share of primary exports in 1974 is associated with lower growth in the next 24 years, with an estimated

1) Sachs and Warner [9] used the data from the Penn World Tables.

<Figure 1>



coefficient of 2.4 and a *t*-statistic of 1.97. To measure the size of this coefficient, note that PE is measured as a share of GDP, with a cross-country mean in 1974 of 0.20 and a standard deviation of 0.19. Regression 1.1 suggests that a unit standard deviation increase in the share of primary exports in GDP in the year of 1974 is associated with a decrease in annual per capita growth by 0.11 percentage points ($-0.46 = -2.4 \times 0.19$) for the next 24 years. Even though the magnitude of the natural resource abundance effect is different from that of Sachs and Warner [9] where the estimated coefficient for PE was 6.920, we can see that the sign of the coefficient is same as Sachs and Warner [9]. In short, even though we tried a regression on slightly different periods with different number of countries, we still get the similar result as Sachs and Warner [9] that the abundant natural resource has a negative relationship with the economic growth.

Sachs and Warner [9] introduced a number of control variables in order to isolate the effect of primary export in GDP. It is possible that the negative association between resource wealth and growth reflects the association

〈Table 1〉 Partial Association between Growth (1975~1998) and Natural Resource Intensity (1974): Dependent Variable: GDP7598

- Note : 1) GDP7598 average annual per capita GDP growth during 1975~1998.
2) PE share of primary exports in GDP in 1974 (primary exports are the sum of the categories "non-fuel primary exports" and "fuels").
3) INV - investment variable, the average investment to GDP ratio over the period 1975~1998.
4) OPENNESS - openness variable, which is found as $(\text{exports} + \text{imports})/\text{GDP}$.

between the economic growth and some other indicators of economic growth.

Thus, we added more variables that are usually included in other growth studies and saw if they are significantly associated with growth once natural resource abundance is taken into account.

Therefore, the remaining regressions in 〈Table 1〉 are designed to show that the resource abundance variable remains significant after including some other independent variables related to economic growth. In regression 1.2 we added a variable for outward orientation, OPENNESS, that measures an extent the country was integrated with the global economy during the analyzed period (the share of trade turnover in GDP). In regression 1.3 we added an investment variable.

<Table 2> World Trade Prices and Terms of Trade for Developing Countries

Note : * Terms of trade for fuel exporters (17.5).

Source : World Bank.

The table shows that the negative relationship between the share of the primary exports and the growth remains significant even after including these variables. The table also shows that the initial GDP per capita is not significantly associated with growth, while OPENNESS and investment are significantly associated with growth.

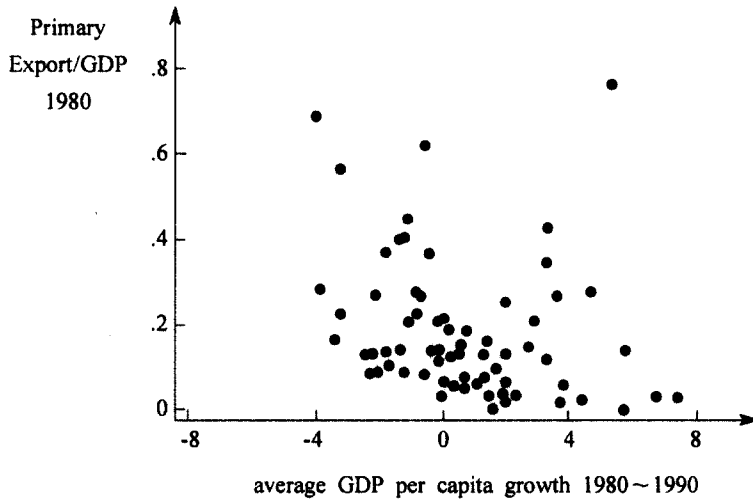
In conclusion, as in Sachs and Warner [9] the inverse relationship between the natural resource abundance and the economic growth from 1975 to 1998 is robust even after considering OPENNESS and investment.

One remaining potential problem is that this analysis was done without considering the changes in global conditions for primary producers. It is possible that we lost important information by simply averaging over 24 years which happened to experience quite severe price fluctuations in primary products prices, especially the oil price. In other words, the declining of the oil price in 1980s may be the main reason why the natural resource abundant countries showed low economic growths in our first analysis and also in Sachs and Warner [9].

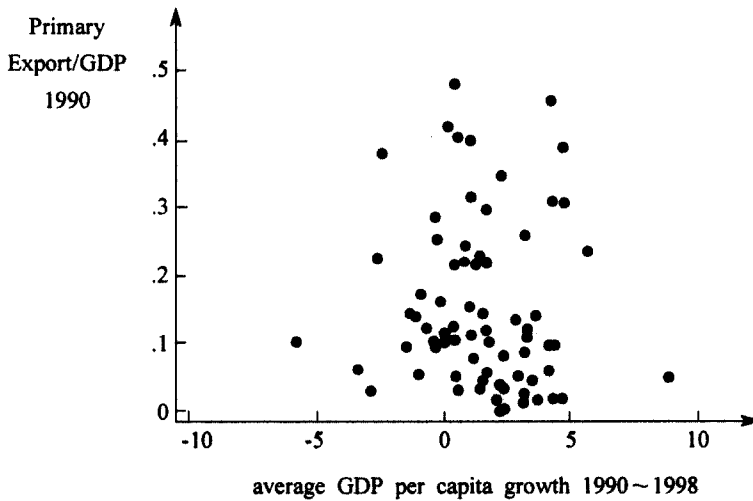
<Table 2> shows the average annual changes in world primary commodity prices and terms of trade of developing countries in different periods of time. It can be seen that world prices for primary commodities rose sharply in the 1970s, then fell quite sharply in the 1980s, and rose slightly in 1990s. The changes in the terms of trade of developing countries show the same trend.

<Figure 2>

(a)



(b)



〈Table 3〉 Dependent Variable: Average GDP Per Capita Growth in Each Period

In order to prove our suspicion that the large fluctuations in primary commodity prices are the main reason that Sachs and Warner [9] got their results, we divided the original time period into three periods and did a regression for each period: 1975~1980, 1980~1990 and 1990~1998.

The model we use here is same as the first regression.

$$\frac{1}{T} \sum_{n=1}^t Y_n^i = a_0 + a_1 PE^i + a^i \log(Y_0^i) + e_i$$

The results are shown in 〈Table 3〉.

From the regressions and scatter-plots in 〈Figure 2〉 it can be noticed that the negative natural resource intensity effect exists in 1980s but not in 1990s.

In 1980s the result showed a high statistical significance (t -value = -2.69) and a high natural resource abundance coefficient.

On the other hand, in 1970s and in 1990s the coefficients are not significantly different from zero and the t -values are low.

Even when we used the primary exports intensity for the initial year of each separate period instead of that of 1974 as shown in 〈Table 4〉, the results did not show much change.

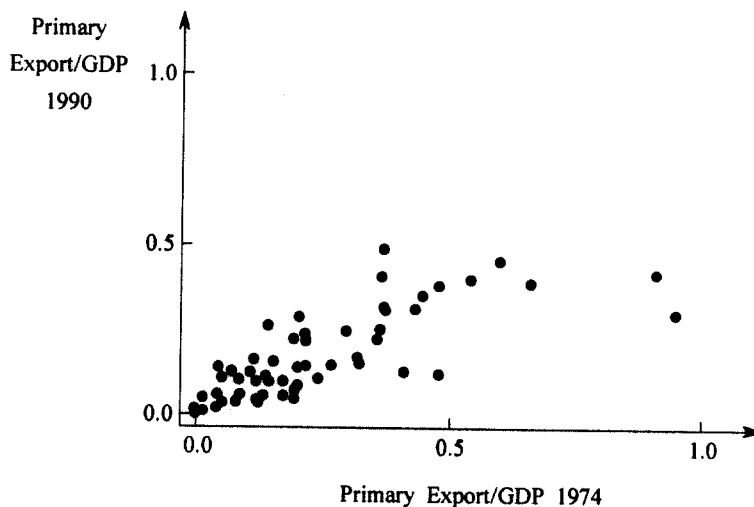
<Table 4> Dependent Variable: Average GDP Per Capita Growth in Each Period

Hence, the main conclusion from the regression analysis is that we found an evident negative relationship between the economic growth and the natural resource abundance only for the period of 1980s, when the world saw large drops in the primary commodity prices. When the global conditions were beneficial for primary exporters as in the second half of 1970s or when the terms of trade were rather stable as in the 1990s, we could not see a clear negative relationship between analyzing variables.

One more remark we want to make about the regressions we have done is that these results may also imply that the developing countries who have initially gone through difficulties with their abundant natural resources made adjustment in the long run. <Figure 3> shows the fact that most of the developing countries have reduced the portion of primary products in their exports dramatically in 1990 compared with the year in 1974.

Therefore, even though we have not proved it, one can interpret the regression results such that the abundant natural resources can be a curse for developing countries in the short run, but the country is likely to find a solution in the long run. Further researches are needed to check this conjecture.

<Figure 3>



II . Conclusion

Sachs and Warner [9] and following literature gave us a gloomy message that developing countries with abundant natural resources are destined to experience a slow economic growth.

Our paper raised a question on this argument by pointing out that the period that these previous studies looked at was not a normal period for these natural resource abundant countries. Particularly, 1970s and 1980s are times when the primary product prices have experienced severe fluctuations. When we looked at 1990s, it was not so clear if the natural resources hurt the economic growths.

Further researches should be done on this subject before we reach any conclusions on the effect of natural resources on the economic growth.

■ *References* ■

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