

DEMOCRATIC DEVELOPMENT AND THE IMPACT OF VARIOUS NATURAL RESOURCES ON ECONOMIC DEVELOPMENT: EVIDENCE FROM PANEL TIME SERIES DATA

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Overview

The paradox of plenty is a symptom characterized by a negative correlation between economic growth and natural resources which is also known as the resource curse: countries richly endowed with natural resources tend to have slower economic growth compared to countries without substantial natural resources (Sachs and Warner, 1995). Empirical evidence from the last two decades shows that natural resource wealth has detrimental affects on a countries economic, social, or political well-being (Ross, 2015). At least three theories - dutch disease models, rent seeking models, and institutional explanations - help to explain this phenomenon (Sarmidi et al., 2014). Natural resources tend to have different impacts on the political or economic dimension depending on their physical characteristics, the revenues they generate, the volatility of their markets, the degree to which they are controlled by state-owned companies, and the labor intensity of their extraction processes (Ross, 2015). Point source natural resources (e.g. oil and minerals) tend to have more detrimental growth effects compared to diffuse resources (e.g. associated with agriculture, water, and forest) (Auty, 2001). Mehlum et al. (2006) identified institutional quality as key to determine whether natural resources are a blessing or a curse for economic development. The scope for successful rent seeking behavior for instance depends on the quality of institutions in a given country (Mehlum et al., 2006). The aim of this paper is to empirically identify if the dependence on different types of natural resources has different thresholds for institutional quality, after which a potential curse can be turned into a blessing.

Data and Methodology

To test our hypothesis - different resources have different long-term growth effects which depend on institutional quality - we use data from the World Development Indicators (WDI) covering the period 1993 to 2016 in annual frequency. The analysis is conducted at an aggregate level and includes as many countries as possible within a panel time series design. The countries are grouped into six panels to account for the contribution of different resources to economic output. Due to both greater availability and consistency, we use rents from natural resources over GDP for five different resources (coal (hard and soft), forest, natural gas, and oil) as well as one aggregate measure of total resource rents as our proxy for resource dependence. The panels are balanced and only contain countries which do have entries for the respective resource rent greater or equal to zero, but unequal to zero for the whole period. Following Solow (1974) and Stiglitz (1974), we use an aggregate model of production with natural resources:

Empirical specification:

$$GDP_{it} = \alpha_{0i} + \beta_{1i}C_{it} + \beta_{2i}L_{it} + \beta_{3i}R_{it} + \beta_{4i}INS_{it} + \beta_{5i}(INS_{it} \times R_{it})$$

The dependent variable (**GDP**) is GDP measured in constant 2010 USD. Capital (**C**) and labor (**L**) as the two standard neoclassical factors of production are measured as gross capital formation (constant 2010 USD) and labor force in million people ages 15 and older who supply labor for the production of goods and services during a specified period, respectively. The aforementioned rents (**R=Coal, Forest, Mineral, Natural gas, Oil, Total**) from resources are measured in percentage of GDP. To account for the quality of political institutions as a mediating factor of the resource curse, we include two commonly used indicators (**INS=INS₁, INS₂**) on both democracy and political development to check the robustness of the results concerning institutional quality.¹ The dependent variable as well as capital and labor are transformed into logarithms. A potential resource curse will be eliminated ($dGDP_{it}/dR_{it} = \beta_{3i} + \beta_{5i}(INS_{it} \times R_{it}) \geq 0$) when the institutional quality is greater than the required threshold ($INS_{it} \geq -\beta_{3i}/\beta_{5i}$). This paper uses a panel autoregressive distributed lag (ARDL) model developed by Pesaran et al. (1999) to

¹ Following Haber and Menaldo (2011), we normalize the Polity2 (**INS₁**) index to run from 0 to 100 which is our measure for political development. The second measure for democratic development (**INS₂**) comes from Freedom House and we use a transformation suggested by Helliwell (1994) leading to a single indicator graded with scores from 0 (no political rights and civil liberties) to 1 (complete set of political rights and civil liberties).

obtain the coefficients. With this approach it is possible to estimate the short- and long-term dynamics irrespective of the order of integration of the variables used.

Preliminary results

The table below reports the results of the pooled mean group (PMG) estimation for the long-run coefficients:

	Coal		Forest		Mineral		Natural gas		Oil		Total	
	INS ₁	INS ₂	INS ₁	INS ₂	INS ₁	INS ₂	INS ₁	INS ₂	INS ₁	INS ₂	INS ₁	INS ₂
C	1.28***	0.89***	0.95***	0.44***	0.86***	0.58***	0.88***	0.62***	1.00***	0.84***	0.66***	0.57***
L	-1.64***	-0.12	-1.85***	0.82***	-0.25*	0.49***	-0.25	0.56***	-0.52***	-0.45**	0.24***	0.55***
R	0.26**	0.47**	-0.52***	-0.07***	0.03	0.02***	0.01*	0.01***	-0.04***	-0.10***	0.004*	0.004***
INS	0.03***	0.61***	-0.001	-0.6***	0.02***	0.66***	0.02***	1.51***	0.005**	0.93***	0.01***	0.39***
(INS×R)	-0.005**	-0.83*	0.009***	0.29***	-0.001***	-0.06***	0.001	-0.10***	0.001***	0.22***	0.001***	0.01**

Notes: *, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively. The pooled mean group (PMG) estimator by Pesaran et al. (1999) are used to obtain the coefficients. The decisions are based on the outcome of Hausman (1987) specification tests.

The long-run results show significant and positive growth effects for the coefficients on coal, mineral, and natural gas. On the contrary, the coefficients on resources are negative and statistically significant for forest and coal. However, within the forest and coal panel, the coefficients on the interaction term are statistically significant and positive in magnitude for both measures of institutional quality which indicates and institutional reversal of the resource curse. The estimated threshold for political development (INS₁) as our first proxy for institutional quality is at 52.32 (61.22) for forest (coal). The estimated threshold for democratic development (INS₂) as our second proxy for institutional quality is at 0.24 (0.45) for forest (coal). The results are stable and remain significant for both measures for the quality of political institutions.

Preliminary conclusions

The current preliminary empirical results indicate that the relationship between resource rents and economic growth depends on both the quality of the democratic institutions and in particular on the type of resource. Moreover, the resource curse is also possible for diffuse resources associated with forest. Forest and oil dependence negatively impact economic growth but an institutional reversal is possible to turn the curse into a blessing. The threshold for forest dependency is lower compared to oil dependency. The policy pathways could differ between countries although the ultimate policy objective might be the same (Apergis et. al, 2014). In this regard, improving institutional quality particularly in forest and oil dependent economies is key to curtail resource rent seeking behaviour.

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