



Resource Curse and Economic Growth: Evidence from Global Panel Data

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لعنة الموارد الطبيعية والنمو الاقتصادي: أدلة من بيانات مقطعية عالمية

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Abstract:

This study evaluates the influence of natural resources on economic growth, utilizing oil rents as a representative indicator of resource wealth. By employing a panel data fixed-effects model alongside instrumental variable techniques, we analyze a dataset encompassing 142 developed and developing nations over the period 1975 to 2013. The findings reveal a statistically significant positive relationship between oil rents and economic growth, suggesting that oil rents serve as an economic advantage rather than a detriment.

Keywords: Oil Rents, Natural Resource Curse, Economic Growth, Panel Data Fixed Effect, Instrumental Variable.

الملخص

تهدف هذه الورقة إلى تقييم ما إذا كانت الموارد الطبيعية نقمة أم نعمة من خلال عينة بيانات مقطعية خاصة 142 دولة متقدمة ونامية خلال الفترة 1975 – 2013. وذلك باستخدام العوائد النفطية كمثل للموارد الطبيعية وبيانات مقطعية ثابتة ذات التأثير الثابت بالإضافة إلى استخدام طرق المتغيرات الفعالة في التحليل. لقد أظهرت النتائج بأن الإيرادات النفطية ترتبط بشكل إيجابي مع النمو الاقتصادي وهذا يؤثر بأن الإيرادات النفطية نعمة وتعزز النمو الاقتصادي.

الكلمات المفتاحية: ريع النفط، نقمة الموارد الطبيعية، النمو الاقتصادي، بيانات مقطعية ذات التأثير الثابت، متغير مساعد.

Introduction

A growing body of literature has been widely accepted that natural resources adversely affect growth rate of the economy rather than positively (Corden and Neary, 1982; Sachs and Warner, 1995; Gylfason, 2001; Mehlum et al., 2006a; Tiba and Frikha, 2020; Alssadek and Benhin, 2022; Malik and Masood, 2022; Alssadek and Benhin, 2023). This puzzle refers to the curse of nature resources, which contradicts earlier positive views suggesting that natural resources are assumed to enhance economic growth by making a productive investment, creating foreign currencies, inviting foreign direct investment, and promoting economic diversification (Watkins, 1963; Ricardo, 1971; Auty, 2001; Stevens et al., 2015; Badeeb et al., 2017). The phenomenon can be attributed to several factors – for example, the Dutch disease, the poor institutional quality, and less investment in human capital.

The Dutch disease theory was developed by Corden and Neary (1982) and Corden (1984), which is considered as the most popular explanation for the resource curse. It refers to an adverse impact of

natural gas discoveries on the Dutch manufacturing sector resulting from an appreciation in the Dutch domestic currency. It occurs when the boom in the oil sector increases income, which motivates individuals/government to increase spending on the non-tradable goods (service), resulting in an increase in the prices within the sector, which in turn causes appreciation in the real exchange rate. It makes exports of the manufacturing sector more expensive relative to international markets, which causes a loss of competitiveness in the sector, adversely affecting economic growth. This scenario has been referred to as a spending effect. Furthermore, higher wages in the oil sector resultant from higher labour demand in the sector also cause a shift of labour from the non-oil sector (manufacturing and service) to the oil boom sector. This results in a reduction in labour and production in the non-oil sector, negatively affecting the output of the sector and, thereby, economic growth. This scenario has been named a resource movement effect. Therefore, both spending and resource movement effects are key characteristics of the Dutch disease phenomenon, resulting in lower economic growth and, therefore, the resource curse.

Poor institutional quality is another explanation for the resource curse phenomenon. It is suggested that natural resources are a curse for economic growth only if country experiences grabber-friendly institutions, while a blessing only if country experiences producer-friendly institutions (Mehlum et al., 2006a, 2006b). They identified two types of institution in the natural resource economy. The first is the producer-friendly institution, which has several features, including sluggish rent-seeking behaviour, good quality of bureaucracy, control of corruption, protection of property right, greater transparency and accountability, and low jeopardy of government repudiation of contracts. These types of institution enhance economic growth and provide a cure for the natural resource curse. The second is the grabber-friendly institution; these are poor, and they lack several of the above aspects. These types of institution hamper the economic growth and thus lead to the natural resource curse.

Further reason for the resource curse is lower spending on human capital. It has suggested that natural resources-rich countries are overconfident about the sector in terms of bringing wealth. This would ignore investment in human capital, leading to an adverse effect on economic growth (Gylfason, 2001). Sachs and Warner (1995) was the first author to assess the impact of natural resources on economic growth. They found that wealth of natural resource has a significant effect economic growth, confirming the resource curse phenomena. Following Sachs and Warner (1995), several studies have supported the phenomenon (see, for example, Mehlum et al., 2006a; Eregba and Mesagan, 2016; Tiba and Frikha, 2020; Malik and Masood, 2022). In contrast, other empirical studies oppose the debate of the phenomenon (see, for instance, Cavalcanti et al., 2011; Antonakakis et al, 2017; Yang et al., 2019; Matallah, 2020; Shittu et al., 2022). Our work provide new insights to the ongoing discussions of the resource curse by employing a global panel data sample of oil-rich countries including developed and developing once. This enables us to draw more broad conclusions, especially compared to research limited to developing countries. We also employ panel data fixed effect and two-stage least squares (TSLS), which have ability to control for all unobservable time-invariant country characteristics and reduce endogeneity problem¹ (simultaneity, omitted variables, and measurement errors) (Collier and Goderis, 2008; Wooldridge, 2010).

The model and Estimation Technique

In order to estimate whether natural resources are a curse or a blessing, this paper adheres the empirical growth models of Sachs and Warner (1995), Mehlum et al. (2006a), Eregba and Mesagan (2016), and Hassan et al. (2019), with the following specification:

$$RGDPG_{it} = \beta_0 + \beta_1 OILR_{it} + \beta_2 GFCF_{it} + \beta_3 TOPEN_{it} + \beta_4 GEE_{it} + \beta_5 CORP_{it} + \beta_6 CONF_{it} + \alpha_i + \mu_{it}$$

Where RGDPG is the growth rate of GDP in US dollars as 2005 taken as a base year. Regarding the explanatory variables, OILR is oil rents' share of GDP, used as a proxy for natural resources and measured as the difference between the value of crude oil production at world price and total cost of production. GFCF is the gross fixed capital formation share of GDP, representing domestic investment. TOPEN is openness of trade, calculated by imports and exports share of GDP. GEE refers to general government expenditure on education share of GDP. CORP is control of corruption. It ranges between -2.5 (the most corruption) and +2.5 (the least corruption). CONF is conflict and calculated as 1 for a country undergoing civil war and 0 otherwise. *i* refers to a country, *t* time, α the country fixed effect, which controls for all time-invariant, but country specific variables to deal with the omitted variables bias problematic, and *u* is the error term. Data for the real GDP growth, oil rents share of GDP, gross fixed capital formation share of GDP, trade openness share of GDP, government expenditure on education share of GDP are collected from the World Bank's World Development Indicators (WDI). The data for corruption are taken from the World Governance Indicators. The data for conflict are based on the

authors' calculation and taken from IV Project Polity. Due to unavailability of data for some variables, our panel data sample covers 142 developed and developing countries over the period 1975 to 2013. Definitions of variables and sources of data are presented in Appendix A. A list of sample countries is presented in Appendix B.

We apply panel data fixed effect to estimate the economic growth model. It effectively controls for all unobservable time-invariant country characteristics, which eases the issue of omitted variable bias (Collier and Goderis, 2008). Wooldridge (2010) also asserted that the fixed effect estimation approach has less affected by omitted variables bias compared to pooled OLS. In addition, we employ the TSLS to address the endogeneity problem (e.g simultaneity, omitted variables bias, and measurement errors). The TSLS applies instrumental variables to calculate model coefficients and is separated into two main steps (Davidson and Mackinnon, 1993; Porter and Gujarati, 2009; Gujarati, 2021). The first step involves defining the proportions of endogenous and exogenous variables, which might be accredited to the instruments. On a given set of instruments, it involves estimating an OLS regression for each variable in the model. In the second step, the original model is estimated with all variables substituted by the fitted values from the first step regression.

Several studies have concerned with endogeneity problem in relation to economic growth model. For instance, Ugur and Dasgupta (2011) and Ahmad et al. (2012) argued that higher economic growth might be associated with higher level of institutional investment, which reduce level of corruption. Sahlgren (2014) also indicated that higher economic growth might result in improving education level and vice versa (Valero, 2021). According to Sandholt Jensen and Skrede Gleditsch (2009), the effect of conflict on economic growth might lead to endogeneity problem but the problem might be worse when we evaluate the effect vice versa. Andersen and Babula (2008) showed that a higher level of economic growth result an increasing exchange of goods and services, which rise trade volume, indicating that the endogeneity problem may happen between trade openness and economic growth. To moderate the endogeneity problem², ethnicity and freedom of press are utilized as instrument variables for corruption (Aidt, 2010 and Esarey, 2015), military expenditure is used as instrument variable for conflict (Collier and Hoeffler, 2005), land area is employed as instrument for trade openness (Frankel and Romer, 1999), and population growth as an instrument for government expenditure on education (Cook, 2002).

Estimation Results and Discussions

Table 1 provides the estimated main results, using oil rents OILRNT share of GDP as a proxy for natural resources variable. Column (1) presents the results, using panel data fixed effect. The column shows that oil rents significantly increase economic growth, conflicting the argument of the resource curse theory proposed by Sachs and Warner (1995), indicating that rich countries in natural resources undergo lower economic growth and development relative to countries with fewer wealth of natural resources. Similar outcomes have been found by Cavalcanti et al. (2011), Al Mamun et al. (2017), Aimer (2018), Damette and Seghir (2018), and Jalili et al. (2019).

Table 1: Country Fixed Effect and Instrumental Variables Regressions for Economic Growth Model (1975–2013).

Independent Variables	(1)	(2)
	Fixed Effects	Instrumental Variables
OILR	0.314*** (4.36)	0.192*** (3.70)
GFCF	0.184*** (5.59)	0.062* (1.83)
TOPEN	0.021*** (2.73)	0.003 (1.22)
GEE	-0.604*** (-3.26)	-0.788 (-1.30)
CORP	1.535*** (2.76)	-0.091 (-0.23)
CONF	-1.604*** (-2.75)	-0.463 (-1.01)
Constant	-0.520 (-0.49)	5.204* (1.80)
Observations	1,197	1,131
R-squared	0.149	0.055
Country FE	Yes	-
Hansen's Test (P-Value)	-	0.5058

Note: t statistics in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Regarding the other explanatory variables, the coefficient of GFCF is positive and statistically significant at a 1 % significance level. This result supports exogenous and endogenous economic growth theories proposed by (Solow, 1956) and (Romer, 1986 and Lucas, 1988), respectively. The coefficient of TOPEN is also positive and statistically significant at a 1 % significance level. This result confirms the trade liberalization argument (Krugman and Venables, 1990; Dennis and Shepherd, 2011). Expansion of both variables are associated with higher economic growth. CONF significantly reduces economic growth. This result suggests that conflict are destructive of human capital, infrastructure and economic stability, which causes lower economic growth (Collier, 1999).

Unexpectedly, GEE adversely affects economic growth. This might be due to inefficient allocation of funding to increase spending on education level, and a lack of complementary public goods that facilitate quality education particularly in developing countries (Frank, 2018). CORR has a significant positive impact on economic growth. It is argued that corruption might increase growth rate of the economy by overcoming bureaucratic and other problems (Podobnik et al., 2008; Spyromitros and Panagiotidis, 2022).

Column (2) represents the results of the instrumental variable approach. The sign and coefficient of OILR variable remain the same. This result is similar to the fixed effect approach, providing further evidence against the argument of the resource curse hypothesis. This implies that oil rents are indeed a blessing for economic growth.

Concerning the other explanatory variables, the coefficient of GFCF is still positive and statistically significant at 1 % significance level. The sign of the coefficients for TOPEN, GEE, COROP, and CONF variables remain the same but became statistically insignificant. In column (2), we apply the Hansen test to check for the validity of instruments. The outcomes of the test are accepted the null hypothesis, confirming the validity of the joint instruments variables that we have employed in our analysis.

Conclusion

This study re-assesses the natural resource curse hypothesis by examining the relationship between natural resources and economic growth in a panel data sample of 142 developed and developing countries from 1975 to 2013. Unlike previous literature, we control unobservable time-invariant country characteristics and endogeneity problem, using a panel data fixed effect and TSLS estimation approaches in the analysis. Using oil rents as a proxy for natural resource, our results indicate that oil rents are a blessing for economic growth. This result is against to the argument of the hypothesis. Our results provide policy implications for natural resource-rich developed and developing countries. The positive impact of oil rents on economic growth suggests that these countries should execute additional practical macroeconomic policies. For instance, they should evade unnecessary national and foreign debts, gather budget surpluses, monitor inflation, depreciate their local currency, support trade liberalisation, diversify their economy, and reduce their government spending on large-scale projects. Such policies definitely enhance economic growth and development. They should also invest largely in human capital, technology development, and the manufacturing and agricultural. Such investment sustains economic growth. Additionally, these countries need to build their capability to improve their institutional quality including political rights, free media, civil society, and public participation in decision making, secure property rights, control corruption level and rent seeking activities, contributing positively to growth rate of the economy.

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Appendix A

List of Variable Definitions and Data Sources

Variables	Definitions	Sources
RGDPG	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2005 prices.	WDI
OILR	Oil rents' share of GDP, measured as the difference between the value of crude oil production at world prices and total cost of production.	WDI
GFCF	Gross fixed capital formation shares of GDP.	WDI
TOPEN	Trade openness – imports and exports share of GDP.	WDI
GEE	Government expenditure on education (current, capital, and transfers) share of GDP.	WDI
CORR	Control of corruption, and that measures the extent to which power is exercised for private gain, including both petty and grand forms of corruption, as well as the “capture” of the state by elites and private interests. It ranges between -2.5 (the most corruption) and +2.5 (the least corruption).	WGI
CONF	Conflict and is a dummy variable. It refers to an internal conflict in which at least 1000 battle related deaths (civilian and military) occurred per year. Coding takes value 1 for a country experiencing civil war and 0 otherwise.	IV Project Polity

Appendix B

List of Countries Included in the Sample

Europe and North America	Middle East and North Africa	Asia and Pacific	Latin America	Sub-Saharan Africa
Albania	Algeria	Vietnam	Bolivia	Angola
Armenia	Bahrain	Australia	Brazil	Benin
Australia	Egypt	Azerbaijan	Bruin Darussalam	Botswana
Austria	Iran	Bangladesh	Chile	Burkina Faso
Belarus	Iraq	Cambodia	Colombia	Burundi
Belgium	Israel	China	Costa Rica	Cameroon
Bulgaria	Jordan	Hong Kong	Cuba	Central Africa
Canada	Kuwait	India	Dominican Republic	Chad
Croatia	Libya	Indonesia	Ecuador	Congo Republic
Cyprus	Lebanon	Japan	El Salvador	Cote d'ivoire
Czech Republic	Morocco	Kazakhstan	Fiji	Equatorial Guinea
Denmark	Oman	Korea Republic	Guyana	Ethiopia
Finland	Qatar	Kyrgyz Republic	Guatemala	Gabon
France	Saudi Arabia	Malaysia	Honduras	Gambia The
Georgia	Syrian Arab Republic	Maldives	Jamaica	Ghana
Germany	Tunisia	Mongolia	Mexico	Guinea
Greece	United Arab Emirate	Nepal	Nicaragua	Guinea- Bissau
Hungary	Yemen	New Zealand	Panama	Kenya
Iceland		Pakistan	Peru	Liberia
Ireland		Philippines	Trinidad and Tobago	Madagascar
Italy		Singapore	Venezuela	Malawi
Latvia		Sri Lanka	Uruguay	Mali
Lithuania		Thailand		Mauritania
Luxembourg		Timor-Leste		Mauritius
Macedonia		Turkmenistan		Mozambique
Malta		Vietnam		Namibia
Netherland		Turkmenistan		Nigeria
Norway				Niger
Poland				Rwanda
Portugal				Senegal
Romania				South Africa
Russian				Sudan
Slovak Republic				Togo
Spain				Uganda
Sweden				Zambia
Swaziland				Zimbabwe
Turkey				
United Kingdom				
Ukraine				
United States				