ON THE DILEMMAS OF NATURAL RESOURCE RENTS AND THE WEALTH OF THEIR CITIZENS: CASE OF ANGOLA AND NORWAY

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Abstract

Since the very dawn of humanity, the possession of natural resources has claimed an important participation in the debate, elements such as the accumulation of precious metals, the government of nature, market freedom, government intervention in the economy, the impacts of these situations, the participation of academia in the investigation of these phenomena as contributors to the welfare of their inhabitants is necessary. Thus, it is decided to investigate the contribution of natural resource rents to the GDP per capita for two nations that are producers of this type of resources, Norway and Angola, in a 2011-2020 window within the framework of a model that aims to find a useful regression coefficient to forecast the behavior of the two variables for the model in the case of Norway, In the case of Angola, which registered a weak Pearson correlation and a negative Spearman correlation compared to its Nordic peer, there is linearity and correlations in the relationship between natural resource rents and GDP per capita.

Keywords: Dutch disease, revenues from natural resource exploitation as % of GDP, GDP per capita.

INTRODUCTION

From the above, a discussion on the real contribution of these items of the economy to the growth of nations and the development of their inhabitants arises, which is why it is helpful to investigate whether necessarily and for all natural resource-producing nations, the production and export of natural resources involves a deterioration in their industry and their national accounts. Nevertheless, it is worthwhile to make a 180° turn and evaluate whether or not this phenomenon, i.e., the exploitation of natural resources, contributes to the wealth and development of its inhabitants, which for practical purposes is referred to as welfare in this paper. The Republic of Angola, located in the south of the African continent, has a variety of natural resources, among which oil and mining, such as iron and copper stand out, which present a series of dilemmas and challenges, due to its great economic dependence on its natural resources such as oil, where there is a high dependence, representing more than 95% of the country's exports. Angola, like many countries on the African continent, presents great inequalities or asymmetries among its provinces. At the economic, financial and technological levels, there is a great disparity between them, where it is observed that the province of Luanda is the largest financial business center to the detriment of others such as Mexico, Zaire and Cabinda (Catoto Capitango et al., 2022). The citizens of Angola have seen how the country has been experiencing economic growth, but it is not reflected in the population that continues to live in poverty, despite the increase in the country's oil reserves remaining in the top 5. Recent oil reserves have increased the importance of this resource in African economies. Five African

countries dominate upstream oil production, accounting for 85% of the continent's oil reserves. These countries are Nigeria, Libya, Algeria, Egypt and Angola (Adeola et al., 2022).

Africa harbors all types of fossil fuels-crude oil, coal, and natural gas. The continent accounts for about 7.2%, 7.1%, and 1.3% of the world's proven crude oil, natural gas, and coal reserves, respectively (BP, 2019, cited by Inal et al., 2022). Available evidence from countries such as Angola, Equatorial Guinea and Nigeria suggests that economic growth has an inverse relationship with oil production. They also base their estimate of resource rents on a numerical model and find that reforming the Danish fisheries policy could potentially increase resource rents by about 50 % in the short term and more than 100 % in the long term (Greaker et al., 2017). Although it is clear that all companies extracting oil and natural gas in Norway pay their taxes and royalties just as companies do in Angola, here it happens that in Norway, there is strict control on the use of these revenues, which mostly go to finance health, education and the development of its infrastructure in addition to financing the Norwegian Global Pension fund. Norway relies heavily on revenues from the oil sector. Just before the oil market crisis in 2013, the oil industry accounted for about 20% of the GDP, 30% of investments and 49% of exports (Rørheim and Boschma, 2022). The fund is owned by the Norwegian people and managed by the Norwegian central bank (Norges Bank) on behalf of the Ministry of Finance. Contrary to its name, the GPF-G is technically a sovereign wealth fund (Urban and Wójcik, 2019).

The oil fund is an essential part of Norway's fossil fuel-based economic regime; it determines the distribution of national oil revenues and provides a helpful illustration of the institutionalization of new economic practices resulting from complex political processes during socio-economic transitions (Bakken Øvald, 2023). Exciting are the approaches of Wirth & Ramírez-Cendrero(2020) analyze the asymmetries of the Dutch disease Reviewing the Norwegian oil model, 1970-2018, in which they aim to point out the particular observations of the case among which stand out: 1) No clear evidence of resource reallocation effect; 2) Lower oil dependence than other producing countries; and 3) Effects on the trade balance determining a high level of contribution of the oil sector to the Norwegian economy. Decision-making for companies and trade policy in which they demonstrate the high vulnerability of these nations to situations of this nature.

METHODS

The least squares method minimizes the sum of the squares of the errors. Carollo (2012) states that this type of regression model tries to explain the relationship that exists between a dependent variable (response variable) and a set of independent variables (explanatory variables) X1,..., Xn. In the particular case of the simple linear regression model, the relationship between the response variable Y and a single explanatory variable X is explained as follows:

$$Y = \alpha + \beta X + \varepsilon$$

α = Ordinate at the origin (the value Y takes when X is 0); β = Slope of the line (and indicates how Y changes when X increases by one unit); ε = Error. Pearson's Correlation Analysis: The analysis of correlations is widespread for research, which in this case is of high value in the sense of explaining the direction taken by the behavior of the variables, a valuable element from which to propose conclusions, which is why researchers such as Hernandez Sampieri (2014)

Equation 1. Pearson's Correlation Coefficient Formula

$$r = \frac{n \cdot \sum x_i \cdot y_i - \sum x_i \cdot \sum y_i}{\sqrt{[n \cdot \sum x_i^2 - \left(\sum x_i\right)^2] \cdot [n \sum y_i^2 - \left(\sum y_i\right)^2]}}$$

Where
r = Pearson's coefficient
n= number of stock pairs

Σxy = sum of products of paired shares.
Σx = sum of the x scores.
Σy= sum of the scores y
Σx2 = sum of the x-scores squared.
Σy2 = sum of the squared y-scores.
Level of measurement of the variables: intervals or ratio. Interpretation: Pearson's r coefficient can vary from +1.00 to -1.00, where:
+1.00 = Perfect positive correlation
+0.90 = Very strong positive correlation.
+0.75 = Significant positive correlation.
+0.50 = Average positive correlation.
+0.25 = Weak positive correlation.
+0.10 = Very weak positive correlation.
0.0 = No correlation between variables.
-0.10 = Very weak negative correlation.
-0.25 = Weak negative correlation.
-0.50 = Average negative correlation.
-0.75 = Significant negative correlation.
-0.90 = Very strong negative correlation.
-1.00 = perfect negative correlation.

It is a measure of linear association that uses the ranks and order numbers of each group of subjects and compares these ranks as defined by the following equation:

Equation 2. Linear association of ranks.

$$r_S = 1 - \frac{6\sum_{d_i} 2}{n^3 - n}$$

Source: Martínez Ortega, Rosa María, & Tuya Pendás, Leonel C., & Pérez Abreu, Alberto, & Cánovas, Ana María, & Martínez Ortega, Mercedes (2009).

Variables and their operationalization are essential in research. Hernández Sampieri (2014) defines variables as a set of procedures that describe the activities that an observer must perform to receive the sensory impressions that indicate the existence of a theoretical concept to a greater or lesser degree, thus specifying which activities must be performed to measure a variable even when several operational definitions are possible for the same variable, to present the variables understandably, the definition and operationalization of the three variables to be considered are shown in the table as follows.

Regarding the Hypothesis, reference researchers such as Hernández Sampieri (2014) argues that the hypotheses arise from a problem statement based on a theoretical framework that has collected elements of previous research of a similar nature. Thus, the following elements are considered to propose the hypotheses described by Hernández-Sampieri (2014): 1) Current situation; 2) Understandable variables; 3) Logical and plausible relationship between variables; and 4) Variables are measurable in terms of real referents. For this case, a research hypothesis is defined as tentative basic propositions about possible relationships between two or more variables. Because of the above, in this way, the authors have considered as a starting point the idea of a significant contribution of the exploitation of natural resources to the economic growth and development of nations.

RESULTS

As well as the data that records total natural resource rents (% of GDP) as a direct source (World Bank, 2022) providing reliable information for ten years between 2011 and 2020:

Table 1. Angola's GDP per capita and total natural resource revenues
(% of GDP) Angola (2011-2020)

YEAR	GDP PER CAPITA ANGOLA USD	Total natural resource rents (% of GDP) ANGOLA
2011	4.511,15	41,09317327
2012	4.962,55	36,28887798
2013	5.101,98	30,85046542
2014	5.059,08	23,75862606
2015	3.100,83	10,82928906
2016	1.709,52	10,89222027
2017	2.283,21	16,43678183
2018	2.487,50	27,53311928
2019	2.142,24	26,13835474
2020	1.603,99	25,51796283

Source: Data World Bank (2022)

From 2011 to 2020, ten observations are taken to find some relationship between Total Natural Resource Rents and Angola's GDP Per Capita. See table:

Table 2. Correlation of GDP Per Capita Angola vs. Total Resource Rents
(% of GDP) Angola

		PIBPERCAPIT AANGOLA	RENTRECNA TPIBANGOLA
PIBPERCAPIT AANGOLA	Pearson correlation	1	,582
	Sig. (bilateral)		,078
	N	10	10
RENTRECNAT PIBANGOLA	Pearson correlation	,582	1
	Sig. (bilateral)	,078	
	N	10	10

The results show an average correlation of 0.582 without being significant, standing at 0.078, which indicates that it cannot be conclusively stated that the independent variable (total income from Angola's natural resources) determines the behavior of the dependent variable (GDP per capita). However, when plotted using dispersion, a positive trend is evident which, although not perfect, tends towards a considerably positive behavior in which the relationship between the variables is undeniable and which can be considered an improvement in the GDP per capita based on the increase in the income from natural resources in the case of Norway, unlike Angola, which presents a low level of contribution to this indicator.

Natural Resources Income as % of GDP Norway 2011-2020

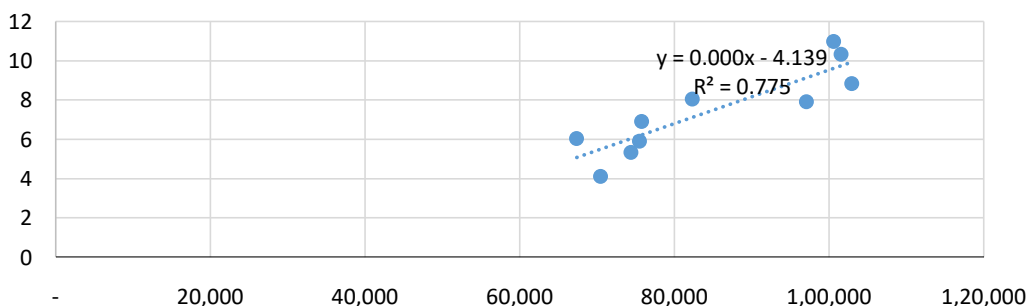y = 0.000x - 4.139
R^2 = 0.775

Figure 1. Dispersion Graph Natural Resources Income as % of GDP Norway 2011-2020

Regarding the assumptions of the model: 1) It can be affirmed for the case of Norway that there is a Linear Relationship between the income obtained from the exploitation of natural resources and the GDP per capita, but not for the case of Angola. 2) The variation of residuals for the case of Norway is constant (homoscedasticity), considering that no association pattern (no pattern) is shown in the cloud of points in the residuals graph registering positive and negative values.

To broaden this analysis, it would be convenient to delve into issues such as individual and market freedoms, the quality of institutions, democratic strength, and equality, among others that in isolation would be complex to collect but that, nevertheless, would constitute a good research exercise that the authors address on a later occasion.However, to enrich the discussion proposed in this opportunity, the possibility of using an indicator that involves various dimensions that evaluate the development of the inhabitants of a country to appreciate with greater depth and breadth the panorama of these two nations and that, in practical terms could constitute a new hypothesis in addition to those proposed in the Methodology section, as follows: Ha: There is a positive correlation between the HDI Human Development Index ranking in Angola and the HDI Human Development Index ranking of Norway for the period 2011-2020. For the development of this part,the study proceeded to consult the HDI Human Development Index ranking of the United Nations Development Program (UNDP) in which the annual location of the two countries is recorded.

Table 3. Ranking Human Development Index Norway - Angola 2011-2020

Year	Human development index ranking Norway	Human development index ranking Angola
2011	1	148
2012	1	149
2013	1	149
2014	1	150
2015	1	150
2016	1	145
2017	1	147
2018	1	149
2019	2	147
2020	1	148

Source: United Nations Development Programme (UNDP).
(2022). Human Development Index (HDI)

CONCLUSION

The question of equality and human development, which is why the Human Development Index (HDI) of the United Nations Development Program was involved, no longer as indexes, but as rankings, by means of Spearman's correlation, a deeply useful analysis to understand the historical development and evolution as nations of these peoples, who are ultimately those who enjoy or suffer the impact in terms of country decisions, from these considerations, the historical ranking of HDI nations was taken for the same period evaluated (2011-2020), finding a difference as considerable as discouraging for the people of Angola, which ultimately shows an inverse or negative correlational behavior with respect to their peers in Norway, especially when evaluating the regression model, which provides evidence regarding the practically nonexistent expectations of welfare contribution, in the production of its natural resources for its development, a fact that would be worth evaluating in other nations with strong dependence on raw materials.

In conclusion, these are excellent expectations for Norway, in profound disparity with Angola, the door to a new debate, which must transcend the sovereign decisions in productive/commercial matters of nations towards a debate for global welfare that involves a decisive and real way the

fulfillment of the Sustainable Development Goals, in which future generations should not question their ancestors for "stop doing and let it pass."

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