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Export Diversification in Sub-Saharan Africa: What are the Explanatory Factors in Country Groups?

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Authors' contributions

This work was carried out in collaboration among all authors. Author NNI contributed to the formulation of title and gave the main orientations. Author DPV managed the literature searches, wrote the protocol and wrote the first draft of the manuscript. Authors DPV and TTG performed the statistical analysis. All authors read and approved the final manuscript.

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ABSTRACT

This study empirically analyses the determinants of export diversification, as measured by the Theil Diversification Index, which takes into account the different margins of diversification. The pooled mean group method is applied to a sample of 23 Sub-Saharan African (SSA) countries divided into three distinct groups according to their natural resource endowments. The results show that the quality of government negatively determines export diversification in all groups of countries while total resource rent negatively determines export diversification in resource-rich countries. In contrast to this result, the level of democracy and stability of government positively determines export diversification in non-oil resource-rich countries and trade openness promotes diversification in oil-exporting countries. As for foreign direct investment, it promotes export diversification in oil-exporting countries and resource poor countries. Thus, policymakers should focus on promoting industrialization in the agricultural and processing sectors by better targeting foreign direct investment or by investing resource income in productive infrastructure to improve the competitiveness and productivity of economies.

Keywords: Export; diversification; Theil index; extensive margin; intensive margin; pooled mean group.

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1. INTRODUCTION

The globalization of the economy is one of the highlights of this century, its intensification from the second half of the twentieth century onwards has transformed the world into a single, interconnected market, and has led to a trade structure that is very different from that advocated by classical trade theories, based on pure and perfect competition and comparative advantages [1,2].

While emerging Asian countries have been able to take advantage of globalization through well-articulated national and regional strategies, Africa's performance shows that the continent remains out of the mainstream [3]. Indeed, Africa has lagged behind in the industrialization process and its development has not kept pace with that of the countries that industrialized from the 1960s onwards. As a result, the manufacturing sector has never developed in depth and in most African countries, particularly those in sub-Saharan Africa (SSA), the trend has been towards deindustrialization [4].

The contribution of the manufacturing sector to Africa's gross domestic product (GDP) has declined. Between 1981 and 1985 the share of manufacturing in Africa's GDP (excluding South Africa) was 14.7 per cent and fell to 10.4 per cent between 2010 and 2014 [5]. This decline in the manufacturing sector was accompanied by a concentration of exports on commodities, mainly hydrocarbons: fuels accounted for 55% of exports between 2010 and 2015, compared to 18% for manufactured goods. Thus, Africa's share of world exports fell from 3.7% in 1980 to 2.2% in 2016[1].

Policy-makers and researchers are paying particular attention to understanding this concentration of exports in African countries [6,7]. These are mainly non-renewable natural resource exporting countries that face significant macroeconomic and institutional constraints in a context where the prices of their main export products are highly volatile [8,9].

Indeed, increased specialization of production and exports increases vulnerability to external shocks specific to each sector. Thus, a significant factor explaining the low level of development and the volatility of growth in developing countries is the volatility of commodity prices. [10] show that countries specializing in products with volatile prices face lower growth rates than countries specializing in products with more stable prices. Moreover, [11] show that countries specializing in primary commodities are at a distinct disadvantage, partly due to Dutch disease [2] [12,13] and the difficulty of managing the volatility of government revenue flows [14].

Thus, countries with unstable prices for major export products and undiversified economies lag behind in their economic development [15,16].

To address this pronounced volatility of growth and other macroeconomic indicators in developing countries, economic diversification has been identified in the literature as an effective strategy to protect against Dutch disease [17]. The benefits of a diversified export basket include reduced vulnerability to idiosyncratic shocks, reduced instability and increased export earnings, more efficient use of resources and, as a result, higher growth and productivity [18].

Auty [19] uses the term resource curse to refer to the overall harm caused by natural resources to growth and production. Indeed, the volatility of commodity prices can have a long-run impact on firms' performance, as large price fluctuations can increase uncertainty and risk, discouraging private investment and thus export diversification [20].

Although price volatility and Dutch disease explain the poor performance of countries exploiting raw materials, many researchers question their relevance in explaining the low level of export diversification. Thus, [21] find that an oil boom negatively affects export diversification only if countries initially have low levels of diversification.

At the structural level, several indicators are identified as having an impact on export diversification. [22] find that trade openness, exchange rate volatility and improved terms of trade favour export concentration, while human capital accumulation is the main factor favouring export diversification. The study of [23] and [24] identifies financial development and public investment as drivers of export diversification.

[1] *See UNCTADstat*

[2] *Dutch disease is an economic phenomenon that links the exploitation of natural resources to the decline of local manufacturing industry. This phenomenon is triggered by the increase in export earnings, which in turn leads to currency appreciation making other export sectors uncompetitive.*

However, some studies find contrary effects, for example, the [25] show that in North African countries, trade openness and foreign direct investment (FDI) are drivers of export diversification, unlike public investment, which tends to increase the concentration of trade. Furthermore, [9] find that in oil-rich countries, export diversification depends mainly on the initial technology deficit and market failures and not on government failures.

As a result, the question of what explains the high concentration of exports in some economies has not yet been resolved. While some authors have studied the drivers of diversification with reference to a mix of developed and developing countries, those who have studied African countries have not paid particular attention to the nature of natural resource dependence and how different indicators affect the different margins of export diversification and focus only on diversification in the broad sense.

This study therefore contributes to the literature in the context of SSA by examining both the drivers of overall diversification and the drivers of the extensive and intensive margin of export diversification of 23 SSA countries, distributed according to their natural resource endowment (oil-exporting countries, countries rich in non-oil non-renewable natural resources and resource-poor countries) defined according to IMF criteria.

Indeed, the Theil index used in this study to measure the exports diversification to take into account both the diversification resulting from the introduction of new products in a country's export basket (extensive margin) and the diversification resulting from a variation in volume of the various export products already existing (intensive margin), the latter in fact reflecting a variation in volume and not in number of export products. The rest of the paper is divided into four sections, Sections 2 and 3 present the literature review and methodology while sections 4 and 5 present the main findings and conclusion.

2. LITERATURE REVIEW ON EXPORT DIVERSIFICATION

2.1 Theoretical Foundations of Export Diversification

According to David Ricardo's theory of comparative advantage, in a context of trade liberalization, each country should specialize in the production and marketing of goods for which it has a comparative advantage. This implies that African countries that are richly endowed with natural resources in order to foster economic growth should specialize in the production of raw materials. However, many studies question this argument and advocate diversification of production [26,27,28].

Export diversification appears in the literature through the pioneering work of [26,27], who challenge views in favour of free trade. They argue that, given the deterioration in the terms of trade between primary and manufactured products, specialization is not favourable for developing countries as they are heavily dependent on the production and export of commodities.

Pham and Martin [29] point out that, this diversification should not be limited to an increase in the quantities exported of the same goods (intensive margin of diversification). But also, to an increase in the number of products exported (extensive margin) because the effect of the latter is likely to be more favourable for growth. What matters is not only the quantity exported but also what is exported [30].

In addition to the deterioration in the terms of trade, the volatility of commodity prices is also put forward to justify the need for export diversification [31,32]. Indeed, the volatile nature of commodity prices presents countries whose economies are dependent on natural resources with many challenges in terms of financial management and forecasting. For example, sharp fluctuations in natural resource prices are very often accompanied by volatility in export earnings and tax revenues, which in turn fuel instability in public spending [33].

This price volatility can also lead to a sharp increase in State consumer spending or excessive indebtedness during periods of high price rises, but when prices begin to fall again it may be difficult to reduce such spending, especially in developing countries that do not have strong institutions [34,21].

To this end, given the deterioration in the terms of trade between manufacturing and commodities and the volatility of commodity prices, many researchers consider that a country whose economic fabric is made up of different sectors of activity is less exposed to internal and external turbulence, especially when its different sectors have a low degree of correlation [35,36]. Based on Markowitz's diversification logic "it is

not prudent to put all your eggs in one basket", [37] modern portfolio theory has positioned itself as a theoretical basis for justifying export diversification.

2.2 Empirical Study on the Determinants of Export Diversification

In the literature, several authors study the factors explaining export diversification [22,18,38]. These factors are considered as prerequisites for a successful process of diversification of the productive base. However, it was the seminal work of [39] that analysed the process of export diversification throughout the economic development process. Using data on employment and value added, [39] show that there is a non-linear relationship between output diversification and growth. This implies that countries diversify as per capita income increases and above a certain level of income, the sectoral distribution of economic activity becomes more concentrated. [40] and [41] confirm this result using disaggregated export data.

Following [39] some authors have identified other determinants of export diversification. Thus, [42] find that infrastructure, human capital, public investment and institutions are important drivers of export diversification in African countries.

Prasanna [43], referring to India's exports, explores the specific impact of FDI on export performance and concludes that there is a positive relationship between FDI inflows and export diversification. Similarly, [44,45,46] find a positive effect of FDI on export diversification.

However, [38] show that the effect of FDI on export diversification is mixed. [47] also shows that although FDI does not have a significant effect on overall diversification, it has negative effects on export diversification in related sectors.

Focusing on the exchange rate, [48]; [49] find that an exchange rate depreciation is conducive to export basket diversification. On the other hand, [50] conclude that exchange rate appreciation or depreciation has no impact on exports of goods and services.

On the relationship between trade liberalization and export diversification, the results are mixed. Some studies show that trade openness leads to specialization rather than diversification [51,52]. However, some authors show that trade openness increases export diversification through different channels [53]. For [38], trade openness increases export diversification through the extensive margin (introduction of new export products).

In addition to economic factors, institutional factors have a significant influence on export diversification. Moreover, the impact of certain macroeconomic factors may be conditioned, if not crowded out, by national institutions, particularly in the context of developing and resource-rich countries. According to [54], democratic regimes are associated with greater respect for property rights and the rule of law, which promotes the creation of a fair and competitive market. In addition, the [55][3] stress the importance of good governance[4] as a determinant of diversification in African economies. They present it as a prerequisite for building an enabling environment for diversification.

However, other authors show that the effect of institutional quality on export diversification remains mixed. Studies by the [25][5] and [56] show that institutional variables are not significant. [38] find that democracy is not closely associated with export diversification. Dividing the sample into commodity exporting and diversified countries, they also find that good governance is associated with export diversification but with a non-significant effect.

3. RESEARCH METHODOLOGY

3.1 Data, Sources and Samples

The data are secondary sources and quantitative in nature. They cover the 1986-2014 period and come from the World Development Indicators [5], the Gothenburg database [57], the International Country Risk Guide [58] and the IMF database. The sample consists of 23 SSA countries divided into three groups according to their natural resource endowment as defined by IMF criteria.

[3] *OECD and United Nations, 2011. Economic Diversification in Africa: A Review of Selected Countries, OCDE Publishing.*

[4] *There is no single definition of the concept of good governance, even though it has been regarded as an imperative for development policies since the 1990s. However, common dimensions are emerging, such as the six governance indicators proposed by the World Bank: Voice & accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, control of corruption, etc.*

[5] *UN, 2013, Diversification and Sophistication as a Lever for Structural Transformation of North African Economies. Rabat: ECA/BSR-AN, United Nations.*

These are oil-exporting countries [6] (Angola, Cameroon, Gabon, Republic of Congo, Nigeria), countries rich in non-renewable natural resources other than oil[7] (South Africa, Ghana, Niger, Democratic Republic of Congo, Mali, Guinea, Sierra Leone, Burkina Faso) and countries poor in natural resources [8] (Ivory Coast, Gambia, Guinea Bissau, Kenya, Madagascar, Malawi, Mozambique, Senegal, Togo, Uganda). The countries were selected on the basis of data availability.

3.2 Model Specification

The objective is to identify the determinants of export diversification in different groups of SSA countries according to their natural resource endowment, for which the Theil Diversification Index inspired by [59][9] is used. The model is based on those developed by [22,60,38]. The matrix form is as follows:

$$ED_{it} = \beta X_{it} + \varepsilon_{it}$$

Where, ED_{it} export diversification index, X_{it} the matrix of macroeconomic and institutional explanatory variables.

In linear form, the model is written as follows:

$$ED_{it} = \beta_0 + \beta_1 ED_{it-1} + \beta_2 QOG_{it} + \beta_3 LDE_{it} + \beta_4 SG_{it} + \beta_5 GDP_{it} + \beta_6 FDI_{it} + \beta_7 TOP_{it} + \beta_8 RTR_{it} + \varepsilon_{it}$$

Where QOG is the quality of government; LDE is the level of democracy; SG is the stability of government; GDP is GDP per capita; FDI is foreign direct investment; TOP is trade openness; RTR is total resource rent. The β_i coefficients of the model parameters to be estimated and ε_{it} the error term.

3.3 Estimation Method (Pooled Mean Group)

In order to identify the factors that explain export diversification, the PMG (Pool Mean Group) method developed by [61] and applied to an ARDL (autoregressive distributive lag) is used. The ARDL has an error-correction representation that allows efficient estimation of long-term relationships while providing information on the short term. ARDL models in particular PMG provide consistent coefficients even in the presence of endogeneity because it includes lags of the dependent variable and independent variables [61]. According to [22], the majority of the explanatory variables for export diversification are endogenous. The PMG approach simultaneously takes into account the heterogeneity of individuals, the dynamics of the series and the non-stationary nature of the variables. This approach introduces a heterogeneity of short-term parameters while maintaining a homogeneity of long-term parameters. Empirically, [61] find that PMG estimates produce efficient estimators for both large and small sample size.

4. RESULTS AND INTERPRETATIONS

4.1 Descriptive Statistics

The mean and standard deviation of the different variables are summarized in the Table 1.

The Table 1 shows that in terms of export diversification, resource-poor countries perform best, followed by non-oil-rich countries. In terms of quality of government (QOG), resource-poor countries also perform best, although the average for this variable is below 0.5 (the index is between 0 and 1), reflecting the poor governance that characterizes all these groups of countries. In terms of the level of democracy (LDE), countries rich in non-oil resources appear to be the most democratic.

With regard to macroeconomic variables, they all average higher in oil-exporting countries and lower in resource-poor countries. Table 1 shows that the standard deviation is below or above the average in all groups of countries, showing that the variables are widely dispersed around the average.

The results of the ARDL panel model of the determinants of export diversification are summarized in the Table 2. We will present a summary of the long and short-run results in turn.

4.2 Long-run Results of the ARDL Panel Model of the Determinants of Export Diversification in SSA by the PMG Method in Different Country Groups

The Table 2 shows that the results vary from one group of countries to another. We will therefore

[6] *In these countries, net oil exports account for at least 30% of total exports.*
[7] *These are countries where non-renewable natural resources account for at least 25% of total exports.*
[8] *These countries belong neither to the group of oil exporters nor to the group of other resource-rich countries.*
[9] *Because of its construction, the lower the values, the more diversified the exports are.*

comment on the results separately for each group of countries in order to be able to identify the differences.

4.2.1 Long-run result in oil-exporting countries

In the group of oil-exporting countries, the institutional variables quality of government (QOG), stability of government (SG) and level of democracy (LDE) negatively and significantly determine overall export diversification (measured by the Theil index). This is mainly due to the fact that they favour the concentration of exports at the intensive margin (volume concentration). All these variables favour diversifications at the extensive margin (increase in the number of products that a country exports), however, their effects on concentration at the intensive margin seem to be more important. These results, which are contrary to our expectations, are consistent with those of [62]. They could be explained by the fact that, in SSA oil-exporting countries, policies put in place to improve the quality of institutions and democracy, while promoting the introduction of new products in the export basket, further exploit their comparative advantages, thus failing to achieve broad diversification.

Foreign direct investment (FDI) significantly promotes export diversification in these countries. This result confirms our expectations and corroborates those of [44] and [46]. This diversification is mainly achieved by broadening the range of products exported to these countries as it has a greater positive and significant impact on the extensive margin of the Theil index.

Table 1. Descriptive statistics

Variables	Oil-exporting countries		Countries rich in non-oil resources		Resource-poor countries	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Total Theil	5.393	0.703	4.207	0.981	3.830	0.822
Extensive margin	0.954	0.740	3.458	0.539	0.509	0.473
Intensive margin	4.550	0.995	3.458	0.847	3.320	0.879
QOG	0.376	0.810	0.373	0.161	0.416	0.115
LDE	3.112	1.509	5.097	2.614	4.662	2.304
SG	7.979	2.182	6.545	2.880	7.313	2.107
GDP	2311.3	2362.2	1147.6	1621.5	501.96	306.31
FDI	3.297	6.233	2.261	4.326	2.696	4.675
TOP	79.707	39.26	61.86	28.579	61.85	18.662
RTR	25.695	14.69	12.73	8.278	8.747	5.912

Table 2. Long-run result

Country	Oil-exporting countries			Countries rich in natural resources			Resource-poor countries		
Variables	Total Theil	Extensive margin	Intensive margin	Total Theil	Extensive margin	Intensive margin	Total Theil	Extensive margin	Intensive margin
QOG	0.899***	-0.11**	1.937*	1.189**	-0.199**	1.757*	1.776*	1.482*	0.790*
	(0.300)	(0.047)	(0.354)	(0.476)	(0.088)	(0.244)	(0.343)	(0.219)	(0.216)
LDE	0.011***	-0.006*	0.143*	-0.08***	-0.023*	-0.049**	0.039	-0.011	0.053*
	(0.017)	(0.002)	(0.020)	(0.030)	(0.005)	(0.023)	(0.032)	(0.012)	(0.012)
SG	0.040***	-0.005***	0.034*	-0.062*	-0.011*	-0.001	0.124*	0.097*	0.038**
	(0.015)	(0.003)	(0.012)	(0.026)	(0.004)	(0.016)	(0.032)	(0.018)	(0.014)
GDP	-2.85^{E}-06	4.9^{E}-05*	5.6^{E}-08	0.000***	3.2^{E}-5**	-8.4^{E}-05	0.001*	0.0004*	0.001*
	(1.8^{E}-05)	(1.6^{E}-05)	(5.9^{E}06)	(0.000)	(1.4^{E}-05)	(7.0^{E}-05)	(0.000)	(8.3^{E}-05)	(8.1^{E}-05)
FDI	-0.03***	-0.08*	0.004**	0.027**	0.000	-0.005	-0.087*	-0.070*	-0.011
	(0.000)	(0.003)	(0.002)	(0.013)	(0.001)	(0.006)	(0.029)	(0.018)	(0.007)
TOP	-0.01***	0.0002	-0.005*	0.006	0.0001	0.011*	0.010***	-0.005**	0.024*
	(0.002)	(0.000)	(0.000)	(0.001)	(0.0007)	(0.003)	(0.005)	(0.002)	(0.003)
RTR	0.015***	0.001**	0.001***	0.038***	0.002	-0.003	-0.014	0.044*	-0.120*
	(0.004)	(0.000)	(0.001)	(0.007)	(0.001)	(0.003)	(0.022)	(0.011)	(0.010)

*Note: *, **, *** respective significance at the 10% threshold; 5% and 1%*
The values in parentheses represent standard deviations

Both trade openness and FDI significantly improve the diversification of exports, a result similar to that of [53]. However, unlike FDI, this diversification does not take place through the introduction of new products in the export basket (no significant effect on the extensive margin) but through a better distribution of export volumes of the various products already existing in the economy (intensive margin).

With respect to total resource rent, like [8] and [9], the results show that it is associated with greater export concentration at both the extensive and intensive margins. While the link between RTR and the intensive margin of diversification is expected as the extracted oil is likely to be exported, the effect on the extensive margin suggests that the export of oil compromises the development of other production sectors, thus indicating the poor management of oil resources in these countries.

4.2.2 Long-run result in countries rich in non-renewable natural resources other than oil

In this group of countries, the quality of government (QOG) as in the group of oil exporting countries has a negative and significant impact on export diversification. The level of democracy (LDE) as opposed to the QOG has a positive and significant impact on diversification at both the extensive and intensive margins. This result is in line with our expectations and is consistent with that of [63]. The stability of the government, like the level of democracy, favours overall export diversification. However, contrary to the level of democracy, this diversification is essentially done through the extensive margin insofar as it does not have a significant effect on the intensive margin.

With respect to macroeconomic variables, GDP is an important determinant of export concentration, and this concentration is mainly at the extensive margin. In contrast to [8], GDP per capita has a positive and significant impact on the total Theil index. However, this result corroborates those of [64]; [60] could be explained by the fact that domestic firms in these countries probably have an incentive to concentrate on a few products in order to achieve economies of scale when GDP increases.

FDI promotes the concentration of exports in a significant way. This result is similar to that of [65] and could be explained by the fact that most of the FDI that arrives in countries rich in non-oil natural resources is directed into the capital-intensive mining sector which has little connection with the rest of the production sectors. Both RTR and FDI negatively and significantly affect export diversification.

4.2.3 Long-run result in resource-poor countries

In this group of countries, as in oil exporting countries, the quality of government and government stability have a significant negative effect on export diversification. However, in contrast to oil-exporting countries, this negative effect comes through both the intensive and extensive margin of diversification. These results indicate that policies to fight corruption and improve the quality of bureaucracy do not promote diversification of production, as a large part of the economy's assets are still in the hands of a concentrated elite.

As in non-oil rich countries, GDP is closely linked to export concentration. This negative effect comes through both the extensive and intensive margin of diversification. This result is similar to that of [53] who show that an increase in the logarithm of GDP per capita increases the probability of concentration in SSA.

FDI promotes export diversification. This diversification takes place mainly through the introduction of new products into the export basket. Indeed, FDI does not have a significant effect on diversification at the intensive margin. With regard to trade openness, it has a negative and significant effect on export diversification. This negative effect is mainly due to the intensive margin. RTR has no significant effect on the Theil diversification index. Indeed, it favours concentration at the extensive margin and diversification at the intensive margin, the two effects offset each other so that the effect on overall export diversification is not statistically significant, a result consistent with that of [38].

4.3 Short-run Results of the Determinants of Export Diversification in SSA

The Table 3 shows that there are very few variables that explain export diversification in the short term. However, the adjustment coefficient (ECT) is strictly negative and significant across country groups, indicating that all models are broadly stable.

Table 3. Summary of short-run results

Country	Oil-exporting countries			Countries rich in natural resources			Resource-poor countries		
Variables	Total Theil	Extensive margin	Intensive margin	Variables	Total Theil	Extensive margin	Intensive margin	Variables	Total Theil
ECT	-0.472**	-0.389***	-0.535***	-0.347***	-0.554***	-0.429***	-0.326***	-0.247*	-0.541***
	(0.185)	(0139)	(0.180)	(0.118)	(0.188)	(0.151)	(0.110)	(0.137)	(0.174)
D(QOG)	-0.350	-0.321*	-0.529	-1.223	0.307	-1.694***	-0.892	-0.295	-0.103
	(03.09)	(0.165)	(0.362)	(1.308)	(1.291)	(0.618)	(1.379)	(1.040)	(1.160)
D(LDE)	0.009	-0.008	-0.004	-0.001	-0.038	0.023	0.004	0.008	0.039
	(0.309)	(0.019)	(0.455)	(0.429)	(0.051)	(0.034)	(0.025)	(0.043)	(0.042)
D(SG)	0.000	0.003*	0.008	0.051*	-0.004	0.049	-0.048*	-0.024	0.062**
	(0.019)	(0.001)	(0.014)	(0.030)	(0.051)	(0.037)	(0.026)	(0.016)	(0.034)
D(GDP)	7.99^{E}-0.5	6.86^{E}-06	0.000	-0.001	-9.85^{E}-05	-0.001	-0.000	0.000	8.69^{E}-06
	0.000	(1.86^{E}-06)	(0.000)	(0.001)	(0.003)	(0.001)	(0.000)	(0.000)	(0.000)
D(FDI)	0.010	0.002*	-0.008**	0.003	0.010	0.004	0.007	0.010	0.006
	0.009	(0.001)	(0.0)	(0.017)	(0.014)	(0.014)	0.025	0.020	(0.022)
D(TOP)	0.000	0.000	0.001	-0.000	-0.001	-0.000	-0.007*	0.006	-0.011**
	(0.001)	(0.000)	(0.001)	(0.002)	(0.001)	(0.003)	(0.004)	(0.003)	(0.004)
D(RTR)	0.001	-0.000	0.006	0.002	-0.002	0.013*	0.014	-0.014*	0.032
	(0.001)	(0.001)	(0.004)	(0.009)	(0.007)	(0.007)	(0.015)	(0.008)	(0.026)
C	2.223**	0.397**	2.066**	1.30**	0.445****	1.202***	0.342	-0.256**	1.095*

*Note: *, **, *** significant respectively at the 10% threshold; 5%; 1%.*
The values in brackets are standard deviations

The quality of government (QOG) does not significantly determine export diversification in the short term. However, it does have a positive and significant impact on the extensive margin of diversification in oil-exporting countries and the intensive margin in non-oil-rich countries. Government stability (SG) promotes diversification in resource-poor countries while it promotes concentration in resource-rich countries.

FDI in oil-exporting countries promotes diversification at the intensive margin and consolidates the process of concentration at the extensive margin. This result can be explained by the fact that in the short term FDI targets sectors already existing in the economy. The two effects offset each other so that it has no significant effect on total diversification. This result is consistent with those of [38].

Trade openness has a positive and significant effect on diversification in the short term only in resource-poor countries. However, this diversification does not take place through the introduction of new export products but through a more proportional distribution of the export shares of existing products. This result shows that, in the short term, trade openness allows these countries to exploit their comparative advantages even more. Total resource rent (RTR) promotes diversification at the extensive margin in resource-poor countries. This result could be explained by the fact that the state better manages natural resource revenues in terms of financing productive expenditures in non-natural resource sectors.

5. CONCLUSION

This study contributes to the literature on the determinants of export diversification from a sample of 23 SSA countries, distributed according to their natural resource endowments. It distinguishes between extensive and intensive margin diversification in addition to the Theil index generally used to measure export diversification. The PMG method applied to a panel ARDL model shows that macroeconomic and institutional factors act differently on the level of diversification of different groups of countries. Thus, decision-makers must take into account the different margins of diversification as well as the specificities of their economies by paying particular attention to the nature and management of natural resources and to improving the quality of institutions. Furthermore, emphasis should be placed on promoting industrialization in the agricultural and processing sectors by better targeting foreign direct investment or by investing income from natural resources in production infrastructure, with a view to improving the competitiveness and productivity of economies.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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