

Analyzing the impact of corruption on economic growth according to the difference in exports' structure

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Abstract:

This study aims to analyze the impact of corruption on economic growth and the form of that effect according to the difference in the export structure of 79 countries, during the period 2012/2018, which were divided into four groups, according to the UNCTAD classification. The analysis is based on the panel data model. Which was estimated using the STATA 16 software. The study found a variety of effects due to export structure differences. It was found that corruption has a significant negative impact on oil and minerals exporters' countries, while it had no significant effect on industrial and agricultural products exporters' countries. Therefore, the most important recommendation that can be made here is that there is no unified anti-corruption policy among countries to follow. Rather, the country's export structure is of major importance in generating solution components of that anti-corruption policy.

Keywords: corruption; Economic growth; Exports structure; Panel data model.

JEL classification codes : D72; D73; F43; P28.

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تحليل أثر الفساد على النمو الاقتصادي حسب اختلاف هيكل الصادرات

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الملخص:

تهدف هذه الدراسة الى تحليل أثر الفساد على النمو الاقتصادي، ودراسة شكل ذلك الأثر وفق الاختلاف في هيكل الصادرات لمجموعة من الدول، بالاعتماد على عينة مكونة من 79 دولة، خلال الفترة 2012-2018، تم تقسيم الدول الى أربع مجموعات على أساس التصنيف الخاص بمؤتمر الأمم المتحدة للتجارة والتنمية UNCTAD، تم الاعتماد في التحليل على نماذج بيانات البانل، التي تم تقديرها بالاعتماد على برنامج STATA 16. توصلت الدراسة الى وجود اختلاف في هذا الأثر، حيث تبين أن للفساد أثر سلبي ذو دلالة معنوية في الدول التي تعتمد في صادراتها على النفط والمعادن، بينما لم يكن له تأثير ذو دلالة معنوية في الدول التي تعتمد في صادراتها على المنتجات الصناعية والزراعية، وبالتالي فان أهم توصية يمكن تقديمها هنا هو انه لا توجد سياسة مكافحة فساد موحدة بين الدول، وانما تختلف مكونات تلك السياسة وأهميتها باختلاف هيكل صادرات البلد.

الكلمات المفتاحية: فساد؛ نمو اقتصادي؛ هيكل صادرات؛ نموذج بيانات سلاسل زمنية مقطعية.

رموز تصنيف JEL: P28; F43; D72; D73.

Introduction

Theoretically, the success of the anti-corruption policy, in any country, is related to its ability define accurately corruption phenomenon, then to develop an appropriate solution. For that reason, this economic literature felt on the need to develop a comprehensive concept of corruption. (Erum & Hussain, 2019) pointed out that the simplest concept of corruption lies in the abuse of public power for private gain; hence, corruption means giving priority to the private benefit of the corrupted over the public good, or use public resources and institutions to serve personal purposes of officials.

Many studies have dealt with corruption impact on economic growth, and it can be said, that there are two trends on how to consider the nature of the impact (Méon & Sekkat, 2005). The first includes those who found a positive effect of corruption on growth, according to the theory of grease in wheels (Huang & Ho, 2018). The second research found a negative impact of corruption on economic growth, according to the theory of sand in wheels (Mauro, 1995).

Another observation on these researches is that they focused on studying a sample of countries regardless of the disparity that exists between them. Some other researches dealt with a specific type of countries, such as rentier countries (Erum & Hussain, 2019). Some other researches were limited to studying the situation in one country, few researches dealt with a comparative study.

In this study a comparative approach has been adopted to consider corruption impact on economic growth by classifying countries into four groups according to the structure of their exports, in which the products are most concentrated in exports. This study seeks to answer the following main question:

What is the corruption effect on economic growth with regards to the difference in the exports' structure?

The main hypothesis of this study is:

H: There are many differences in the effect of corruption on economic growth due to the exports' structure.

The aim of this study is to analyze the relationship between corruption and economic growth in different groups of countries through: the distinction between rentier and industrialized countries, as well as the distinction between the prevailing rents' type in rentier countries and the impact of this difference on the corruption-economic growth relationship. The study sample is composed of 79 countries.

Countries were divided into four groups, according to the classification presented by the United Nations Conference on Trade and Development (UNCTAD). These groups are agricultural products exporting countries; Oil products exporting Countries; manufactured products exporting countries; and mineral exporting countries. It is similar to the methodology adopted by (Isham, Woolcock, Pritchett, & Busby, 2005).

This study aims to clarify the impact of the nature of the country's economy, and the main source of income on the corruption-economic growth nexus. This allows defining the form of anti-corruption policy that is appropriate to the nature of each country.

The remainder of the study is divided into four parts: part No. 2 deals with the literature review; part No. 3 included a presentation of the methodology; part No. 4 presents the empirical study results, which are discussed in part No. 5 of the study; part No. 6 included the conclusion.

Literature review

The relationship between corruption and economic growth has been analyzed according to two main theories, namely, the theory of grease in the wheel and the theory of sand in the wheel (Campos, Dimova, & Saleh, 2010). According to the first theory, corruption has a positive effect on the economy and investment (Kato & Sato, 2015), by working to facilitate and speed up bureaucratic procedures and reduce their costs (Aidt, Dutta, & Sena, 2008). These ideas spread widely after the success of the Asian tiger experiment (Huang & Ho, 2018).

The sand in the wheel theory suggests that the process of corruption and bribery are hampering investment and economic growth, especially in terms of misallocation of public resources granted to investors (Méon & Sekkat, 2005). Researchers have considered it as the closest theory to reality. Whereas (Campos, Dimova, & Saleh, 2010) surveyed the results of 41 studies on the corruption-economic growth relationship; they had concluded that most of the studies indicated that corruption had a negative and significant effect on economic growth. It is the same conclusion reached by (Ugur & Dasgupta, 2011).

The relationship between corruption and income level (measured by GDP per capita) is an extension of the relationship between corruption and investment. As many studies agree that the negative impact of corruption on economic growth can follow five main channels (Lučić, Radišić, & Dobromirov), Decline in domestic and foreign investment; Increase in production costs; Misallocation of natural resources; Growing income inequality and poverty; Increasing uncertainty in the decision-making process by investors. In addition, some studies have criticized the issue of focusing on economic growth. They have suggested using other indicators such as sustainable development indicators (Aidt T. S., 2011)

The relationship between the two variables has not been always linear. It can be a simultaneous relationship whereas in addition to the negative impact of corruption on the income level, the low level of this latter has been considered a motive for more corruption. Thus, the effect between the two variables is reciprocal and not unidirectional (Leite & Weidmann, 1999). Other studies have found a non-linear relationship between corruption and economic growth (Ahmad, Aman ullah, & Arfeen, 2012). In addition to the above, many other studies have focused on analyzing the impact of corruption on economic growth and the level of income. By focusing on determining the threshold values that, affect the shape of the relationship between the two variables (Alfada, 2019).

The analysis of natural resources availability impact on the relationship between corruption and economic growth leads us to talk about what is known in the economic literature as the “resource curse”, which affects rentier economies (Sachs & Warner, 2001). This takes many forms such as corruption (Mehrara, 2009) and the Voracity effect phenomenon (Tornell & Lane, 1999).

The (Ades & Tella, 1999) study is among the first attempts to analyze the impact of rents on corruption. This study focused on two samples of countries, the first consisting of 52 countries studied during the eighties, while the second included 31 countries during the period of the nineties. One of the most important findings of the study is that the level of corruption is high in countries in which the activity of institutions is highly related to economic rent, if this coincides especially with a low level of competition, either in natural or strategic ways or even because of the lack of effectiveness of anti-trust laws. In the same context, (Leite & Weidmann, 1999) study concluded that natural resource capital intensity is a major determinant of corruption and that the latter affects negatively the economic growth.

(Treisman, 2000) also found a negative impact of the proportion of natural resources in total exports on the level of economic growth in the country. He also found that this percentage is negatively related to the level of democracy. The explanation presented to these results is that the countries that depend in a large part of their exports on oil, minerals, and natural resources are mostly developing countries, which makes it characterized by a high level of corruption. The concentration of the exploitation of natural resources in the hands of a small group of institutions, in the absence of democracy and competition, will contribute to spray corruption even more.

(Isham, Woolcock, Pritchett, & Busby, 2005) attempted to study the effect of the country's export components on its economic growth level, based on its top two exports. The sample of the studied countries was divided into four categories: Manufacturing exporters; diffuse exporters (livestock and agricultural exporters); Point source exporters (fuels, minerals and plantation crops); coffee and cocoa exporters. The results showed that the governance index for the third and fourth categories was weak.

The (Bhattacharyya & Hodler, 2010) study included a sample of 124 countries, during the period 1980-2004. They found that the relationship of rentier resources to the level of corruption was related as per the form of democracy in a country. They also found that countries with large rentier returns had a high level of corruption. (Bjorvatn, Farzanegan, & Schneider, 2012) also found that in countries with a democratic system of government, the impact of resources on income will be low. Unlike in countries where decision-making power is concentrated in the hands of a small group of individuals, the impact of rentier revenues will be high.

(de Medeiros Costa & dos Santos, 2013) pointed out that among the reasons for the resource curse in rentier economies are : unfair application of laws and uncertainty in management. Whereas, implementing laws with full transparency requires the existence of government institutions effectively operating, far away from any lobbyists influence. This is due to the evolution pressure groups able to influence the opposition that leads to the emergence of aspects of spending which are for non-productive purposes, in rentier economies.

(Neudorfer, 2018) concluded that the level of corruption countries that are: poor, autocratic, and rich in natural resources, is higher than corruption level of rich, democratic, and resource-rich countries. This means that democracy and the economic growth level contribute to limiting the spread of corruption in countries rich in natural resources.

(Erum & Hussain, 2019) found that corruption harms economic growth in the Organization of Islamic Corporation (OIC), but the combined effect of corruption and the abundance of natural resources on economic growth becomes positive. Therefore, the explanation presented by the researchers is that in light of the abundance of natural resources, the good management of these resources, through a tight anti-corruption policy and active governance, allow improving economic growth in the studied countries.

Methodology

Data

The studied population comprised the countries identified by the United Nations conference on trade and development. These are, according to their type, divided into: agricultural products exporters; petroleum exporters; exporters of manufactured goods; and exporters of minerals and mining products; where the study sample included 79 countries (appendix 1). This division is based on the proportion of exported products (agricultural (Agr), hydrocarbons (Oil), manufactured (Man), minerals (Min) in total exports; these data covers the period between 2012 and 2018.

Study Variables

The study variables are as follows:

1. The Gross Domestic Product per capita (GDPPC) in constant prices for the year 2015 in US dollars according to the UNCTAD database;
2. Transparency international's Corruption Perceptions Index (CPI);
3. Human Development Index HDI, a composite index issued by the United Nations;
4. Gross Fixed Capital Formation (GCF) issued by UNCTAD;
5. The Economic Openness index (OPENX) issued by UNCTAD, which represents the proportion of exports to GDP;
6. The economic diversification index (DIV) issued by UNCTAD;
7. Political Stability Index (PS) from International Monetary Fund data.

The study Model:

In the current decade, Panel models have attracted great interest especially in the economic studies. The term "panel data" refers to the pooling of observation on a cross-section of households, countries, firms, etc. over several times periods (Baltagi, 2005, p. 1). The panel analytic models are divided into three main types: Pooled Regression model; Fixed Effects model, Random Effects model. The study form can be written according to the following equation: $GDPPC = f(CPI, HDI, GCF, OPENX, DIV, PS)$

Results

Descriptive statistics:

The descriptive statistics (appendix 2) show that there are differences between the averages of the four countries' groups. To determine the fundamental difference between them, the mean comparison test will be used focusing on the study's two main variables (GDPPC, CPI).

Table 1.
The results of the mean differences (GDPPC and CPI variables)

		Sum of squares	ddl	mean square	F	Sig.
GDPPC	Inter-groupes	11613536930,081	3	3871178976,694	35,921	,000
	Intragroupes	59165728916,222	549	107769998,026		
	Total	70779265846,303	552			
CPI	Inter-groupes	12156,975	3	4052,325	21,787	,000
	Intragroupes	99507,207	535	185,995		
	Total	111664,182	538			

Source: Developed by the authors based on STATA 16

The table.1 indicates that there are significant differences between the countries categories.

Study Models according to each group of countries

The results are summarized in the following table:

Table 2.
Results of accepted panel models for each group of countries

Countries groupes	Agr		Oil		Man		Min	
Best model	Random Effects Model		Fixed effects Model		Random Effects Model		Random Effects Model	
	Coef.	P> z	Coef.	P> z	Coef.	P> z	Coef.	P> z
GDPPC								
CPI	0,007	0,840	0,748	0,000	0,005	0,886	0,104	0,086
HDI	2,474	0,000	4,242	0,000	3,856	0,000	2,586	0,000
GCF	0,030	0,186	0,060	0,029	0,153	0,000	0,037	0,062
OPENX	0,027	0,251	0,030	0,652	0,107	0,000	0,083	0,001
DIV	0,101	0,358	-1,071	0,021	-0,433	0,000	-0,188	0,132
PS	0,014	0,347	0,591	0,000	-0,020	0,348	0,141	0,004
_cons	8,574	0,000	6,438	0,000	7,469	0,000	7,871	0,000
N° obs:	154		140		133		126	
N° groups	22		20		19		18	
R-sq:	within	0.7500		0.5016		0.8966		0.5891
	between	0.8711		0.6510		0.8232		0.7374
	overall	0.8711		0.6421		0.8226		0.7366
Wald chi2(6)	382.62	0.0000			874.88	0.0000	874.88	0.0000
F(6,114)			20.33	0.0000				
BB LM test								
chibar2(01)	415.95	0.0000	415.95	0.0000	326.16	0.000	320.00	0.0000
Hausman test								
chi2(5) =	-117.91	///	15.32	0.0179	-44.35	///	-19.42	///

Source: Developed by the authors based on STATA 16

Agricultural products exporters' countries (Agr_Exp):

In the table 2. The LM and Hausman tests show that the random effects model is the more appropriate one. It is also evident through the parameter values that there is an insignificant effect of corruption on GDPPC at $\alpha < \%10$.

Oil Exporters' countries (Oil_Exp):

LM test results show that the random effects model is more appropriate compared to the pooled regression model, while the Hausman test results also show that the fixed effects model is also more appropriate compared to the random effects model. According to the chosen model, an increase in CPI by 1% leads to an increase in GDPPC by 0.748%.

Manufactured goods exporter's countries (Man_Exp):

From the table above, the LM and Hausman tests show that the random effects model is the appropriate model. This model shows that the CPI is insignificant, which means that this indicator has an insignificant effect.

Minerals and mining products exporters' countries (Min_Exp):

From the table above, the LM and Hausman tests show that the random effects model is more appropriate for the statistical test. This model shows that the CPI is significant; therefore, an increase in CPI by 1% leads to an increase in GDPPC by 0.104%.

Discussion

From the results above, CPI has a significant positive effect on GDPPC in both exporter countries of petroleum, and exporter countries of minerals and mining products, where the index average is 31.907, 34.421, respectively, and it is a lower value than the general average of the sample.

We also note that these countries' economies are based on extractive industries, which depend on rents, and that one of their characteristics is the high level of corruption (Ross, 2019) (Leite & Weidmann, 1999), this makes the CPI value higher. In the category of exporter countries of petroleum, the results recorded an average of 31.907, where corruption may witness a wide spread and a diversity in the methods used for it, especially in the periods of high oil prices, such as the use of investment funds and off- shore companies (Gillies , 2020).

One of the possible solutions for countries to improve the level of the index is to join the Extractive Industries Transparency Initiative (EITI), which is based on building trust between governments, companies, and civil society. Affiliation with the initiative requires disclosure of information about the value chain of the extractive industries, which enhances governance in the public and private sectors and transparency and accountability in natural resources management, and provides data that allows for the opening of discussions and reforms within the sector.

However, the affiliation to this initiative according to its evaluation made by (Kolstad & Wiig, 2011) (Öge, 2016), did not allow the role of transparency to be activated in reducing corruption. Even though the study was conducted in 2008, the situation did not significantly change and the level of corruption are still the same, which is in line with the study results, where the role of transparency and accountability has not been activated yet and the CPI value in most countries remained below the average (35.325) in the overall sample.

According to the sample of the surveyed countries, there are five exporter countries of petroleum, including the Congo, which recorded a decline in the CPI, Iraq with a CPI between 18-16, as well as in Colombia between 37-36, in Nigeria, it did not exceed 28, and in Kazakhstan, it reached a maximum of 31. While the exporter countries of minerals and mining products, which are the most included with 12 countries, Suriname was the best country with a CPI of 45, and in Burkina Faso, the value of CPI was up to 42, but generally, we did not notice a significant improvement in the value of CPI.

It is assumed that the countries affiliated with the initiative improve their transparency, thereby reducing corruption, but the latter has remained its value. (Liz & Ken, 2013) stated about this strange paradox that the rush of joining the initiative by the most corrupt countries is due to the assistance especially the financial ones, which cannot be obtained only by the affiliation and providing the necessary information.

In addition, most of the countries surveyed and affiliated with this initiative are of low or medium- income countries according to the World Bank's classification, such as Mali, Congo, and Burkina Faso. And the latter may have made the exception as it is one of the poorest countries in the world, with an average per capital income of only 700\$, but the CPI has reached 42, which is considered high compared to most of the countries surveyed that are affiliated with the initiative.

Among the criticisms to the initiative is its focus on monitoring and reporting on revenues without focusing on expenditures, which was taken into consideration in the 2019 EITI standard review, to include disclosure of contracts, gender, environment, and goods trade, to provide a better governance of public finance in terms of revenues and expenditures.

Another paradox is that (Asongu, 2012) (Charron , 2011) found an effect of assistance in reducing corruption, whereas (Menard & Weill)found that there is a non-linear relationship between corruption and assistance, as the latter can alleviate corruption but cannot raise it.

While facts indicate the possibility that corruption may permeate itself assistance, the reason why the provision of such assistance should be associated with conditions to prevent corruption, which is the case of the International Monetary Fund (IMF, 2020), at least the assistance transactions may be free of corruption and can be addressed in a timely manner if it occurs.

Affiliations with international initiatives and foreign programs is a small step that should be followed by activating the role of domestic bodies in fighting corruption according to a local model followed by a strong will to implement it. Most countries, if not all of them, have anti-corruption laws, if they are correctly applied, they will reduce corruption and raise the CPI, as confirmed by (Easterly, 2003) who affirmed that assistance may have an effect on growth, but it should not be given more than its value, because it represents only a small proportion of the donor countries' GDP.

Accordingly, the initiative' failure in curbing corruption should not be judged by the assistance that countries receive. Failure and success must be measured by the extent to which the goals, for

which assistance has been provided, are realistic, and not linked to growth and macroeconomic aggregates. This means that countries whose economies depend on extractive industries should not seek and rush to obtain assistance, forgetting that internal work in curbing corruption is more important.

Among the solutions that have been indicated by a lot of researches about the situation of petroleum exporter countries, is the resort to economic diversification, as we can observe an increase in the average diversification index to 0.725, because of the positive effect of this policy on growth (Hesse, 2008), thus reducing its dependence on one sector, means addressing the Dutch Disease, that refers to the situation in which the extractive sector eliminates the rest of the other sectors, such as gradually reducing the role of the revenues of this sector in financing public expenditures and allocate them to support the foreign currency reserves.

It is also possible to mitigate this disease, which could be caused by the orientation of the highly qualified people towards the rentier sector that gives high wages rather than employing their competencies in entrepreneurship and productive sectors, where there is a poor allocation of resources (Murphy, Shleifer, & Vishny, 1991), a situation that can be addressed by providing incentives and encouragement to the entrepreneurial, creative and other productive sectors.

Another solution that can contribute to reducing dependency is the orientation towards building a knowledge economy that reduces the use of oil revenues to finance productive investment and infrastructure (Sepehrdoust & Shabkhaneh, 2018).

Corruption does not exist only in countries that focus on the extractive sectors but also in agricultural ones, while according to the study results, it has an insignificant effect. Paraguay is one of the most corrupt countries, although its economy depends widely on the agricultural sector, where corruption does not appear in the rent collection from the agricultural sector as in the public transactions, which is in the range of 5.5% and 6.9% of GDP, and this situation has negatively affected development and orientation towards entrepreneurship activities (Auriol, Straub, & Flochel, 2016).

In Zimbabwe, the results recorded high levels of CPI in the range of 22, despite being an agricultural country, mineral discoveries (gold and diamond) and conflict over them, have made corruption rampant in it.

According to the research model, corruption has a insignificant effect on GDPPC in exporter countries of manufactured goods, which include a group of emerging countries (Brazil, India, China, and South Africa), where the CPI average is above the average and it is significantly different from the petroleum countries' average. The results also indicated a high value of GDPPC, but it does not significantly differ from the petroleum countries' value. The absence of a significant effect of CPI on GDPPC in this category does not mean that corruption is allowed to spread in these economies.

Additionally, these countries have witnessed many incidents and manifestations of corruption (Sahu & Gahlot, 2014), as with the former president of Brazil who was persecuted for corruption

cases. China also has implemented a corruption cleansing campaign that affected a large number of senior and junior officials in various government levels and organs. GDPPC in these countries has not been affected by the level of corruption or the political stability as much as it has been affected by the other factors: human development; gross fixed capital; the economic diversification; the economic openness, while GDP was multiplied by 6.3 times in BRICS countries during the period 2001-2014.

Moreover, corruption in these countries is not as severe as it is in rentier countries by comparing the amount of bribes and money involved in the corruption process. In rentier countries, corruption is associated with granting infrastructure deals with higher costs than their real costs, and providing of assistance to entities that may not have the necessary competencies, thereby eliminating the competition. While in the exporter countries of manufactured goods, the corruption may be associated with overcoming bureaucratic obstacles, even the theory of grease in the wheel has matched with the situation in China (Wedeman, 2004).

Moreover, the countries that depend on manufactured goods industry, mainly BRICS (excluding Russia), are huge economies. and have recorded high growth rates, unlike its level of corruption that has been stable. These countries were able to eliminate the effect of corruption to a level in which it will not have a negative effect on growth, but at the same time, this level will not improve it.

Therefore, it can be said that if corruption is associated with the dominant sector in the economy on which the country depends for its revenues and public expenditures especially in the recovery periods of extractive sectors, corruption will have a significant effect. However, if there is an association of corruption with public sector outside the dominant sector, and there is presence of large size economies and its achievement of high growth rates, then corruption will have an insignificant effect.

Conclusion

The study aimed to identify the corruption effect on economic growth measured by the gross domestic product per capita (GDPPC), through a comparative study of a sample of countries that have been classified according to the proportion of their principal exports, which is the standard used by the United Nations conference on trade and development, where we find exporters of agricultural products; exporters of petroleum; exporters of manufactured goods; and exporters of minerals and mining products.

Research have shown that corruption has an effect on economic growth, but the results have ranged from grease in the wheel theory, where corruption has a positive effect on growth, to sand in the wheel theory where corruption has a negative effect on growth. In spite of the logical results of the grease theory in terms of interpreting the results, where corruption is considered a mechanism for overcoming bureaucratic obstacles, bureaucracy needs to be addressed as it is the cause of corruption, or corruption will spill-over into many sectors and become a dominant society's culture.

In some studies that have examined the effect of corruption on economic growth in rentier countries, most of the results have matched with the sand in the wheel theory and the concept of the resource curse. In view of the variation of exports types, the study tried to compare countries according to the proportion of their most important exports, by classifying them into exporters of agricultural products; exporters of petroleum; exporters of manufactured goods; and exporters of minerals and mining products. Based on panel data for the period 2012-2018, the study found consistent results with the rentier countries' studies (exporters of minerals and mining products), meaning that corruption has a significant effect on economic growth.

However, the results also showed that in exporter countries of agricultural products and the exporter countries of manufactured goods, corruption has an insignificant effect on growth, while the corruption exists in these countries but with an insignificant effect even at the significant level of 10%.

These findings are consistent with the hypothesis formulated before testing the model, where the empirical results showed that there are many differences in the effect of corruption on economic growth due to the export structure.

According to these findings, the most important recommendation that can be made here is that there is not a unified anti-corruption policy among countries. Because the components of that policy and its importance differ according to the country's export structure. In addition, some other recommendations can be made. Like the necessity to join the EITI initiative. As well as the need to work on developing the country's economic diversification. Because the countries that had a lower level of diversification, which was characterized by a focus on rent. It knew a significant impact of the level of corruption on its economic growth. On the other hand, there is a great need to increase the effectiveness of governance in managing public expenditures.

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Appendix

Appendix 1 List of countries

N°	Agricultural products	Petroleum	Manufactured goods	Minerals and mining products
1	Afghanistan	Algeria	Argentina	Armenia
2	Benin	Angola	Bangladesh	Botswana
3	Cameroon	Azerbaijan	Belarus	Burkina Faso
4	Côte d'Ivoire	Brunei Darussalam	Brazil	Congo, Dem
5	Cuba	Colombia	Chile	Eritrea
6	Ecuador	Congo	China	Guinea
7	Ethiopia	Equatorial Guinea	Hong Kong	Guyana
8	Guatemala	Gabon	India	Jamaica
9	Guinea-Bissau	Iran	Korea	Kyrgyzstan
10	Honduras	Iraq	Malaysia	Mali
11	Kenya	Kazakhstan	Mexico	Mauritania
12	Malawi	Kuwait	Morocco	Mongolia
13	Maldives	Libya	Pakistan	Namibia
14	Moldova	Nigeria	Philippines	Peru
15	Nicaragua	Oman	Singapore	Sierra Leone
16	Paraguay	Qatar	Thailand	Suriname
17	Seychelles	Russian Federation	Turkey	Tajikistan
18	Solomon Islands	Saudi Arabia	Ukraine	Zambia
19	Syrian	Turkmenistan	Viet Nam	
20	Uganda	Venezuela		
21	Uruguay			
22	Zimbabwe			

Source: Developed by the authors

Appendix 2 Descriptive statistics

1. Descriptive statistics all groups

Variable		Mean	Std, Dev,	Min	Max
corr	overall	35,325	14,407	8,000	87,000
	between		14,309	12,143	85,000
	within		2,195	28,468	44,325
gdppc	overall	7840,275	11323,570	358,400	65445,540
	between		11342,490	381,479	63027,720
	within		984,748	2983,215	22287,810
cpi	overall	17635,780	410554,000	98,406	9654733,000
	between		155466,200	99,821	1381958,000
	within		380325,600	-1364170,000	8290410,000
hdi	overall	0,670	0,133	0,394	0,939
	between		0,133	0,414	0,929
	within		0,011	0,641	0,740
gcf	overall	120807,200	567733,100	-12674,820	5995275,000
	between		566799,100	74,365	4982990,000
	within		67466,260	-818669,500	1133092,000
gcf	overall	120807,200	567733,100	-12674,820	5995275,000
	between		566799,100	74,365	4982990,000
	within		67466,260	-818669,500	1133092,000

openx	overall	40,603	32,276	5,219	221,613
	between		31,553	7,354	201,473
	within		5,773	21,576	65,598
div	overall	0,725	0,133	0,355	0,935
	between		0,131	0,374	0,918
	within		0,025	0,637	0,818
ps	overall	-0,468	0,918	-2,974	1,615
	between		0,90	-2,77	1,41
	within		0,19	-1,11	0,93

Source: Developed by the authors based on STATA 16

2. Descriptive statistics by groups

Variab		Exporters of agricultural products				Exporters of petroleum			
		Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
GDPPC	overall	3669,000	4344,381	358,400	16683,060	12873,340	14207,870	2012,427	65445,540
	between		4419,973	381,479	15614,280		14416,760	2338,398	63027,720
	within		321,878	1894,257	5783,664		1729,872	8016,276	27320,870
CPI	overall	32,209	12,972	8,000	74,000	31,907	14,124	14,000	71,000
	between		13,161	12,143	71,857		14,299	16,857	66,000
	within		2,188	27,066	41,209		1,958	26,907	37,907
HDI	overall	0,603	0,114	0,429	0,808	0,731	0,098	0,502	0,857
	between		0,115	0,451	0,801		0,100	0,524	0,852
	within		0,012	0,578	0,674		0,010	0,702	0,768
GCF	overall	6763,881	6948,445	43,500	29522,870	69457,140	98740,940	-12674,820	542486,800
	between		6908,807	74,365	26786,780		97257,250	4392,505	410931,200
	within		1555,991	-552,872	13732,990		26440,520	-44136,220	201012,700
OPENX	overall	32,789	22,400	5,219	116,356	41,392	18,134	9,501	83,356
	between		22,463	7,354	103,299		16,764	14,946	62,127
	within		3,913	22,008	45,846		8,005	22,365	66,386
DIV	overall	0,761	0,061	0,608	0,906	0,767	0,097	0,454	0,914
	between		0,056	0,655	0,855		0,096	0,468	0,882
	within		0,026	0,703	0,843		0,025	0,689	0,861
PS	overall	-0,517	0,935	-2,974	1,063	-0,627	1,007	-2,556	1,262
	between		0,937	-2,766	0,953		1,014	-2,266	1,143
	within		0,178	-1,155	-0,067		0,174	-0,979	-0,061

Source: Developed by the authors based on STATA 16

Variab		Exporters of manufactured goods				Exporters of minerals and mining products			
		Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
GDPPC	overall	12032,960	14423,570	1074,901	58691,920	2920,593	2462,224	432,677	9033,739
	between		14736,220	1262,671	54874,680		2516,936	479,838	8527,924
	within		868,338	8079,298	15850,200		177,932	2264,351	3426,409
CPI	overall	43,429	16,335	25,000	87,000	34,421	10,335	18,000	65,000
	between		16,529	26,143	85,000		10,378	20,429	62,429
	within		2,457	36,571	51,571		2,069	29,563	40,563
HDI	overall	0,756	0,104	0,533	0,939	0,592	0,129	0,394	0,760
	between		0,106	0,549	0,929		0,132	0,414	0,750
	within		0,010	0,728	0,781		0,009	0,568	0,613
GCF	overall	416022,600	1104092,000	12636,040	5995275,000	5632,925	10335,790	290,691	51449,000
	between		1121562,000	20084,130	4982990,000		10544,470	382,381	46928,110
	within		135257,000	-523454,200	1428307,000		989,807	974,859	10153,810
OPENX	overall	54,011	52,964	9,566	221,613	34,187	11,593	8,134	60,090
	between		53,941	11,590	201,473		10,376	12,251	50,073
	within		5,275	38,078	74,150		5,579	22,302	50,528
DIV	overall	0,558	0,132	0,355	0,891	0,809	0,063	0,611	0,935
	between		0,134	0,374	0,871		0,057	0,670	0,918
	within		0,020	0,504	0,620		0,029	0,721	0,876
PS	overall	-0,421	0,943	-2,677	1,615	-0,280	0,715	-2,051	1,104
	between		0,939	-2,474	1,409		0,709	-1,819	1,037
	within		0,219	-0,976	0,973		0,182	-0,734	0,166

Source: Developed by the authors based on STATA 16