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Analysis of Agricultural Exports and Economic Growth in Benin

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Abstract

Summery-The agricultural sector remains a potential lever for economic growth in the South. Thus, agriculture now represents only 23

Index terms— agricultural exports, economic growth, causality test, benin.

1 Introduction

griculture is considered a major element in the modification and improvement of the structure of economies. But the pace of these structural changes, and their impact on the growth and development of economies, seem to vary greatly from country to country, and are often very uncertain, much more so than standard theory would have predicted. Moreover, the rules of international trade have changed; the era of liberalisation advocates trade based on comparative advantage **??**erthelier et al. (2005). However, it would seem that it is on this agricultural transition that the development of many countries in the South depends, even if the process resulting from the Industrial Revolution leading to a transfer of assets from agriculture to other sectors seems difficult. There are many explanations for the positive effect of exports on economic growth. Exports are a component of aggregate demand, and therefore provide an outlet for local goods and services. They are also a source of foreign currency inflows to meet imports. Finally, they are a potential component of state revenue through the customs duties they may generate or when they are carried out by public enterprises. In addition, some argue that for poor countries to become richer, it is important that they change the composition of their exports. Debates on the Prebisch-Singer thesis **??**1959) and the need for industrialisation have prioritised diversifying economies away from commodities because of deteriorating terms of trade, low value added and slow productivity growth. Similarly, the Food and Agriculture Organisation of the United Nations (FAO) **??**2004) maintains that without export diversification in developing countries, declining and fluctuating export earnings have had a negative impact on incomes, investment and employment. Through diversification, investment risks are spread over a wider portfolio of economic sectors, resulting in higher revenues **??**Acemoglu and Zilibotti, 1997). According to **??**omer (1990), diversification can be seen as a factor that contributes to improving the efficiency of other factors of production. Furthermore, diversification helps countries to protect themselves against terms of trade deteriorations by stabilising export earnings. Economic growth and structural change depend on the types of products that are traded **??**Hausmann and Klinger, 2006; **??**wang, 2006). Thus, through export diversification, an economy can move towards the production and export of more sophisticated products, which can contribute strongly to its economic development.

Benin, like other countries in sub-Saharan Africa, suffered the full force of the economic and social crises of the 1980s. The national economy was faced with major imbalances. This crisis was essentially characterised by a significant slowdown in economic growth, a significant drop in per capita income and the aggravation of internal and external imbalances (deterioration of the balance of payments, growing public deficits). To remedy this situation, the country embarked on a process of liberalisation of its economy under the aegis of the Bretton Woods institutions from 1989 onwards. Since then, enormous reforms covering all areas of economic life have been implemented, with those relating to trade policy taking pride of place. In this context, measures to abolish quantitative restrictions and other non-tariff measures have been initiated. Moreover, Benin's exports are essentially based on cotton, and it is likely that the cost of cotton on the international market will gradually fall, which will have a considerable impact on the country's export earnings and economic performance. The desire to increase exports and gradually reduce the economy's vulnerability to external shocks has led Benin to choose to diversify the economy by promoting other promising sectors. Since 1997, the contribution of the primary sector to GDP has fallen; it currently represents more than 33% of GDP and more than 95% of export

earnings. The cotton sector remains the dominant activity, accounting for 13% of GDP and 35% of tax revenues **??**CAPOD 2000), 85% of export revenues and 77% (1999) of total exports. The desire to increase exports and gradually reduce the economy's vulnerability to external shocks has led Benin to choose to diversify the economy by promoting other promising sectors such as cassava, maize, pineapple, rice, oil palm, cashew nuts and pig farming. Although the main agricultural export products remains cotton, followed by food crops, tobacco and oils, a slight trend towards diversification of agricultural exports seems to be underway, as the share of products other than cotton has gradually increased from 11% in 1996 to 18% in 1999. According to the authorities, this trend is due more to the downward trend in world cotton costs. This will have a considerable impact on the country's economic performance. (Operational Strategic Plan, July 2001.) Indeed, Benin's economic growth is driven by exports of primary products of agricultural origin (cotton, cashew nuts, maize, etc.) and mining (cement, wood), whose revenues are highly dependent on exchange rate instability, climatic hazards, external demand and their world prices, which make growth prospects uncertain. Given the important role that exports play in Benin's economy, the question that arises is whether exports have contributed to its long-term economic growth? And whether there is a causal link between economic growth and exports. With the new statistics that focus on the promotion of economic growth, it is necessary to rethink the role and place of exports in the Beninese economy, in order to channel and accelerate the expected positive effects and the measures to be taken to cope with the shocks that the Beninese economy is experiencing. Our paper is organised as follows. Section 1 deals with the evolution of the economic growth rate and exports in Benin, sections 2 and 3 with the literature review and methodology. The conclusion is given in section 4.

2 I.

3 Recent Trends in Economic Growth and Exports in Benin

Benin's growth improved in 2021 to reach 7.0% compared with 3.8% in 2020. On the supply side, growth is the result of the good performance of the primary sector (+3.9% after 2% growth in 2020), benefiting from the positive effects of reforms that have increased yields and improved governance in the agricultural sector; and, on the other hand, the tertiary sector, which grew by 7.2% in 2021, compared with an expansion of 4.9% in 2020, due to the increase in port traffic, the opening of Nigeria's borders and better governance of the port of Cotonou. On the demand side, growth comes from a 17% increase in investment, with the continuation of a counter-cyclical fiscal policy. Inflation has fallen to 1.7% in 2021 due to improved food supply (African Economic Outlook (AEO) 2022). However, the budget deficit widened in 2021 to 6.1% of GDP, financed in part by the allocation of DtS 118.6 million for Benin, with the remainder of the amount used to finance the 2022 budget deficit. Public debt stands at 47.2% of GDP in 2021 compared to 46.1% in 2020, but the risk of debt distress remains moderate. The current account deficit is estimated to have doubled in 2021, reaching 3.7% of GDP, due to a 64.5% decline in public transfers; foreign exchange reserves cover 5.9 months of imports in 2021. The soundness of the financial system has been strengthened with the rate of outstanding loans falling to 14.8% in September 2021 from 17% in September 2020. The poverty rate was estimated at 38.5% in 2019 and unemployment at 2.4%, with a high level of underemployment (72.9%) (African Economic Outlook (AEO) 2022).

Growth is expected to reach 6.1% in 2022 and 6.4% in 2023. These forecasts are based on governance reforms in the agricultural sector, as well as improvements in public financial management and the business climate. The increase in food supply is expected to allow inflation to continue to decline to about 2.8% in 2023. The budget deficit is expected to narrow to 4.3% of GDP in 2022 and 3.7% in 2023, but these figures remain above the WAEMU criterion of 3% of GDP. After rising to 48.9% of GDP in 2022, public debt is projected to decline to 46.3% in 2023, thanks to robust growth and better debt structuring over this period. The current account deficit is projected to widen to 5.4% of GDP in 2022 before narrowing to 4.6% in 2023, the latter year due to a reduction in the trade balance. Foreign exchange reserves are expected to increase to an average of 6 months of import cover in 2022-23. The main risks are the resurgence of the health crisis, fluctuations in cotton and oil prices, the impacts of the Ukrainian crisis, bad weather and deteriorating security in the northern regions (African Economic Outlook (AEO) 2022).

Benin is vulnerable to climate change, which manifests itself in drought, deforestation, land degradation and flooding. The Bank's 2021 Country Policy and Institutional Assessment places Benin's environmental policies and regulations at 4 in 2021. The socio-economic effects of climate change could, by 2030 and 2050, decrease maize yields by 21.6% and 28.8% respectively, and cotton yields by 0.9% and 6.3%. GHG (Greenhouse Gas) were estimated at 17.3Mt CO2e, or 1.5t CO2e per capita, in 2018. Benin has adopted a National Climate Change Management Policy 2020-2030 and prepared its NDC for 2030. It has implemented a National Renewable Energy Policy 2020-2030. A 25 MW solar photovoltaic plant, expandable to 50 MW, is expected to be operational by April 2022 and produce 35 GWh of electricity, reducing the country's CO2 emissions by 23,000 tonnes over 25 years. Finally, Benin has created the National Environment and Climate Fund, worth CFA F 1.2 billion (African Economic Outlook (AEO) 2022).

4 II. Theoretical and Empirical Reviews

Trade is an important determinant of long-term economic growth. Economic policies favouring export growth and trade liberalisation have been central to the strategies recommended to developing countries. The theoretical

underpinnings of the positive link between trade openness and growth are twofold. On the one hand, the classical approach explains the gains from trade liberalisation in terms of comparative advantage, whether in the form of natural resource endowments (Hecksher-Ohlin model) or technological differences (Ricardian model). On the other hand, the literature on endogenous growth assumes that trade openness positively affects per capita income and growth through economies of scale and technological diffusion between countries. Theoretical and empirical work has attempted to analyse the effects of openness to the outside world and integration into the world economy on countries. Smith and Ricardo were the first to define the advantages that countries can gain from liberalising their trade. In opposition to the mercantilists, Smith asserted that all countries could gain from trade because, for him, the objective of trade did not lie in the trade balance but in being able to obtain products cheaply than if one produced them oneself. This is the basis of the theory of absolute advantage which leads to international specialisation and the establishment of an international division of labour. For Adam Smith, trade is not necessary for development because production is determined by capital. However, free trade, he acknowledged, could promote a certain level of development of the country through the accumulation of capital. In the same vein, Ricardo argues that foreign trade, no matter how extensive, cannot suddenly increase national values. It is advantageous to the countries that engage in it because it increases the number and variety of objects to which one can employ one's income, i.e. the level of welfare or real income. **??**rugman (1995) uses the notion of a 'diversification effect' to describe this situation. This diversification effect benefits not only consumers but also producers who will have an additional choice in production goods. Some work has confirmed that it is not only the level of exports that leads to growth, but also the degree of diversification of those exports or of the export base. Advocates of this view have highlighted the strong impact of diversification on growth. For example, Romer (1990) considered diversification as a factor of production, while Acemoglu and Zilibotti (1997) argued that diversification can increase income by spreading the risks of investment over a wider portfolio. However, more recent studies have focused on the existence of a non-monotonic relationship between diversification and growth. **??**linger and Lederman (2004) have shown that this is the case. Using disaggregated export data, the authors found that, overall, diversification increased in less developed countries but declined when the country exceeded a certain middle income. In addition, Klinger and Lederman analysed the relationship between new export products and the level of development. In this particular case, they found that the number of new exports followed an inverted U-shaped curve with respect to income, indicating that economies become less concentrated and more diversified as income increases. Only at relatively high levels of income does an increase in growth leads to greater specialisation and less diversification. Several empirical studies have shown that export diversification helps to boost per capita income growth. Love (1986), for example, suggested that a country should avoid heavy reliance on the export of a limited number of products as this diminished its ability to partially offset fluctuations in some export sectors with those sectors that are more stable. Love concluded that export diversification was a wise strategy to reduce instability and should not be limited to sectors other than agriculture. Furthermore, Gutiérrez de **??**iñeres and Ferrantino (2000), in their study of Latin American countries, found that there was a positive interaction between export diversification and economic growth. Examples of countries with significant export diversification and relatively high growth included Chile, Colombia, El Salvador, the Plurinational State of Bolivia, Paraguay and Uruguay. Similar results were found by Balaguer and Cantavella-Jordá (**??**004) for Spain and by **??**ammouda et al. (2006) for African countries. The relationship between a country's productivity and the sectoral variety of its exports has also been studied by **??**eenstra and Kee (2004). In a sample of 34 countries for the period 1984-1997, they found that a 10% increase in export diversity across all industries resulted in a 1.3% increase in the country's productivity. Furthermore, Herzer and Nowak-Lehmann (2006) analysed the hypothesis that there is a link between export diversification and economic growth through learning-by-doing and learning-by-exporting externalities in the case of Chile, and found that both horizontal and vertical export diversification had a positive effect on economic growth. However, this positive link between export diversification and growth is not always apparent in the literature. **??**ichaely (1977), for example, found a significant positive link between exports and economic growth only in more developed countries. This was not the case in the least developed countries. He found that a minimum level of development was necessary for exports to have an effect on the growth of the economy. **??**ariem's (2019) work analysed the relationship between FDI (Foreign Direct Investment), exports and economic growth in 14 countries in the Middle East and North Africa (MENA) region. They used a lagged laddered model (ARDL) over the period 1970-2014. Their results show that the stylised facts show that the selected countries can be classified into two more or less homogeneous groups: Where Y is aggregate output, K is capital, L is labour and X is exports. Exports (X) are not in principle an argument in the neoclassical production function, but their incorporation allows for international factors that affect output, but are not captured by K and L factors.

5 b) Data Sources

The data used for the estimation of equation (**??**) are annual. They come mainly from the World Bank's databases (World Development Indicators). The period covered is from 1960 to 2022.

Global output or GDP is real gross domestic product, capital is the real capital formation, exports are represented by total real exports. All these variables are in constant CFAF. L, labour, represents the total population. All variables are in natural logarithms.

6 c) Methodology

In this article, we use time series econometrics, which is based on three steps and consists of determining the degree of integration of each variable. In econometrics, several statistical tests are used to determine the degree of integration of a variable. The tests that will be used in this study are the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Once the order of integration of the series is known, the next step is to examine the possible presence of cointegration relationships that may exist in the long term between the variables. This analysis will follow the Johansen (1988) cointegration test procedure, which is more efficient than the Engle and Granger (1987) twostep strategy when the sample size is small and the number of variables is large. The third step involves testing for causality between the variables in the model. The so-called sequential test procedure and the nonsequential procedure of Toda and Yamamoto (1995) will be applied.

7 d) Empirical results

The implementation of the different stationarity tests for each series led to the results summarised in Table 1 The results of the level stationarity tests indicate that the series Ln(Y), ln(K), Ln(L) and Ln(X) are not stationary at the 5% threshold. In fact, for these series, the ADF and PP test statistics have probabilities greater than 5% and therefore allow us not to reject the null hypothesis of unit root (non-stationarity). The tests carried out on the first difference series allow the null hypothesis of non-stationarity to be rejected for all the series at the 5% threshold. However, for the series ln(L), the ADF test accepts the hypothesis of the presence of a unit root (nonstationarity) whereas the PP test rejects the null hypothesis of non-stationarity; given the effectiveness of the PP test compared to the ADF test, it is appropriate to accept the hypothesis of stationarity for this series in first difference. The presence of at least two non-stationary series leads to the search for the presence of a long-term equilibrium relationship between the variables of the model by the Johansen procedure based on the estimation of a vector autoregressive model by the maximum likelihood method. However, some work has shown that the Johansen test statistic is biased in small samples in the direction of too frequent rejection of the null hypothesis of no cointegration. In other words, the Johansen test too often concludes that there is at least one cointegrating relationship between non-stationary variables. The risk of underparametrization of the VAR underlying the test procedure as well as the loss of degrees of freedom introduce level distortions that weaken the effectiveness of the test. **??**einsel and Ahn (1992) and **??**heung and Lai (1993) have made proposals to correct these distortions. The test statistics and critical values were thus corrected according to the monotonic correction factor proposed by **??**einsel and Ahn (1992) and **??**heung and Lai (1993). This correction factor allows the risk of spurious cointegration to be mitigated. All the results of the cointegration test are presented in Table **??** below: Table 2 To estimate the coefficients of the long-run relationship, the ARMA maximum likelihood method is used because of the presence of an autoregressive term. The results of the estimation are presented in Table 4. The results in Table 4 report the diagnostic tests which indicate that the adopted specification is globally satisfactory. The Jarque-Bera test does not reject the hypothesis of normality of errors. The tests carried out to detect the presence of ARCH (Autoregressive Conditional Heteroscedasticity) and Breusch-Pagan-Godfrey residuals in the estimated equation do not reveal any heteroscedasticity problems at the 5% threshold. The dummy variables were introduced to improve the specification of the model. The estimates indicate that the capital stock, labour and exports have a positive and significant long-term impact on economic growth.

In other words, the export promotion policy was not neutral with respect to economic growth, i.e. real GDP growth depends on the increase in exports in the long run. Such a result supports the hypothesis that economic growth is driven by exports. This result is consistent with part of the theory. An increase in the capital stock and exports of 10%, for example, can lead to an increase in the economic growth rate of 15.7%. An increase in population of 10% will result in an additional real GDP increase of 10.56%. The closure of Nigeria's border (Dum 2018) with Benin has a significantly negative impact on Benin's economic growth. The weight of this border closure in Benin's economy has induced a 2.235% decrease in GDP. Agricultural exports are heavily exported to Nigeria, and this closure has also led to low incomes for farmers in the active population, which is only 30%. On the other hand, the advent of COVID 19 (Dum 2020) has a significantly positive impact on growth in Benin. This result is the result of the efforts made by the Beninese state to accompany the subsidies granted to various enterprises in order to cushion the shocks induced by COVID19. An increase in the impacts of COVID19 led to an increase of 0.079% in economic growth in Benin. The war in Ukraine (Dum 2021), on the other hand, has a significantly negative impact on economic growth in Benin. Thus, an increase in the impact of the war in Ukraine leads to a 0.875% reduction in economic growth in Benin. The closure of the Nigerian border and the war in Ukraine have had significantly negative impacts on agricultural growth in Benin.

The existence of cointegration implies that causality tests are carried out, according to the sequential approach, using a vector error correction model. The results of these tests, reported in Table 6, do not reveal any short-or long-term causality between exports and economic growth in the Granger sense. To complete and ensure the results of the Granger test, the causality test according to the approach suggested by Toda and Yamamoto (1995) will be performed. Indeed, several uncertainties related to the Granger sequential approach have been identified due to the nonprecision of the stationarity tests and the number of lags of the VAR model used to perform the Granger causality test. The results of all these tests are reported in Table 6. Following Toda and Yamamoto's approach, there is a unidirectional causality from exports to economic growth in the short and long run. However, these results also indicate that in the short and long run there is a unidirectional causality from exports, capital

stock and economic growth to labour, on the one hand, and from capital stock to exports on the other. In the light of these results, it is appropriate to conclude that there is a unidirectional causality from exports to economic growth in the short and long term for Benin.

IV.

8 Conclusion and Economic Implications

The impact of agricultural exports on economic growth varies from country to country and is often very uncertain. In Benin, for example, proximity to Nigeria is an asset for the Beninese economy in the perspective of shared co-prosperity. Moreover, the rules of international trade are weakened by uncertain events that expose comparative advantages. Agricultural supply factors are very important, as they constitute a lever for boosting sectoral growth rates through general equilibrium mechanisms. Agricultural export price policies can have a long-term impact on the structure of an economy. Agricultural incentive policies can lead to an increase in the agricultural growth rate, exchange rate policies can also have an impact on economic growth in southern countries such as Benin. Our results show that capital stock, labour and agricultural exports are likely to promote economic growth in Benin. However, the importance of primary products in Benin's exports should be a cause for concern. Indeed, Benin continues to produce cotton in large quantities, with all the important public funding and investments, without a native industrialisation of cotton fibres. It is imperative that strategies for economic diversification towards manufactured goods are favoured. Encouraging and promoting the emergence of private entrepreneurship and the development of infrastructure are likely to boost economic growth.

9 Bibliographic References

1. **??**cemoglu, D. et F. Zilibotti (1997) [1] [2] [3]

Figure 1:

1

Variables	Differences in level		Differences in the first year		Conclusions
	ADF	PP	ADF	PP	
Ln(Y)	6.432	5.321	-8.542	-8.672**	I(1)
Ln(K)	2.764	2.531	-9.543**	-8.022**	I(1)
Ln(L)	1.032	17.432	-1.210	-4.327**	I(1)
Ln(X)	3.658	3.210	-9.512**	-9.598**	I(1)

Source: Author's results 2022, Note: ** denotes rejection of the null hypothesis at the 5% level.

Figure 2: Table 1 :

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[2] The exclusion test is based on the likelihood ratio statistic and follows a ?2(r) distribution, where the number of degrees of freedom r is the number of cointegrating vectors (here r = 1) ©

[3] Global Journals

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Number of relationships of cointegration r 3 =0	Eigenvalues 0.78432	Statistics of the trace 77.43219	1 Adjusted trace statistics 56.54387 * 4	Critical values at 5%. 55.78643	2 Critical values at 5% adjusted 63. 086531	Year 2023
r ? ??	0.562100	33.431980	26.65219	44.532190	39.87654	
r ? ??	0.0782145	5.7642902	4.5412975	17.754312	19.543218	
r ? ??	0.0349856	2.4328962	6.764389	8.3428756	7.543869	

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Figure 3: :

4

Dependent variable: Real GDP per capita	
Explanatory Variables	Parameters
Capital stock per capita	0.157 (6.432) ***
Work	0.1056 (9.543) ***
Exports	0.638 (7.654) ***
Dum 2 2018	-2.235 (-2.679) **
Dum 3 2020	0.079 (3.249) **
Dum 4 2021	-0.875 (4.120) ***
Constant	-2.785 (-2.09)*
?? 2 =0.654	
?? 2 adjusted = 0.643	
AR(1) = 0.798 (0.000)	
Fisher statistic (F) = 823.65 (0.000)	
Number of observations (N) = 62	
Jarque-Bera = 2.03 (0.612)	
ARCH(1) = 0.875 (0.402)	
ARCH(2) = 0.736 (0.887)	
Heteroscedasticity (Breusch-Pagan-Godfrey) = 15.643 (0.082)	

Sources: Author's results. Numbers in brackets are t-ratios. For diagnostic test statistics, numbers in brackets are p-values. ***, ** and * significance at 1%, 5% and 10%.

Figure 4: Table 4 :

5

Sources: Author 2022 Results

Figure 5: Table 5 :

6

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	Source of causality (independent variable)											
	Short term											
Dependent Variables	?ln(Y)t	?ln(K)t	?ln (L)t						?ln(X)t	?t-1(t-stat)	?l t ?t	
?ln(Y)t	—	3.77	9.421	K = 3					2.683	- 0.226	—	
?ln(K)t ?ln (L)t ?ln (X)t	3.23	(0.51)	(0.04)*	*	4.125	(0.531)	—-(0.338)	5.658	(0.716)	(-	6.	
	(0.32)	—							2.591	2.4)*	(0	
	0.52	4.75							(0.782)	—	3.	
	(0.86)	(0.56)							2.521	—	(0	
	0.74	(0.08)*							(0.684)	—	(0	
	(0.97)	7.26							—	—	2.	
										—		

Notes: ** and * = significance at 5% and 10%. The reported statistics are Chi-squares. Numbers in bracket
k values. The numbers in the ?t-1 column refer to the coefficients of the Johansen-derived recall terms, and

		Ln(Y)	——	4.15 (0.26)	0. (0
1	1				
		Ln(K)	0.65 (0.734)	——	3. (0

Notes: The reported statistics are Chi-squares. Values in brackets are p-values. k is the number of lags in the level VAR and dmax is the maximum integration order of the variables. The selection of k is based on the SC criterion. ***, ** and * = significance at 1%, 5% and 10%.Sources: Author 2022 Results

Figure 6: Table 6 :

, «Was
Prometheus unbound by chance? Risk diversification and growth»,

Figure 7:

.1 Sources: Author 2022 results

The results in Table **??** consider the null hypothesis that there is no cointegrating relationship between the four variables (r = 0) is rejected at the 5% threshold by the trace statistic. On the other hand, the hypothesis of at most one cointegrating vector (r ? 1) cannot be rejected because the test statistic reports a value below the critical value. The test statistic therefore leads to a cointegrating relationship between the four variables. In order to find out whether all variables actually belong to this cointegrating relationship, an exclusion test was performed (see **??**ohansen and Juselius, 1990). The results of the likelihood ratio tests (Table **??**) indicate that the four variables cannot be excluded from the cointegrating space. 1 a/ The values of the statistics are adjusted according to the correction of Reinsel and Ahn (1992) 2 b/ The asymptotic critical values are corrected according to Cheung and Lai (1993) 3 r indicates the number of cointegrating relationships. The SC criterion was used to determine the optimal number of lags. 4 indicates the rejection of the null hypothesis of non-integration at 5%.