THE LONG RUN AND SHORT RUN IMPACTS OF EXPORTS ON ECONOMIC GROWTH: EVIDENCE FROM GABON

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Abstract

This study investigates the impact of exports on economic growth in Gabon using annual time series data for the period 1980 - 2015 by implementing cointegration analysis and error correction model. The empirical results show that in the long run, investment and exports affect negatively on economic growth. However, in short run investment and export cause economic growth. These results provide evidence that investment and exports are necessary in Gabon's economy and are presented as an engine of growth since they cause economic growth in the short term. But they are not carried out and treated with a solid and fair manner, which offer new insights into Gabon's openness policy for promoting economic growth.

Keywords: Exports, Growth, Error-Correction, Openness policy, Gabon
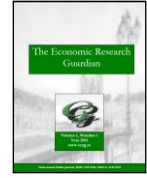
JEL classification: F1, F10, F14

1. Introduction

Some of the most controversial economic issues have competed over the importance of opening up to international trade for development and economic growth. The arguments that support the theory of openness are well known and are attributed to David Ricardo's analysis, in particular the market analysis of Adam Smith, who emphasized that openness enhances the efficiency of allocating resources through a comparative advantage. On the other hand, openness allows the dissemination of knowledge and technological progress and promotes competition in the domestic and international markets[*]. Also, there are a lot of arguments opposing the building of openness to trade, many of which mention not to benefit from human resources and the concentration of capital in strategic economic activities or specialization away in the most technologically advanced sectors and increase the return[†]. The link between exports and economic growth has been an important field of study in recent years, specifically for developing countries. Research has focused on the relationship between exports and economic growth. Several macroeconomic policies have been identified as

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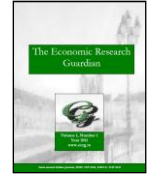[*] See Young (1991), Grossman and Helpman (1991), Lee (1993), and Eicher (1999)
[†] See Grossman and Helpman (1991), Matsuyama (1992), Sachs and Warner (1995, 1999), Harrison (1996), Rodríguez and Rodrik (2001).

having a significant impact on long-term economic growth. These include fiscal policy, monetary policy, and the policy of liberalization of foreign trade. And policies for the promotion of foreign direct investment. Exports are usually added up to participate in a definite way in economic growth with indulgence to means giving the go-ahead to give preferential treatment to the exploitation of economies of scale and encourage the spread of technical knowledge. In the particular case of the policy of trade openness, the literature indicates the existence of a possible causality between exports and economic growth. However, the many empirical studies that have examined the relationship between exports and economic growth have not resolved the causality between these two variables.

Among the studies that have shown that an expansion of exports has a significant positive impact on economic growth are Michaely, (1977); Balassa, (1978, 1989 and 1995); Tyler, (1981); Grossman and Helpman, (1989); Fosu, (1990); Tybout, (1991 and 1992); Rahman (1993); Savvides, (1995); Asmah, (1998); Sachs and Warner, (1997); Edward, (1998); Frankel and Romer, (1999); Ram, (1987). On the other hand, others have concluded that the positive relationship between exports and economic growth does not exist during certain periods in some countries Tyler (1981), Helleiner (1986), Ahmad and Kwan (1991), Buffie (1992), Onafowora and Owoye, (1998). In recent decades, and for international economists, trade policies in developing countries have been a focal point of analysis, with a desire for rapid economic growth in developing countries raising many questions about the relationship between trade and economic growth. Policies permitted in various developing countries have often been largely in disarray with those which are the necessary result of rational and intellectual resource allocation models, and have provided researchers with an astronomical margin of anatomy and diagnosis for their effects. At the same time, analysts have studied the theoretical and empirical immanence of the justifications given for the abandonment of rational patterns of resource allocation. In addition, some developing countries have reversed their trade policies significantly, often with dramatic results. These reversals and the resulting changes in the economic structure have also stimulated analysis of the link between trade policies and development.

Thanks to oil and the small population, Gabon's average purchasing power is historically very much higher than that of sub-Saharan African countries; GNI per capita in 2013 is US $ 10,650 compared to US $ 1,657 in sub-Saharan Africa. It is the second country in continental Africa in terms of per capita income, after Equatorial Guinea (US $ 14,320); nevertheless the unequal distribution of wealth means that almost a third of the population is considered to be affected by poverty. According to the reports of the Association of Senates, Shoora and Equivalent Councils in Africa and the Arab World 2016 "The unemployment rate is worrying, estimated to be over 20% and unemployed young people would represent 60% of the unemployed population". The structure of Gabon's exports remains more than 90% dominated by the oil, mining and timber sectors, making the economy vulnerable to fluctuations in international prices, and to the euro / dollar exchange differential. By 2015, Gabonese exports, at 3,116 billion dollars, fell by 29%, driven by exports of oil (-33%), not offset by higher exports of manganese (+ 26%) and of sawn timber (+ 15%), up sharply. The fall in the price of a barrel of oil led to a sharp decline in sales. The three main destination areas of Gabonese exports are Asia (33%), Europe (37%) and America (18%). Otherwise, imports have also decreased by 9% to 1,773 XAF in 2015, after sustained growth since 2012, to link in a cyclical way to the organization of the 2012 CAN and the very large volume of public investment. In this cafe, France holds a special place in Gabon, with a market share of nearly 25%, although it has been steadily declining in recent years due to the emergence of new competitors, notably in Asia. Some 120 French subsidiaries are

established in Gabon, and French investments represent a stock of several billion euro. In view of the progress and prosperity of Gabon due to the abundance of natural resources of oil and gas and livestock and agricultural crops and agricultural products, but the export sector is unregulated and has experienced many shocks, especially as most of these exports depends on oil and natural resources available and not It depends on manufacturing or export in the construction sector and is designed by officials to be an addition to growth progress. What is strange is that researchers and officials in Gabon have not given serious and necessary attention to this gap. The aim of this research is to look again at the impact of exports on economic growth and the effectiveness of economic strategies and policies in Gabon by using an empirical and policy analysis. This paper examines the causal relationship between trade and economic growth in Gabon. In contrast to most previous ELG studies, this study specifies an augmented production function that explicitly tests for the effect of exports on economic growth.
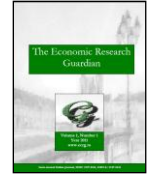
This script is organized as follows. The second section describes the basic literature survey to explain the role of exports in the economic growth, the third section present the data, methodology and model specification, the fourth section reports the empirical results, and the fifth section concludes the paper with a summary of the findings.

2. Literature survey

There is a colossal empirical literature on the link between growth and trade openness. One of the main complications of this literature is that it is no longer possible to draw conclusions, for prodigious studies exhibit contradictory and incompatible results. The first empirical investigations of export-led growth have included static comparisons between countries Balassa (1978, 1985), Kormendi and Meguire (1985), Moschos (1989) which in general concluded that there remains a

Strong evidence of a positive correlation between export expansion and income growth. This passage may devote captious results because it implicitly posits as a hypothesis a similar economic structure between the different countries and does not succeed in differentiating between statistical association and statistical causality. Some recent developments in the analysis of cross-sectional data Jin (1995), Xu (1996), Burney (1996), Islam (1998) the validity of empirical results from this parameter is an object of debate Enders (1995) and Hamilton (1994). To judge whether exports are the engine of growth or its consequence, it is necessary to monitor the time series of each country. This approach has been evaluated in an impressive number of studies with mixed results Boltho (1996), Marin (1992), Chow (1987), Jung and Marshall (1985), Afxentiou and Serletis (1991), Riezman et al. (1996), Shan and Sun (1998). From the inquiries of the extensive empirical literature Riezman et al. (1996), Shan and Sun (1998) we can confirm the wide diversity of econometric methodology, data sets, and country groups that have been bestows and the wide variety of results acquired.

These empirical results should be considered and considered with caution because some authors have ignored the (Co) integrated properties of the variables involved which, if not detected, could

induce parasitic regressions. The issue of the relationship between exports and economic growth is very important, in short, it indicates the strength and prosperity of countries economically, which proves the large number of studies related to it. For these reasons, we collect the most recent research that encompasses the relationship between exports and economic growth. These studies include in the table below:

Table 1 - Studies related to the relationship between exports and economic growth

No.	Authors	Countries	Periods	Econometrics Techniques	Keys Findings
1	Arabi (2014)	Sudan	1970-2012	Cointegration Analysis Granger Causality Tests	EX => GDP
2	Dritsakia and Stiakakisb (2014)	Croatia	1994-2012	Cointegration Analysis Granger Causality Tests	EX ↔ GDP
3	Kumari and Malhotra (2014)	India	1980 - 2012	Cointegration Analysis Granger Causality Tests	EX => GDP
4	Ronit and Divya (2014)	India	1969-2012	Cointegration Analysis Granger Causality Tests VAR	GDP=> EX
5	Shahbaz and Mohammad (2014)	Pakistan	1991-2012	Cointegration Analysis	GDP => EX
6	Shahzad et al. (2014)	South Asia	1989 - 2011	Cointegration Analysis OLS	EX => GDP
7	Szkorupováa(2014)	Slovakia	2001-2010	Cointegration Test	EX => GDP
8	Saleem and Sial (2015)	Pakistan	1973-2013	Cointegration Analysis Granger Causality Tests	EX ↔ GDP
9	Saaed and Hussain (2015)	Jordan	1977-2012	Cointegration Analysis VECM Granger Causality Tests	EX => GDP
10	Alaoui (2015)	Morocco	1980 - 2013	Cointegration Analysis Granger Causality Tests	EX ‡ GDP
11	Bokosi (2015)	Malawi	1980 - 2013	Cointegration Analysis Granger Causality Tests VAR	EX => GDP
12	Gaber (2015)	Palestine	1968 - 2012	Cointegration Analysis VECM Granger Causality Tests	GDP ≠ EX
13	Tapşin (2015)	Turkey	1974 - 2011	Granger Causality Tests	EX ↔ GDP
14	Vardari (2015)	Kosova	2004-2014	Cointegration Analysis Granger Causality Tests	EX => GDP
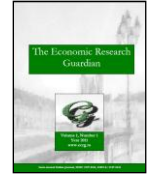
				OLS	
15	Simon and Sheefeni (2016)	Namibia	1998 - 2014	Cointegration Analysis Granger Causality Tests VECM	EX => GDP
16	Iftikhar et al. (2016)	Pakistan	1952-2013	Cointegration Analysis Granger Causality Tests	EX => GDP
17	Sothan (2016)	Asia	1980 - 2013	Cointegration Analysis Granger Causality Tests	EX ↔ GDP
18	Faisal et al. (2017)	Saudi Arabia	1968-2014	Granger Causality Tests	EX => GDP
19	Bakari and Krit (2017)	Mauritania	1960 - 2015	Cointegration Analysis VECM Granger Causality Tests	GDP <=> EX
20	Bakari and Mabrouki (2017)	Panama	1980 - 2015	Cointegration Analysis VAR Granger Causality Tests	EX => GDP

It is clear from those recent studies and investigations in the nexus between exports and economic growth have attended to focus on VAR and VECM models and cointegration approach to capture the short run dynamics and the long term effects between the two variables.


3. Data, methodology and model specification

This pursuit bestows three variables: (i) GDP (constant US$), (ii) exports of goods and services (constant US$) and (iii) Fixed Formation Capital (constant US$) to explore the short run and long run impacts of exports on economic growth. The secondary data for period 1980-2015 is collected from WDI (2016) and converted into logarithm denoted by l in each variable to make the model linear and to avoid heteroskedasticity problem {Shawa and Shen, (2013)}. The functional form is as shown below:

$$\log (GDP)_t = \beta_0 + \beta_1 \log (X)_t + \beta_2 \log (K)_t + + \varepsilon_t \qquad (1)$$

where: β_0 is the constant term, β_1 the coefficient of variable (Exports: X), β_2 the coefficient of variables (Investment: K), t the time trend and ε the random error term assumed to be normally, identically and independently distributed.

This paper clenches the Unit Root test, Cointegration, and an Error-Correction Modeling method to the initial model of exports and growth.
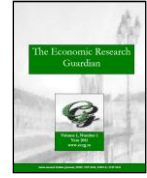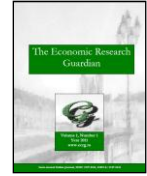
4. Empirical analysis

4.1. Test for unit roots

Unit Root Tests ought to be executed before practicing cointegration tests, because the statistical inference from a time series is usually asserted on the surmise of stationarity. This etude utilizes the Augmented Dickey-Fuller (ADF) test. The null hypothesis of non-stationarity is tested against the alternative hypothesis of stationarity and investigated for all variables (GDP, K and X). Table 2 mentions the Unit Root Tests using the ADF test.

Table 2 - Stationary test of each variable

Null Hypothesis: D(LOG(Y)) has a unit root			
Augmented Dickey-Fuller test statistic		t-Statistic	Prob.*
		-5.959320	0.0000
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	
Null Hypothesis: D(LOG(K)) has a unit root			
Augmented Dickey-Fuller test statistic		t-Statistic	Prob.*
		-8.034345	0.0000
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	
Null Hypothesis: D(LOG(X)) has a unit root			
Augmented Dickey-Fuller test statistic		t-Statistic	Prob.*
		-4.164928	0.0026
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

It can be seen that for all variables the statistics of the ADF test are lower than the criterion statistics of the different thresholds than after a prior differentiation, so accepting the first differencing for all series induces stationarity, entangle that all series are integrated of order one.

4.2. Lag order selection

For obtaining the most favorable lag Length for Co integration analysis and Error-Correction Model, we have taken generally on five criteria, namely, LR test statistic, Final prediction error, Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion.

Table 3 - Determination of the number of lags

VAR Lag Order Selection Criteria					
Lag	Log L	LR	FPE	AIC	SC	HQ
0	95.34983	NA	3.44e-07	-6.368954	-6.227509*	-6.324655*
1	105.9784	18.32507*	3.09e-07*	-6.481267*	-5.915489	-6.304073
2	112.0885	9.270556	3.86e-07	-6.281966	-5.291856	-5.971876
3	118.7532	8.733068	4.82e-07	-6.120912	-4.706468	-5.677926
4	126.0213	8.019897	6.10e-07	-6.001466	-4.162689	-5.425584
5	132.7589	6.040630	8.79e-07	-5.845440	-3.582329	-5.136662
6	146.7707	9.663295	8.92e-07	-6.191080	-3.503636	-5.349406

 * indicates lag order selected by the criterion. LR: sequential modified LR test statistic (each test at 5% level). FPE: Final prediction error. AIC: Akaike information criterion. SC: Schwarz information criterion. HQ: Hannan-Quinn information criterion.

It is clear from the table 3, that most of the criteria {LR, FPE and AIC} have suggested a leg length of 1 as an optimal leg length.

4.3. Cointegration analysis

Once we get the results of unit roots, the upcoming step is to plot, whether there exists cointegration, using the same order of integrated variables. To discuss for co-integration, the Johansen and Juselius (1990) procedure was involved, which brings to two test statistics, trace test and maximum Eigenvalue test, for cointegration.
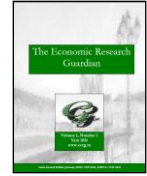
Table 4 - Johansen Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.481842	50.37761	29.79707	0.0001
At most 1 *	0.421376	28.68093	15.49471	0.0003
At most 2 *	0.275314	10.62657	3.841466	0.0011
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.481842	21.69668	21.13162	0.0416
At most 1 *	0.421376	18.05436	14.26460	0.0120
At most 2 *	0.275314	10.62657	3.841466	0.0011

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level. Maximum Eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level. * denotes rejection of the hypothesis at the 0.05 level.

Table 4 squeezes out the results of the co-integration test. There are two test statistics for co-integration, the Trace test and Maximum Eigen value test. The Trace-Statistic value is shown to be greater than the critical values at the 5% levels. Therefore, we reject the null hypothesis of no co-integrated equation among the variables. Thus, we conclude that there is at most three co-integrated equation among the variables. The results of Maximum Eigen value test statistics also express same here. Finally, we can say that there are three cointegration relationships, so the error-correction model can be retained.

4.4. VECM estimation

In our research, the objective of an estimate based on an error correction (ECM) model is to determine the effect of exports on economic growth (both short-term and long-term).
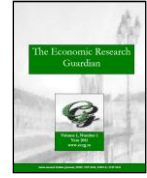
Table 5 - Granger causality test results based on error correction models (ECM)

	Dependent Variable: D (DLOG(Y))				
	Method: Least Squares (Gauss-Newton / Marquardt steps) and WALD Test (Granger Causality)				
	$D(DLOG(Y)) = C(1)*(DLOG(Y(-1)) + 11.612873288*DLOG(K(-1)) + 9.59892959281*DLOG(X(-1)) - 0.392008185562) + C(2)*D(DLOG(Y(-1))) + C(3)*D(DLOG(K(-1))) + C(4)*D(DLOG(X(-1))) + C(5)$				
	Coefficient	Std. Error	t-Statistic	Prob.	Effect
C(1)	-0.017614	0.005366	-3.282695	0.0028	Long run
C(2)	-1.022167	0.233116	-4.384803	0.0001	
C(3)	0.239662	0.052015	4.607515	0.0001	Short run
C(4)	0.449254	0.131327	3.420891	0.0019	
C(5)	0.002635	0.009576	0.275187	0.7852	

Table 5 reports the results of Granger causality tests based on the ECM. If the coefficient of the variable C (1) is negative and possesses a significant probability. This means that all variables in the long-term relationship are significant in explaining the dependent variables. In addition, if coefficients of variables C (3) and C (4) possess a significant probability. This means respectively that investment and exports cause economic growth in the short term. In our case, the correction error term C (1) is significant (0.0028) and has a negative coefficient (-0.017614). These prove that in the long run, investment and exports affect negatively on economic growth. However, it's seen that in short run investment and export cause economic growth since they have a probability of less than 5% {C (3) = 0.0001 and C (4) = 0.0019}.

4.5. Diagnostics tests

The aim of applying a set of diagnostic tests after each empirical investigation is:
- to judge the quality of the adjustment related to the model {R^2 and Fisher test};
- to check the robustness of our model;
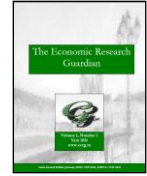- to verify the solidity of our estimate.

Table 6 - Residual diagnostics tests

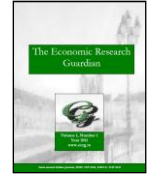|		
Heteroskedasticity Test: Breusch-Pagan-Godfrey	F-statistic	1.484378
	Prob. F(9,23)	0.2122
Heteroskedasticity Test: Harvey	F-statistic	1.401254
	Prob. F(9,23)	0.2445
Heteroskedasticity Test: Glejser	F-statistic	1.398001
	Prob. F(9,23)	0.2458
Heteroskedasticity Test: ARCH	F-statistic	0.000620
	Prob. F(1,30)	0.9803
Breusch-Godfrey Serial Correlation LM Test:	F-statistic	1.389707
	Prob. F(1,27)	0.2487
R-squared		0.607978
Adj. R-squared		0.551975
F-statistic		10.85615
Prob. (F-statistic)		0.000019

All residual diagnostic tests are satisfactory and assert that our model is acceptable and well treated {R^2 is greater than 60% (0.607978), Fisher statistical probability is less than 5% (0.000019), Breusch-Godfrey Serial Correlation LM is superior to 5% (0.2487) et all Tests of Heteroskedasticity are superior to 5%.}.

4.6. VAR Stability

Finally we will apply to use the test CUSUM, this test makes it possible to study the stability of the model estimated over time.
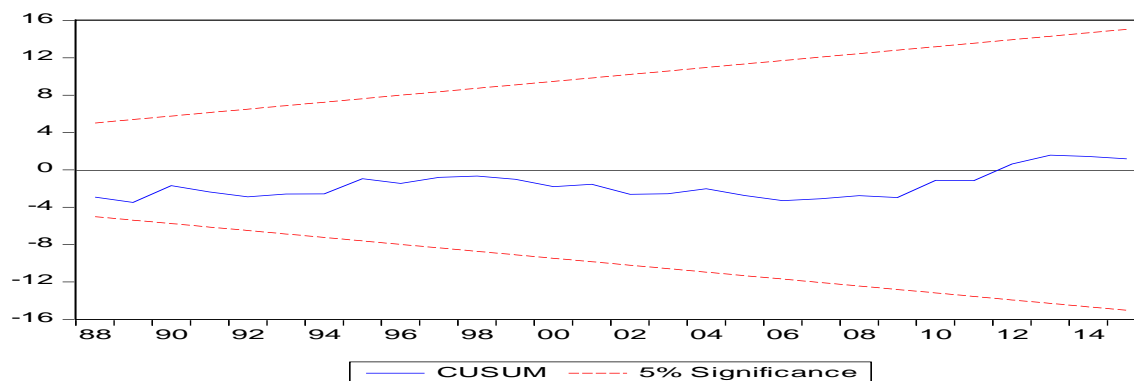
The test result shows that the Modulus of all roots is less than unity and lie within the unit circle. Accordingly we can conclude that our model the estimated VAR is stable or stationary.
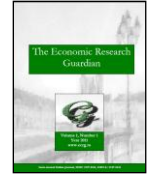
5. Conclusion

This study is one of very few studies, which have investigated, empirically, the impact of export on economic growth of a small rich country Gabon during the period 1980 – 2015. The Co-integration and the Error Correction Model are applied to investigate this relationship. The unit root properties of the data were examined using the Augmented Dickey Fuller test (ADF) after that the cointegration and the Error Correction Model were conducted. Empirical results show that all variables are stationary in the first differences. The application of the cointegration test indicates the existence of cointegration relations, which obviously forces us to apply the Error Correction Model.

The latter shows us that in the long run, investment and exports affect negatively on economic growth. However, it's seen that in short run investment and export cause economic growth. Economically, this explains that investment and exports are necessary in Gabon's economy and are presented as an engine of growth since they cause economic growth in the short term. But they are not carried out and treated with a solid and fair manner, resulting in the negative effect of these two major macroeconomic magnitudes on economic growth in the long term. Despite considerable attention to fluctuations in export prices and earnings, there are few systematic analyzes of how these fluctuations could have a negative impact on the economies of developing countries. MacBean (1965), Mathieson and McKinnon (1974) found that fluctuations in export earnings would likely influence the rate of economic growth in a negative way in developing countries. Kenen and Voivodas (1972), following MacBean, found little overall evidence of adverse linkages between fluctuations in export earnings and the overall economic performance of developing countries. Among other things, Voivodas (1974) found that export instability had an adverse effect on growth and, more precisely, identified the contrary. It seems reasonable to conclude that, if there are adverse effects of instability on growth, they are sufficiently small in relation to other factors contributing to the growth that it is difficult to find empirical tests robust devices that detect them. Otherwise, our empirical investigations have been approved by several new and recent studies such as Furuoka and Munir (2010), Afzal and Hussain (2010), Huang and Ramirez (2016), Nguyen (2017), Nwodo and Asogwa (2017) and other works.

Oil plays the bulk of the country's exports. However, there has been a significant decline in oil production in the country since 1998 to reach 13 million metric tons in 2003. For the first time in 25 years, in 2004 the contribution of oil to the national budget is lower than the contribution of non-oil goods. That is why Gabon's political authorities should seek a way to compensate for the decline in oil production by stimulating production in other sectors and turning to industrial production of the country's abundant mineral resources. In fact, unless new oil fields are discovered, Gabon's policymakers will face the challenge of finding economic alternatives to oil to stimulate economic growth in the country. Otherwise, the country will slowly enter the economic "recession" when existing oil fields dry up. However, the prospects for economic growth in Gabon are still large and large. For example, there are other alternatives, including the exploitation of forests covering 85% of agricultural land, which occupies 12.5 million hectares, the profiteering of wood (from 4340000 to 5 million panels per year). Further measures could be taken to diversify the manufacture and sale of

wood products, such as flooring and wooden home accessories, in African and international markets, and to produce furniture rather than timber and the development of the tourism sector.

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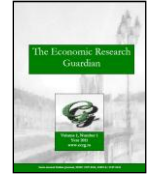
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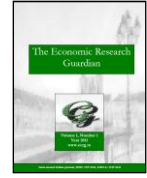
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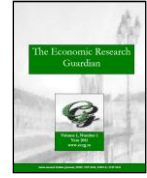
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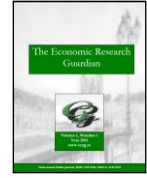
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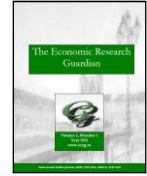
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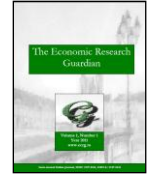
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