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**INVESTIGATING THE DETERMINANTS OF GHANA'S AGRICULTURAL EXPORTS PERFORMANCE:
FOCUS ON BANANA, COFFEE AND RUBBER**

***Boansi David**

Department of Economic and Technological Change, Center for Development Research (ZEF), Bonn, Germany

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ABSTRACT

Following recent decline for performance of Ghana in rubber exports, failure of the banana sub-sector to achieve competitiveness in exports in spite of the prospects reflected so far, and a generally weak performance reflected by the coffee sub-sector in its export dimension since 1986, the present study sourced identification of the magnitude and effects of relevant export drivers on the country's performance in exports of the respective commodities. The primary goal of the study was to at the end of the day be able to inform policy prescriptions on measure needed for reviving exports in the rubber and coffee sub-sectors and efforts required for achieving competitiveness in the banana sub-sector. Output for the respective regressions estimated (using OLS) shows that the banana sub-sector is in a good position to achieve competitiveness, while performance of the rubber and coffee sub-sectors is hindered by prevailing inefficiencies and developmental constraints. To achieve competitiveness in banana exports however, measures should be put in place to increase production significantly, improve the country's openness to trade, attract more export performance-enhancing foreign direct investments, and improve on the quality of banana exports. Reviving exports for the rubber and coffee sub-sectors on the other hand requires not only increasing production and improving the quality of exports, but also, appropriate identification and effective addressing of prevailing inefficiencies and developmental constraints in the respective sub-sectors.

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INTRODUCTION

In response to declines in world cocoa prices during mid-to-late 1960s and the detrimental implications (including collapse of the Ghanaian economy) yielded thereof, Agricultural Diversification Project (ADP, 1991-1999) under the Medium Term Agricultural Development Programme (MTADP, 1991-2000) was initiated to shield the Ghanaian economy against shocks from the world market. Under this project, non-cocoa tree (namely oil palm, coffee, and rubber) and horticultural crops (including pineapple and banana) were prioritized (Asuming-Brempong 2003; Asuming-Brempong and Kuwornu 2013). This initiative did not only shield the Ghanaian agricultural sector and the economy on a broader perspective against shocks from the world market, but in diverse ways contributed to increasing value of agricultural exports from Ghana. By estimates from the FAO's agricultural trade database, value of agricultural exports from Ghana increased from as low as \$268,927 (thousand) in the year 1983

and \$542,210 (thousand) in the year 2000 to as high as \$3,008,021 (thousand) in the year 2011. This initiative as well helped in addressing inefficiencies in domestic production, processing, marketing, fiscal, and policy environments. In addition, the country adopted more export-growth enhancing (liberal) approaches to trade. Although cocoa and pineapple were already highly competitive prior to initiation of the project, the initiative further enhanced competitiveness of the cocoa and pineapple sub-sectors. In addition, the ADP stimulated export growth of bananas, oil palm, coffee and rubber amongst other traditional and non-traditional agricultural export commodities. In spite of the beneficial implications yielded for agricultural exports on a broader perspective, impact of the initiative on the various commodities prioritized under the project reflected some interesting variations. Although performance for all the aforementioned commodities increased under the project, by new thresholds proposed by Boansi (2014), besides cocoa and pineapple (which were already 'Highly Competitive'), only rubber achieved weak competitiveness. All the other commodities, in spite of the improvements observed in their comparative export performance indices remained uncompetitive. This development in performance for rubber

***Corresponding author: Boansi David**

Department of Economic and Technological Change, Center for Development Research (ZEF), Bonn, Germany

exports painted an optimistic image about the strength of the Ghanaian rubber sub-sector in competing effectively and efficiently on the world market (with appropriate policy interventions and greater export promotion efforts). As a reflection of export performance, the comparative export performance index (CEP) of Ghana in rubber exports increased from a range of 0.07-0.63 for the period 1987-1990 to an average of 1.16 for the period 1993-1999 (revealing competitiveness according to intuition behind the Balassa index (Balassa 1965) and weak competitiveness according to the thresholds proposed by Boansi (2014)). In recent years (2005-2011), based on a seven-year-mean index computed by Boansi (2014) however, the performance of rubber has declined from its average (1.16) under the diversification project to a seven-year average of 0.63 for the period 2005-2011. In spite of the potential Ghana reflected in export performance for rubber under the project, the sub-sector has more or less held onto a gloomy picture in responding to various export promotion measures over a decade now.

Similarly, from virtual non-existence in the 1980s, value of banana exports increased from zero in 1983 to \$2,656 (thousand) in 1999 (marking the final year of the diversification project). By the year 2011, value of banana exports stood at \$5,411 (thousand). With these developments in value of exports came some interesting improvements in export performance for the banana sub-sector. The comparative export performance index of Ghana in Banana exports as shown in *Figure 1* increased from a range of 0.01-0.04 for the period 1987-1990 to an average of 0.27 for the period 1993-1999. The index further increased to 0.55 (driven mostly by significant improvements in 2006 and 2007) over the period 2005-2011, reflecting potential for achieving at least weak export competitiveness (based on newly proposed classes by Boansi (2014)) should conditions be more favorable.

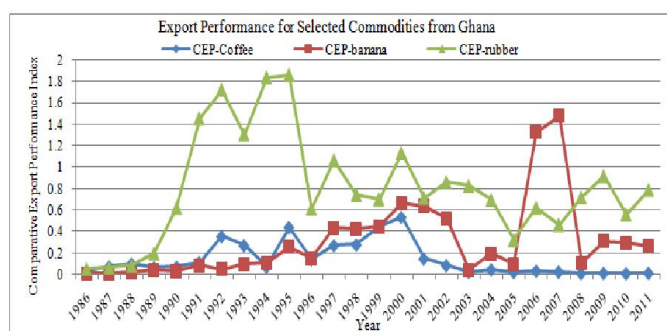


Figure 1. Performance of Ghana in exports of coffee, banana and rubber

Source: Author's construct (own computation with data from FAOSTAT)

Following a trend similar to that observed for the rubber sub-sector, export performance for the coffee sub-sector increased from a range of 0.08-0.10 for the period 1987-1990 to an average of 0.28 for the period 1993-1999. In recent years (2005-2011) however, the index of export performance for the coffee sub-sector has fallen to a low 0.02 seven-year average, the lowest figure observed so far for the period 1986-2011.

In as much as performance for the rubber sub-sector in exports has receded in recent years, that for coffee has fallen to an average well below its pre-diversification project range, while the banana sub-sector is yet to achieve competitiveness in spite

of the prospects reflected by the sub-sector. It is in this regard that the present study sources to investigate the effects of various export supply drivers on the performance of banana, coffee and rubber exports from Ghana. The primary goal of this study is to at the end of the day be able to inform policy prescriptions on measure needed for reviving the rubber and coffee sub-sectors and efforts required for achieving competitiveness in the banana sub-sector. In contrast to the usual export supply studies that regress export indicators (volume or value) on various drivers, emphasis in this study is placed solely on the comparative export performance index as the explained variable instead of volume or value of exports. This is to help identify how various export drivers in one way or another enhance or inhibit export competitiveness for the respective sub-sectors. It is a priori assumed that indicators that enhance export growth (in terms of volume and value) stand enhancing competitiveness. Entirely the opposite is assumed for indicators that inhibit export growth. Use is made primarily of an Ordinary Least Squares (OLS) estimation of two primary export supply functions for the period 1986-2011.

MATERIALS AND METHODS

With a primary goal of informing policy prescriptions on relevant measures needed for stimulating growth in the export dimensions of the banana, coffee and rubber sub-sectors, use in this study is made primarily of time series data on production of the respective commodities, key determinants of export growth based on propositions and findings from previous export trade studies, and of own computations for the respective export prices and CEP's (Comparative export performance indices) for banana, coffee and rubber. Comparative export performance Index as employed in this study is conceptually defined as follows:

$$CEP = \frac{(X_{iB}/X_B)}{(X_{iA}/X_A)} \text{eq.} \quad (1)$$

Where

- X_{iB} - value of commodity i (banana, coffee, and rubber) exports from Ghana
- X_B - total value of agricultural exports from Ghana
- X_{iA} - value of world exports of commodity i
- X_A - total value of world agricultural exports.

Following propositions on various export supply drivers and findings by Kumar *et al* (2008), Kumar and Rai (2007), Anwar *et al* (2010), Boansi (2013), Ball *et al* (1966), Ngeno (1996), Musinguzi and Obwona (2000), Ndulu and Lipumba (1990), Sharma (2000), Cline (2004), Ngouhouo and Makolle (2008), and Agasha (2009) amongst others, the following double-log export supply functions are employed for the respective commodities:

Banana and Coffee

$$\ln CEP_t = C + \ln Prod_t + \ln ToT_t + \ln REXR_t + \ln FDI_t + \ln Exprice_t + \ln ExpvolW_t + \ln Domcons_t \text{eq.} \quad (2)$$

Rubber

$$\ln CEP_t = C + \ln Prod_t + \ln ToT_t + \ln REXR_t + \ln FDI_t + \ln Exprice_t + \ln ExpvolW_t \text{eq.} \quad (3)$$

Where

$\ln CEP_t = \log$ of comparative export performance index for commodity i in time t

$C =$ Intercept term

$\ln Prod_t = \log$ of output (production) of commodity i in time t

$\ln ToT_t = \log$ of terms of trade index of exports in time t

$\ln REXR_t = \log$ of real effective exchange rate in time t (CPI based, index base 2000)

$\ln FDI_t = \log$ of foreign direct investment (Net inflow) in time t

$\ln Exprice_t = \log$ of export price faced by exporters from Ghana for commodity i in time t

$\ln ExpvolW_t = \log$ of world volume of exports for commodity I in time t (proxy for international trade)

$\ln Domcons_t = \log$ of domestic consumption of commodity i (banana or coffee) in time t

The domestic consumption variable is missing in eq. (3) because there was no data on domestic consumption of rubber for Ghana. In contrast to this however, over 60 percent of banana and coffee output is consumed within the country, with consumption of coffee even exceeding production in the year 2011. By this, domestic consumption is a priori deemed a potentially relevant determinant of both volume and value of banana and coffee exports, and hence export performance of these commodities. Although various trade analysts make use of average world prices in export supply analysis, in this study, use is made rather of the price faced by exporters from Ghana. This move is justified on the grounds that, in as much as some average prices are quoted on various websites as world prices for various commodities, exporters from various countries usually face different prices based on quality of the products they export, share of the country in world exports for the respective commodities, the major export destinations, and on other prevailing internal and external trade policies. As employed in this study, the export price variable is defined as follows:

$$Exprice = \frac{Expval}{Expvol} \times 1000eq. \quad (4)$$

Where

$Expval =$ export value (\$1000) for commodity i in time t

$Expvol =$ export volume (tonnes) for commodity i in time t

By this definition, the $Exprice$ (export price) variable computed is in \$/tonne.

Beside own computations as specified in equations 1 and 4, data on output, domestic consumption, value of exports for Ghana, volume of exports for Ghana and world volume of exports were gathered from the food supply and trade database (FAOSTAT) of FAO. Data on ToT, REXR, and FDI were gathered from UNCTAD STAT (United Nations Conference on Trade and Development Statistics) for the period 1986-2011.

Justification for determinants of export performance and a priori expectation

Production (PROD)

As a key supply side determinant of exports (Bertil (1968)), higher level of production has been found a key determinant

for export expansion in many studies on export trade. In as much as increased production is presumed to yield detrimental effects on trade in a closed economy due to the downward pressure it induces on commodity prices, in an open economy, increased production offers an opportunity for export expansion through surpluses, which consequently earn the exporting nation some foreign exchange and revenues through export taxes. With Ghana having adopted a more liberal trading environment (open economy), increased production is a priori expected to yield beneficial implications for export performance of banana, coffee and rubber. This expectation conforms to propositions by Ball *et al* (1966), Ngeno (1996) and Boansi (2013) that there exists a positive relationship between export growth and output level in an open economy, since increased production leads to export expansion.

Term of Trade Index of Exports (ToT)

In more liberal economies, openness to trade does not only present various sub-sectors of the economy with greater market opportunities (Ngouhouo and Makolle 2013), but as well promotes efficiency in production and exports by exposing the country to competition from various commodity markets. Efficiency as affirmed in economic and development theory is relevant for growth and competitiveness. By this, a positive association is a priori expected between the index of trade openness and export competitiveness. This expectation is in line with results from Anwar *et al* (2010), Ngouhouo and Makolle (2008), Musinguzi and Obwona (2000), and Agasha (2009) that favorable terms of trade enhance export growth, and hence competitiveness under efficient production and marketing conditions.

Real Effective Exchange Rate (REXR)

In contrast to the nominal exchange rate (EXR) where increments in the rate reflect currency depreciation (thereby making exports cheaper on the international market and more beneficial for exporters), increments in the real effective exchange rate (REXR) (which adjusts for purchasing power differences between trading partners) reflect currency appreciation (thereby making exports more expensive on the international market and less beneficial for exporters). With policy makers and trade analysts being more interested in the latter rate, in the present study, the REXR is chosen over the EXR. In line with economic and trade theory, depreciation of the real effective exchange rate is a priori anticipated to yield beneficial implications for exports from Ghana; hence a negative association between export competitiveness and appreciation of the real effective exchange rate. This expectation conforms to propositions by Sharma (2000) and Cline (2004) that depreciation in real exchange rate enhances export growth.

Foreign Direct Investment (FDI)

Quite controversial impacts of FDI on exports have been noted in literature. In as much as some researchers, including Jeon (1992) find a significant negative relationship between FDI and export growth, Sharma (2000), Majeed and Ahmad (2006) and Hoekman and Djankov (1997) find no significant association between FDI and export growth. Pfaffermayr (1996), Cabral (1995) and Blake and Pain (1994) on the other hand found a significant positive effect of FDI on export

performance. In as much as the effect of FDI according to these researchers depend on the motive behind such investments, under favorable conditions, FDI stands fueling growth in less developed economies. Such investments have the potential to stimulate export growth, advance technological progress, improve efficiency and quality of exports, create favorable trading relationship between Ghana and its investing partners and strengthen capital formation, innovation capacity and organizational and managerial practices. Inefficiencies in production, processing and domestic marketing, as well as trade restricting policies and other structural weakness could however hinder realization of these potentially beneficial implications of FDI. In this study however, a positive association is a priori expected between FDI and export performance for the respective commodities.

Export Price (Exprice)

As suggested by Dercon (1993), prices are the general conduit through which economic policies are expected to affect agricultural variables such as output, supply, exports and income. Similarly, Agasha (2009) placed a suggestion that, export price is a relevant determinant of export growth especially for countries that depend on exports of agricultural commodities that are highly vulnerable to price fluctuations. In a study by Ndulu and Lipumba (1990), a proposition was made that foreign prices of primary commodities significantly affect export performance of country's involved in their production. In affirming the proposition by Ndulu and Lipumba (1990), Edwards and Golub (2004) discovered that foreign prices yield a strong impact on export performance of South Africa's manufacturing sector. Under efficient and favorable conditions, a positive association is generally anticipated between export performance and export price. Same is a priori anticipated in this study.

World Volume of Exports (ExpvolW)

Increasing international trade for the respective commodities presents an opportunity for increased exports. Under favorable conditions, sub-sectors in a relatively better standing are expected to respond positively to such developments. Failure to respond appropriately to favorable developments in world trade signals existence of growth inhibiting constraints in sub-sectors involved and inefficiencies in production, processing and marketing environments. Such observation could to a greater extent be as well attributed to restrictive trade policies and measures that preclude or discourage exporters from increasing exports for the commodities of interest. In this study, a positive association is a priori anticipated between export performance and world volume of exports for the respective commodities. Deviations from this expectation signal inefficiencies and restrictions in the respective sub-sectors, addressing of which could pave room for export expansion and competitiveness. This a priori expectation is in line with results from Nwachuku *et al* (2010), Anwar *et al* (2010), Kumar *et al* (2008) and Kumar and Rai (2007).

Domestic Consumption (Domcons)

In contrast to a positive association anticipated between export performance and foreign demand, increased domestic consumption (demand) stands impeding export performance.

As discovered by Ball *et al* (1966), at relatively high level of domestic demand, the quantity of resources devoted to export is lower, and this leads to decreased volume and possibly value of exports (in case of minor exporting nations). In affirming this discovery, Boansi (2013) also found a significant negative effect of domestic consumption on export growth for cocoa from Ghana. In line with these discoveries, a negative association is a priori anticipated between domestic consumption (demand) and export performance.

RESULTS AND DISCUSSION

To avoid discussing output of regressions that haul nonsense correlation between unrelated random walks, residual series for the respective regressions was tested for stationarity, normality and serial correlation (with these three tests being deemed relevant diagnostics for time series data). In addition, the respective regressions were tested for appropriateness of specification through a Ramsey Reset Test and for stability of coefficients through the CUSUM and CUSUM of Squares tests. As shown in Table 1, the residual series for the respective regressions were found stationary (based on results for the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests of the residuals), normally distributed (based on the Jarque-Bera values) and non-serially correlated (based on the Q-stat). The Ramsey Reset Test confirms appropriateness of the respective specifications, while stability tests as shown in *Appendix 1* confirm stable and reliable coefficients. Having performed the necessary diagnostics and found the regression results reliable and non-spurious, I proceed with discussion. Discussion of the results is structured in three sections; the first section is on banana, the second on coffee, and the third (final) section on rubber.

Table 1. Regression Results

Dependent V. = ln(CEP)	Banana	Coffee	Rubber
C	-87.418*** (23.867)	-6.157 (36.572)	31.298*** (10.289)
Ln Prod	3.803*** (0.580)	0.966*** (0.282)	1.751*** (0.229)
Ln ToT	1.434 (1.200)	-2.489** (1.133)	-1.241** (0.516)
Ln REXR	1.538** (0.673)	0.170 (1.015)	-0.818* (0.461)
Ln FDI	0.228* (0.122)	-0.148 (0.249)	-0.257** (0.102)
Ln Exprice	1.205*** (0.248)	0.635 (0.394)	0.277* (0.158)
Ln ExpvolW	3.972*** (1.214)	0.517 (2.311)	-2.477*** (0.660)
Ln Domcons	-4.245*** (0.575)	-0.649** (0.296)	-
R-Squared	0.949	0.812	0.927
Adj. R-Squared	0.930	0.739	0.905
F-Statistic	48.182	11.126	40.467
Prob (F-statistic)	0.000	0.000	0.000
Log likelihood	-6.437	-18.823	-0.539
Durbin-Watson stat	2.152	2.392	2.086
Jarque-Bera	0.769	0.834	3.585
Q-stat 1	0.867	1.954	0.288
Q-stat 2	1.333	2.124	3.106
Q-stat 3	1.658	2.355	3.922
Akaike info criterion	1.111	2.063	0.580
Schwarz criterion	1.497	2.450	0.919
Hannan-Quinn criter.	1.222	2.175	0.677
ADF of Residual	-5.335***	-6.189***	-5.218***
PP of Residual	-5.408***	-6.189***	-7.335***
Ramsey RESET Test F	2.973	3.932	0.428

***1%, **5%, *10%

Banana

Based on the adjusted R-squared figure, a total of about 93% of variations in export performance for the banana sub-sector is explained by dynamics in the explanatory variables specified in equation (2). Joint effect of the variables as reflected by the F-statistic and its corresponding probability is highly significant. With exception of the real effective exchange rate variable, signs (effects) for all the other variables conform to a priori expectations. A 1% increase in production leads to a 3.80% increase in Ghana's performance for banana exports, significant at the 1% level. This discovery affirms propositions by Ball *et al* (1966) and Bertil (1968) that production is a key supply side determinant of exports, and that increased production stimulates export expansion and performance. In open economies like Ghana where domestic demand for banana is also high, increased production facilitates effective meeting of both domestic and international demands, the latter being achieved through surpluses from production. Although in line with a priori expectation, the positive coefficient (1.43) observed for the index of trade openness is not significant. This indicates existence of some constraints and inefficiencies that preclude appropriate exploitation of trade opportunities by the banana sub-sector. Amongst the constraints noted to inhibit growth in various sub-sectors of the agricultural sector are inadequate roads (to facilitate easy movement of produce from production centers to ports and agricultural markets), poor access to markets and information on prices, inappropriate agricultural practices (Brooks *et al* 2007) and inappropriate policy and trade measures. Making the best out of trade opportunities would require addressing of such constraints and inefficiencies.

In contrast to the a priori expectation, a positive and significant association is observed between export performance and appreciation of the real effective exchange rate. Although in opposition to economic and trade findings (and deemed a mixed signal), this observation to some degree reflects quite a strong and undying international demand for bananas from Ghana. This claim is made on the grounds that, in as much as appreciation of the real effective exchange rate usually comes with a decrease in demand for exports from the country of interest, any increase in demand under such condition reflects potentially high quality of exports for the product of interest, thereby leading to increased demand even in times of appreciation of the real effective exchange rate. From the results, a 1% increase in the real effective exchange rate variable is associated with a 1.54% increase in banana export performance, significant at the 5% level.

Although quite inelastic, yet positive and significant, FDI is noted to yield beneficial implications for banana exports from Ghana. As a delicate export sub-sector (due to the highly perishable nature of the product and conditions needed for production, processing and marketing) where quality and capital formation are deemed basic foundations for export development, increment in FDI is believed to have over the period 1986-2011 contributed not only to knowledge spillovers and trade creation, but in a more relevant way enhanced quality of banana exports from the country and contributed effectively to capital formation in the sub-sector. A 1% increase in FDI leads to a 0.23% increase in export performance for the banana sub-sector, significant at the 10%

level. This observation affirms propositions by Pfaffermayr (1996), Cabral (1995) and Blake and Pain (1994) that there exists a significant positive association between FDI and export performance. In as much as producers are incentivized through increasing producer prices for commodities on the domestic market, exporters are similarly incentivized through increasing export prices (and reduction in export taxes). By the principles of trade theory, an inverse association is usually expected between prices and demand for commodities. Thus, when prices faced by exporters increase, international consumers are expected to demand less, while exporters on the other hand are expected to export more. Having factored-in all these potential responses from the supplier's and consumer's side, an elastic, positive and significant effect of export price on performance of banana exports observed in this study once again confirms undying and relatively higher demand for banana exports from Ghana. This indicates that, should the banana sub-sector in Ghana be fervently, efficiently and effectively developed, the country stands expanding its tentacles in the world banana markets as demand for exports from Ghana seems relatively high and all positive to developments on the international market. A 1% increase in export price faced by banana exporters from Ghana leads to a 1.21% increase in the country's performance in banana exports, significant at the 1% level.

Affirming once again, a potential strength for achieving competitiveness in banana exports, Ghana's performance in banana exports is noted to increase with increasing international trade. Pointed out by Kumar *et al* (2008), increase in exports and export performance of a country in a commodity with increasing international trade in that commodity reflects a good standing of the commodity involved. As pointed out in the introductory part of this study, the banana export sub-sector has over the period 1986-2011 reflected prospects for achieving at least weak competitiveness, but needs a little more pushing to achieve this. A 1% increase in world volume of banana exports leads to a 3.97% increase in Ghana's performance for banana exports, significant at the 1% level. Domestic demand for banana is noted to yield a 'pulling' (adverse) effect on performance of Ghana in banana exports. In line with discoveries by Boansi (2013) for cocoa exports from Ghana and Ball *et al* (1966) for manufactures from U.K., a negative association is as well observed in this study between index of export competitiveness for bananas from Ghana and domestic demand for banana. At relatively high level of domestic demand, the volume of bananas available for export decreases and this affects the value of exports, and consequently performance of the country in exports of the commodity. A 1% increase in domestic consumption of banana leads to a 4.25% decrease in the performance index for banana exports from Ghana, significant at the 1% level.

In summary, banana exports performance for Ghana is enhanced by increasing production (Prod), foreign direct investment (FDI), export price faced by exporters (Exprice), international trade (ExpvolW), and appreciation of the real effective exchange rate (REXR), the latter being deemed a mixed signal (but having a potentially high demand and export quality implications). Increases in domestic consumption (Domcons) on the other hand impede improvements in the country's index of competitiveness for banana exports.

Addressing the 'pulling' effect of domestic consumption on export performance requires significant increases in production to ensure effective meeting of both domestic and international demands.

Coffee

Performance of Ghana in coffee exports is found to be dependent on domestic production (Prod), openness to trade (ToT) and on domestic consumption (Domcons) of the commodity. As was noted on the association between production and export performance for banana, a significant positive association is as well noted between production of coffee and performance of Ghana in coffee exports. A 1% increase in production leads to a 0.97% increase in the index of competitiveness for Ghana in coffee exports, significant at the 1% level. In contrast to a priori expectation however, a significant negative association is observed between the index of trade openness and performance of the country in coffee exports. This association does not match any of the previous researches acknowledged in this study. Negative association between openness to trade and export competitiveness for coffee signals high degree of inefficiencies and developmental constraints in the coffee sub-sector, addressing of which is a must to ensure revival of coffee exports and place the sub-sector in a good standing to exploit market and other trade opportunities in both domestic and international markets. A 1% increase in the index of trade openness is associated with a 2.49% decrease in performance of coffee exports from Ghana, significant at the 5% level.

Once again, a negative association is noted between domestic consumption and performance of the country in exports of a commodity. Since domestic consumption decreases the volume of coffee available for exports, both the value and index of competitiveness stand declining. A 1% increase in domestic consumption of coffee leads to a 0.65% decrease in the index of competitiveness, significant at the 5% level. Estimates and significance of respective variables in the case of coffee reflect a relatively less responsive sub-sector to dynamics in the export supply drivers. This reflects a very weak export dimension of the coffee sub-sector, revival of which would require greater efforts, including increasing production and addressing of prevailing production, processing, marketing, policy and other developmental constraints and inefficiencies. A total of about 74% of the variations in export performance for coffee is accounted for by dynamics in the explanatory variables specified in equation (2), and their joint effect is highly significant.

Rubber

Performance of Ghana in exports of rubber is significantly steered by all the explanatory variables specified in equation (3). As was discovered for banana and coffee, a significant positive and elastic association is observed between production and performance of Ghana in rubber exports. A 1% increase in production leads to a 1.75% increase in the index of competitiveness, significant at the 1% level. In contrast to a priori expectation however, a significant negative and elastic association is observed between openness of the country to trade and index of competitiveness for rubber exports. This as well reflects existing inefficiencies and constraints which

might have, to a greater extent, accounted for the recent recession in rubber exports performance for Ghana. A 1% increase in the index of trade openness is associated with a 1.24% decrease in performance of Ghana for rubber exports, significant at the 5% level. None of the previous findings in trade literature supports this association, hence an indication of existing inefficiencies and constraints in the rubber sub-sector that need identifying and effective addressing. In conformity to propositions by Sharma (2000) and Cline (2004), a significant negative association (as a priori expected) is observed between the index of competitiveness for rubber exports and appreciation in the country's real effective exchange rate. Appreciation of the country's currency makes exports more expensive and reduces demand for exports from the country, yielding adverse effect on the country's export performance in the process. This association implies that, unlike the case for banana (where appreciation of the currency had no detrimental effects on banana exports), consumers on the international market for rubber place keen interest on dynamics in purchasing power of currencies for trading partners. Appreciation of the domestic currency therefore has adverse implications for exports of rubber from Ghana. A 1% increase in the real effective exchange rate leads to a 0.82% decrease in the index of competitiveness for Ghana in rubber exports, significant at the 10% level.

Affirming once again, existing inefficiencies and developmental constraints in the export dimension of the rubber sub-sector, a significant negative association is observed between FDI and performance of Ghana in rubber exports. A 1% increase in FDI leads to a 0.26% decrease in export performance for rubber, significant at the 5% level. Similarly, a significant negative association is observed between increasing international trade and performance of Ghana in rubber exports. This implies that the export dimension of Ghana's rubber sub-sector is in an unfavorable (bad) standing. Reviving of the sub-sector would require critical identification of all relevant inefficiencies and effective addressing of them to place the sub-sector in a competitive stand to exploit trade opportunities on the international market. A 1% increase in world volume of rubber exports leads to a 2.48% decrease in the index of competitiveness for Ghana in rubber exports, significant at the 1% level. Although quite inelastic, a 1% increase in export price leads to a 0.28% increase in the index of competitiveness for Ghana in rubber exports, significantly at the 10% level. A total of about 91% of variations in the country's performance for rubber exports is accounted for by dynamics in the explanatory variables specified in equation (3). In summary, in as much as increments in production and export price enhance the country's performance in rubber exports, openness of the country to trade, appreciation of the real effective exchange rate, increments in foreign direct investment and increasing international trade dampen the country's performance in rubber exports, the latter association being generally attributed to existing inefficiencies and developmental constraints in the sub-sector.

Conclusion

Following recent decline in performance of Ghana in rubber exports, failure of the banana sub-sector to achieve competitiveness in exports in spite of the prospects reflected

so far, and a generally weak performance reflected by the coffee sub-sector in its export dimension since 1986, the present study sourced identification of the magnitude and effects of relevant export drivers on the country's performance in exports of the respective commodities. The primary goal of the study was to at the end of the day be able to inform policy prescriptions on measure needed for reviving exports in the rubber and coffee sub-sectors and efforts required for achieving competitiveness in the banana sub-sector. Output for the respective regressions shows that the banana sub-sector is in a good position to achieve competitiveness, while performance of the rubber and coffee sub-sectors is hindered by prevailing inefficiencies and developmental constraints. To achieve competitiveness in banana exports however, measures should be put in place to increase production significantly, improve the country's openness to trade, attract more export performance-enhancing foreign direct investments, and improve on the quality of banana exports. Reviving exports for the rubber and coffee sub-sectors on the other hand requires not only increasing production and improving the quality of exports, but also, appropriate identification and effective addressing of prevailing inefficiencies and developmental constraints in the respective sub-sectors. In as much as all the sub-sectors are generally exposed to similar dynamics in various export drivers (specifically ToT, FDI, and REXR), response of the various sub-sectors to such developments depicted some contrasting variations, with the banana sub-sector generally responding positively, while the rubber sub-sector mostly responded negatively. The coffee sub-sector was the least responsive amongst the three to dynamics in the various export drivers. General consistency in effects was however noted for developments in production, domestic consumption and export price faced by exporters from the country.

COMPETING INTERESTS: No competing interests exist

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APPENDIX 1

Stability Test of coefficients

