

Original Research Article

Determinants of Agricultural Export Trade: Case of Fresh Pineapple Exports from Ghana

ABSTRACT

Aims: This study is purposed on informing future trade policy decisions on how the fresh pineapple export industry of Ghana can be revitalized following the declines in both volumes and value of exports since the year 2004. To achieve this, effort is made to identify and assess the magnitude and effects of key determinants of fresh pineapple exports from Ghana for the period 1984-2009

Study design: The study involves separate consideration of value and volume of exports as explained variables, and sourcing of ways by which beneficial implications noted could be maximized for both variables, while minimizing adverse ones in the process.

Place and Duration of Study: This study solely involves the use of secondary data and own-computations on volume and value of pineapple exports, production, domestic demand, export price faced by exporters, terms of trade index of exports, real effective exchange rate, comparative export performance index and net inflows of foreign direct investment

Methodology: Separate regression with value and volumes of exports as explained variables were estimated with the Ordinary Least Squares estimator, and tested for appropriate standard Gaussian assumptions, appropriateness of specification and stability of coefficients

Results: The results show that Ghana's fresh pineapple export industry has competitive advantage and is more price-driven than volume driven. Both volume and value of exports have positive association with production, openness to trade, and the index of competitiveness. Both however have an inverse association with domestic demand and net inflow of foreign direct investment. In as much as the value of exports increases with export price faced by exporters, the response for volumes exported is not significant. The effect of lagged volume of exports on both explained variables is not significant.

Conclusion: Reviving the fresh pineapple export industry would require introduction of incentives to lure more producers into the subsector, improvement in quality of produce exported, minimization of current and possible future distortions to trade, and minimization or avoidance of domestic market capturing and tariff jumping types of foreign direct investment.

Keywords: *Export growth; determinants; pineapples; Ghana; competitive advantage*

1. INTRODUCTION

The extreme reliance of Ghana's agriculture sector and the economy on the cocoa subsector cost the country a period of great depression during the mid-1960s to mid-1970s following the collapse of world cocoa prices (and other marketing and fiscal inefficiencies in the domestic environment). In effort to revive the agriculture sector and promote economic development, the then government introduced various initiatives to help shield the country from future shocks on the international market due to the highly volatile and fragile nature of agricultural trade. Among the numerous initiatives introduced was the agricultural diversification project (1991-1999), with a primary aim of promoting production and export expansion of non-cocoa tree and horticultural crops. This initiative did contribute effectively to improving export performance of the agriculture sector as a whole, although subsector

performances did differ. Among the subsectors that responded positively to the initiative and has for over two decades now been perceived to have steered growth of the horticulture industry is the pineapple subsector. From virtual non-existence in the early 1980s, pineapple exports from the country increased to approximately 56,000 tonnes (by FAO estimate) yielding a value of \$68,340 ("000") by the year 2004. Following shifts in market demand and other relevant economic and policy indicators, as well as the country's slow adaptation to changes on the market however, the fresh pineapple export industry has experienced a steep decline in volume and value of exports.

Exports of pineapples as shown in Figure 1 declined in terms of volume (based on FAO data) from 56,094tonnes in 2004 to 9,971 tonnes in 2010, increasing thereafter to 45,999 tonnes in 2011. These figures correspond to values of 68,343 (\$1000), 3,531 (\$1000) and 51,144(\$1000) respectively. With the country's slow adaptation to developments on the international market by virtue of persisting local policy, structural and biophysical constraints, Ghana's share in European pineapple imports is quoted to have fallen by 18 percent between 2003 and 2007 [9]. In efforts to revitalize the pineapple subsector (and other non-traditional crops) in terms of export, the government has since the year 2010 introduced concessions on income-tax to exports, thereby taxing exporters of pineapples at the company tax rate of 8 percent instead of the standard 35 percent regardless of export performance [25]. In another scheme, exporters are provided direct export incentives through company income tax rebates according to export performance. Effective revitalization of the pineapple subsector in spite of all these efforts and incentives, will require improvement in quality of exports (in terms of MD2 and the other three existing varieties namely Smooth cayenne, Sugar loaf and Queen Victoria), as well as increases in volume of exports. Achieving these however requires identification of existing associations between value and volume of pineapple exports and key determinants of export trade, capturing the effect of quality through a competitiveness index (Primarily the CEP¹). By this, the present study is purposed on informing future trade policy prescriptions on how the pineapple exports dimension of the subsector can be revitalized through identification and assessment of the magnitude and effects of key determinants of fresh pineapple exports from Ghana for the period 1984 to 2009.

¹ Comparative Export Performance Index – holds a definition similar to the Balassa index, but uses the world as a reference group

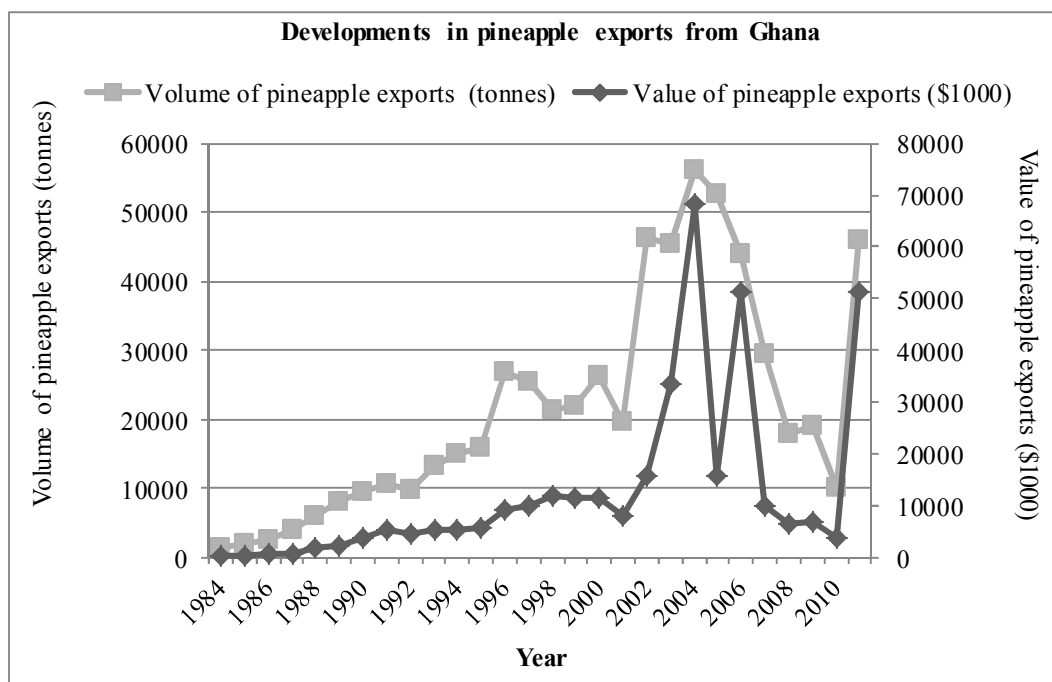


Figure1. Developments in pineapple exports from Ghana
Data Source: Agricultural Trade Database of FAO (FAOSTAT)

2. LITERATURE REVIEW

Historically, the share of trade in the gross domestic product (GDP) of many nations has been an important ingredient for growth and development. In developing countries however, the export of primary commodities and import of finished products may define the basic structure of the economy. In an attempt to explain or predict the type of goods and services exported and imported by nations, their market destinations, and the underlying economic and political conditions, several theories have been formulated.

According to the scholarly review by [22], notable theories justifying free trade include classical tenets of absolute advantage and comparative advantage espoused by Smith and Ricardo respectively, and neo-classical models such as the Heckscher-Ohlin and New Trade Theory (NTT). Although the free trade policies have been heavily criticized in the literature, they are still utilized to advance trade liberalization especially in developing countries [23]. Thus it is within the ambit of the free trade paradigm that the trade liberalization policies were instituted in many developing countries as an alternative to the import-substitution economies in the 1980s.

Ghana represents an interesting model country that could offer empirical evidence for the corollaries of trade liberalization regime. The striking decline in economic growth recorded in post mid-1960s led to the implementation of trade policy reforms to salvage the economy from collapse. Specifically, Ghana implemented the Structural Adjustment Programme (SAP) in 1983 geared towards repositioning the economy on the path of desired economic growth. As noted by [24], the Ghana's trade reform in 1983 and its later fortification in 2005 have resulted in the diversification and growth of the agricultural sector. The main objective of the current economic policy reforms of Ghana is to promote export-led growth through agriculture and to enhance international competitiveness.

In many sub-Sahara African countries, exports of non-traditional commodities including fruits and vegetables have increased [26] with most products from West-Africa ending up on the European market [5]. The situation is not different in Ghana as the adoption of the SAP and other economic policy reforms saw increase in export of fruits and vegetables as new addition to traditional export crops like cocoa.

Following the wave of trade reforms especially in developing countries, many empirical scholarships have emerged. We generally review some of such studies, and place emphasis on areas that are particularly pivotal to our paper. Various authors have studied the determinants of cross-country agricultural commodity exports and recommended plausible variables accordingly. We take a look at some of these variables to inform our empirical study.

According to [26], the increase in export of fruits and vegetable in sub-Sahara Africa is attributable to growing foreign demand, relatively short flight time, price competitiveness, and market liberalization policies. Similarly, access to foreign markets has been cited by other writers as one of the critical determinants of export performance [see 21, 11]. Generally, a fair share of the studies investigating the determinants of agricultural export performance shows that in many least developed countries (LDCs), commodity price variables are very important [10, 13, 28]. From the extant literature, a number of studies [including 17, 2, and 29] have shown a significant and positive influence of real exchange rate (RER) on agricultural export performance. In the empirical scholarship by [29], the authors specified an Error Correction Model (ECM) to analyze the determinants of cocoa, rubber, and palm-kernel exports based on time series data collected between 1970 and 2002. The findings indicate that cocoa export is significantly and negatively influenced by previous year's output and net value of world trade while previous year's GPD stimulate significant and positive effect. For rubber, the results revealed that the significant determinants of export are lagged price ratio and RER which exhibit negative and positive influences respectively. With respect to palm-kernel export, the authors identified previous year's exports and real GDP as the positive drivers of export performance whereas lagged premium and output reduce exports. Contrary to the findings of [29], [19] found no significant influence of RER on export growth in Uganda. According to [19], export growth is significantly and positively determined by previous growth and terms of trade (ToT).

Notwithstanding the suggestion by many empirical studies that there is a direct influence of RER (as surrogate measure for incentive) on agricultural output, there exist dissenting views. The contention resides on the premise of whether or not the inclusion of both producer price and RER as regressors poses any endogeneity problem(s). For instance, [10] argues that RER of the exporting country does not directly influence export volumes, but acts indirectly through the price incentive structure. However, it is worth remarking that potential endogenous relationship between producer price and RER may arise depending on how the author defines RER. The work of [27] is among the empirical studies on cocoa export supply in Nigeria. In performing a co-integration study using time series data, [27] showed that while the influence of weather on cocoa production is stationary, there exist a long run equilibrium relationship between producer price and area planted. In a similar study on cocoa exports from Nigeria, [8] specified an export supply function to investigate the determinants of export. Applying OLS estimation approach, they find that exchange rate fluctuations and agricultural credit positively influence cocoa export. The authors suggested that market forces should be allowed to freely determine exchange rate for cocoa export.

[3] investigated the effects of exchange rate policy on Cameroon's agricultural competitiveness. As part of the study, Amin used OLS to estimate three agricultural export response models for cocoa, coffee, and aggregate agricultural export. It came out that none

of the regressors showed any statistical significance. However, one of the key findings is that, cocoa and coffee are elastic and inelastic to income of trading partners respectively.

[15] investigated cloves export response in Tanzania before and after trade liberalization from 1970 to 2010. The econometric model estimated included world price and real exchange rate (obtained by multiplying the nominal exchange rate with the ratio of consumer price index) and a dummy variable that represents trade liberalization as regressors. World price is deemed a key determinant of export earnings or volume of any country. Real exchange rate is the measure of export competitiveness. He found that world price impact positively and significantly on cloves exports. Moreover, [16] examined the determinants of agricultural export (cotton lint) in Tanzania. The findings reveal that agricultural earnings impact positively and significantly on cotton lint export.

Representing an aspect of his study on competitiveness and determinants of cocoa exports from Ghana, [6] estimated an export supply function with OLS estimator. The study revealed that the significant drivers of cocoa exports from Ghana are lagged output, domestic consumption, real producer price, real world price to real producer price ratio, real producer price in Côte d'Ivoire, prevailing exchange rate, and lagged export quantity. All these significant factors except real producer price in Côte d'Ivoire, domestic consumption, and quantity exported show positive relationship with cocoa export performance. For the other variables used in the regression like foreign direct investment (FDI), nominal rate of assistance, and world stocks, the effects were found to be statistically insignificant.

[1] examined the factors that influence agricultural exports with specific reference to cocoa and rubber in Nigeria. The authors applied OLS multiple regression approach to analyze the data. The explanatory variables used are: quantity of natural rubber/cocoa output, average producer price of natural rubber and cocoa, average world market price of natural rubber and cocoa, exchange rate, domestic consumption of cocoa and rubber, average total rainfall in major producing states, and interest rate. For cocoa, the study revealed that the significant determinants are production and domestic consumption which exert positive and negative influences respectively. They however found that, the level of domestic rubber production, producer price, and interest rate are the key significant and positive drivers of rubber export in Nigeria whereas exchange rate and domestic consumption pose negative influence.

3. PINEAPPLE SUPPLY AND EXPORT CHAIN FOR GHANA

Ghana produces four main varieties of pineapples, namely the Smooth cayenne (SC), MD2, Sugar loaf and Queen Victoria. Production and exports are however dominated by the Smooth cayenne and MD2 varieties. Exports of the Smooth cayenne variety of fresh pineapples to Europe commenced in 1984, marking the beginning of pineapple exports from Ghana based on available data from FAO. In the development phase of pineapple exports, small-holders accounted for at least 50% of volumes of pineapple exported from the shores of Ghana [12]. Following a decrease in profitability of fresh pineapples production due to unexpected shifts in demand by foreign consumers toward the MD2 variety and the inability of most small-holders to quickly adapt to the situation, the number of small-holder pineapple producers has decreased from 1600 to less than 200 engaged in commercial production. As of the year 2004, the country had a total number of 50 exporters. This number has decreased to 14 recently, with about eight of the exporting firms being responsible for 93% of fresh pineapple exports from Ghana [12]. The number of processing firms engaged in juice production is reported by [12] to have increased following the growth of the sector between the years 1999 and 2004. Most of the processing factories however have for over five years now been out of operation due to lack of pineapples for processing. This is due to drifting of majority of the producers from the pineapple sub-sector based on the transition

challenge from smooth cayenne and the other varieties to MD2 and the resulting decrease in profitability. In spite of this however, firms and producers that were able to convert production from the smooth cayenne variety to MD2 pineapples are reported to have had heterogeneous impact on export volumes, with most of them witnessing major increases in their export shares [12]. By this, growth of the pineapple sub-sector is believed to be inhibited by production and productivity challenges, slow adaptation to market shifts and inability of majority of the producers to transit to new varieties of the pineapple fruit to help meet demands in primary and secondary destinations. With a total of 14 export destinations as of the year 2007, the number of destination countries for pineapple exports from Ghana decreased to 8 by the year 2010, primarily due to import diversion toward MD2 varieties by such countries (see Table 1)

Table 1 Destinations for pineapple exports from Ghana

Share in pineapple exports	2007	2009	2010
Between 0% and 1 %	United States of America, South Africa, Egypt, Libya, Spain, Netherlands, Vietnam	South Africa, United Arab Emirates, Libya, Egypt, Spain, Germany, Denmark, United Kingdom	Spain, Netherlands
Between 1% and 10 %	Italy, Switzerland, Germany, United Kingdom, United Arab Emirates	Morocco, Italy	United Kingdom, Morocco
Between 10% and 25%		France	Italy, France
Between 25% and 100%	France, Belgium	Switzerland, Belgium	Switzerland, Belgium

Source: Detailed world Agricultural Trade Flows (FAOSTAT)

Ghana has a relatively less complex pineapple supply and export chain (see Figure 2) compared to chains for commodities like cocoa and coffee observed in Ghana and in countries like Ethiopia [see chains in 6,7]. Like many other commodities (although usually ignored in various supply chains), the pineapple supply chain commences from the factor market side with sourcing of relevant inputs, especially high quality crowns, fertilizer and fumigants. Achieving higher yields requires the undertaking of important cultural practices like weeding, spraying, fertilization among others. Three groups of people have been identified so far to engage in pineapple production; the small-holder as an individual, co-operatives (organization owned and run jointly by a group of small-holders), and large scale producers (nucleus farmers/exporters). In as much as some of the small-holders sell directly to wholesalers on the domestic market by themselves, or through co-operatives (in case of contract), majority of the farmers sell their produce to the larger producer/exporters. Similarly co-operatives have the option of selling directly to wholesalers/retailers and to consumers, or selling their produce to exporters (due to limited capacity for most cooperatives to engage directly in export).

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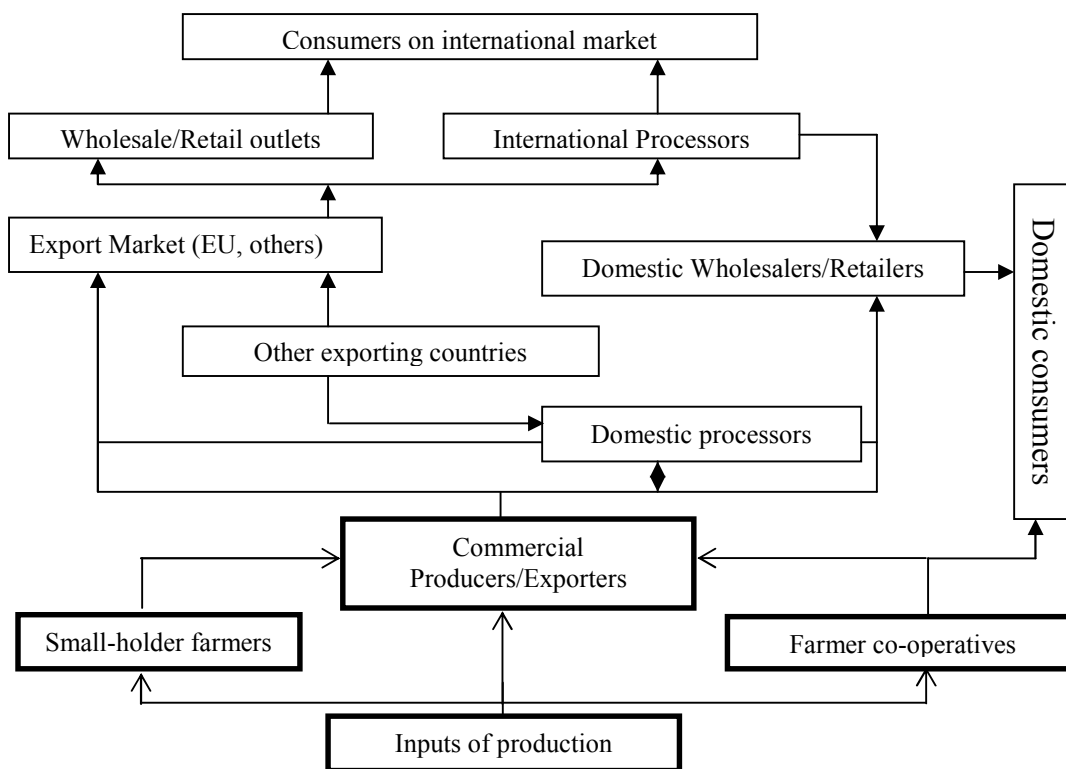


Figure 2 Pineapple supply and export chain for Ghana
Source: Authors construct

After sorting and grading, exporters mostly export the grades with medium to highest quality, and either sell the relatively lower grades to domestic processors or directly to wholesalers/retailers and to consumers. In times of shortage of the produce on the market, both domestic processors and exporters source pineapples from other exporting countries to keep them in operations. As shown in Table 2, pineapples exported from the country are either in the fresh form or canned. Over the period 1997 to 2011 however, there have been very low value added in pineapple exports from the country, as most of the produce exported are in the fresh form. The European Union continues to be the major destination for exports of pineapples from Ghana and from other major exporting countries worldwide (see Appendix 2) with Belgium, Switzerland, France and Italy being the primary export destinations for Ghana. Return of any pineapple exported from the shores of Ghana unto the local market is mostly in a processed form (from foreign processing companies). Pineapples are transported unto foreign markets (destinations) either by sea (mostly for MD2 variety) or by air (mostly for Smooth Cayenne variety).

271 Table 2 Composition of pineapple exports from Ghana
272

Year	Fresh pineapple exports (\$1000)	Canned pineapple exports (\$1000)	Total pineapple exports (\$1000)	Value Added (%)
1997	9,998	0	9,998	0
1998	11,676	0	11,676	0
1999	11,593	0	11,593	0
2000	11,514	5,926	17,440	33.98
2001	7,933	5,655	13,588	41.62
2002	15,520	5,500	21,020	26.17
2003	33,403	3	33,406	0.01
2004	68,343	253	68,596	0.37
2005	15,664	109	15,753	0.69
2006	51,367	29	51,396	0.06
2007	9,950	282	10,232	2.76
2008	6,260	94	6,354	1.48
2009	6,692	190	6,882	2.76
2010	3,531	18	3,549	0.51
2011	51,144	18	51,162	0.04

273 Source: Authors computation with data from FAO (Agricultural Trade Database)
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275 4. METHODOLOGY

276 4.1 Sources of data

277 All the data (secondary) used in this study were collected from the agricultural production,
278 supply and trade database of FAO (FAOSTAT) and the United Nations Conference on Trade
279 and Development (UNCTAD). Data gathered from UNCTAD include real effective exchange
280 rate, terms-of-trade index of exports (as against that for good and services) and foreign
281 direct investment (Net inflows). All other series except export price faced by Ghana for
282 pineapples are gathered from FAOSTAT. Based on differences in quality of products
283 exported by countries, as well as spatial differences in policy environment (including barriers
284 to trade –tariffs among others), countries face respective export prices that are usually
285 different from the average world price for a given commodity. Along this line, we make use of
286 the export price faced by Ghana for export of pineapples and not the price quoted on the
287 world market as is usually seen in other studies. The export price is calculated based on
288 value and volume of exports as follows:
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$$291 \text{ Export price} = [(\text{Value of export}) / (\text{Volume of export})] \times 1000 \dots \text{Eq. (1)}$$

292 The outcome is in \$/tonne. Multiplication of the fraction by 1000 is due to the fact that value
293 of exports gathered from the FAOSTAT is in \$1000, while volume of export is in tonnes.

294 4.2 Model specification

295 Based on the empirical literature reviewed and objective of this study, our model is specified
296 econometrically as follows holding the following a priori expectation (for both value and
297 volume of exports):
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$$299 \ln(\text{EXPTVal}) = C + \ln(\text{Prod}) + \ln(\text{Domcons}) + \ln(\text{EXPTprice}) + \ln(\text{TOT}) + \ln(\text{REXR}) +$$

300 $+ \ln(\text{CEP}) + \text{FDI} + \ln(\text{EXPTVol}(-1)) \dots \text{Eq. (2)}$
 301
 302 $\ln(\text{EXPTVol}) = C + \ln(\text{Prod}) + \ln(\text{Domcons}) + \ln(\text{EXPTprice}) + \ln(\text{TOT}) + \ln(\text{REXR}) +$
 303 $+ \ln(\text{CEP}) + \text{FDI} + \ln(\text{EXPTVol}(-1)) \dots \text{Eq. (3)}$
 304
 305 Where a priori, $\{C, \ln(\text{EXPTVol}(-1)), \text{FDI}\} < > 0$; $\{\ln(\text{Prod}), \ln(\text{EXPTprice}), \ln(\text{TOT}), \ln$
 306 $(\text{REXR}), \ln(\text{CEP})\} > 0$; $\{\ln(\text{Domcons})\} < 0$
 307
 308 $\ln(\text{EXPVal})$ Log of value of pineapple exports
 309 $\ln(\text{EXPVol})$ Log of volume of pineapple exports
 310 $\ln(\text{Prod})$ Log of domestic production of pineapple
 311 $\ln(\text{Domcons})$ Log of domestic consumption (demand) of pineapple
 312 $\ln(\text{EXPTprice})$ Log of export price of pineapple
 313 $\ln(\text{TOT})$ Log of Terms-of-Trade Index of exports (measure of trade openness)
 314 $\ln(\text{REXR})$ Log of Real Effective Exchange Rate
 315 $\ln(\text{CEP})$ Log of Comparative Export Performance Index (to help capture
 316 Competitiveness: Improvement in quality and share of exports)
 317 FDI Net inflow of Foreign Direct Investment²
 318 C Intercept
 319 The specified equations (2 and 3) are estimated with the OLS estimator and tested for
 320 appropriate standard Gaussian assumptions, appropriateness of specification (through a
 321 reset test) and stability of coefficients (through the CUSUM and CUSUM of Squares test).
 322 The Analysis involves use of data for the period 1984-2009

323 5. RESULTS AND DISCUSSION

324 In testing for the appropriate standard Gaussian assumptions, the residuals from estimation
 325 of both equations 2 and 3 were found to be normally distributed, non-serially correlated and
 326 homoscedastic. This inference is based on observed Jarque-Bera value, Breusch-Godfrey
 327 Serial Correlation LM values for the F-statistic and Q-statistic, and F-statistic from the
 328 Breush-Pagan-Godfrey Heteroskedasticity Test. Appropriateness of the specification and
 329 stability of the coefficients are affirmed by the F-statistic value from a Ramsey Reset Test
 330 and the CUSUM and CUSUM of squares test (see Figure 3). As a check on spuriousness of
 331 our results, the residual series was tested for stationarity through the Augmented Dickey-
 332 Fuller Unit Root Test, the outcome of which confirmed stationary (absence of unit root)
 333 nature of the residuals. In checking for issues with endogeneity as often claimed by some
 334 researchers when OLS is used in estimating a regression, a two-stage least squares
 335 estimation of the regression equations was performed (although results not presented here)
 336 and the output was consistent and perfectly in line with that of the OLS; hence we stick to
 337 the use of the OLS output for discussion (output for the control estimation technique is
 338 primarily less informative).
 339

340 In interpreting the results, value of pineapple exports is noted to have a positive association
 341 with production, export price, terms of trade (trade openness) and index of competitiveness
 342 (increased share and quality of exports). Value of pineapple exports however has an inverse
 343 association with domestic consumption (demand) and net inflow of foreign direct investment.

² Use of FDI in level instead of logging it is to make the specification externally valid and pave room for future replication by other researchers. In as much as the values obtained for the period under study are positive, some values for years before the scope of the study (1984-2009) are negative. This could preclude logging for extended period. In addition, data for some countries from the developing world shows negative net inflows in a significant number of years, and using log of FDI may require modification of our specification in situations where researchers want to apply the exact equation in their study.

No significant association is found with respect to real effective exchange rate and lagged volume of exports. The intercept (C) was also found to be highly significant, implying that should conditions in all the other variables remain constant, the value of pineapple exports from Ghana would decrease significantly. This reflects the highly competitive nature of the world pineapple export industry and the relatively low power of Ghana in terms of share on the world market. As shown in appendix 1, value of Ghana's pineapple exports represents only 1.067% of world export shares (and 0.788% in terms of volume), compared to 40.625% (54.269% -volume) for Costa Rica, 14.123% (8.088% -volume) for Belgium, 11.429% (6.556%-volume) for Netherlands, 6.197% (3.232% -volume) for the United States of America and 3.543% (7.881% -volume) for the Philippines. A total of 98.77% of variations in export value are explained by the associations identified in this study. This statement is reflected by the adjusted R-squared value observed.

Table 3. Regression results

Dependent variable	Ln (EXPTVal)		Ln (EXPVol)	
Variables	Coefficient	Std. Error	Coefficient	Std. Error
C	-8.529286 ***	2.239984	-1.621530	2.239984
LnProd	0.980094 ***	0.227825	0.980094 ***	0.227825
LnDomcons	-0.310502 ***	0.065398	-0.310502 ***	0.065398
LnEXPTprice	0.846626 ***	0.123463	-0.153374	0.123463
LnToT	0.757655 *	0.423276	0.757655 *	0.423276
LnREXR	-0.206847	0.240172	-0.206847	0.240172
Ln CEP	0.185686 *	0.088092	0.185686 *	0.088092
FDI	-0.000132 *	0.000070	-0.000132 *	0.000070
LnEXPTVol(-1)	0.199383	0.121832	0.199383	0.121832
R-squared	0.991820		0.983449	
Adj. R-squared	0.987730		0.975173	
Log Likelihood	19.01030		19.01030	
F-statistic	242.5072		118.8358	
Prob (F-statistic)	0.000000		0.000000	
Durbin-Watson Stat	2.250357		2.250357	
Akaike info criterion	-0.800824		-0.800824	
Schwarz Criterion	-0.362029		-0.362029	
Hannan-Quinn criter	-0.679121		-0.679121	
Jarque-Bera	2.436059		2.436059	
Q-stat (1)	0.4582		0.4582	
Q-stat (2)	1.7452		1.7452	
BG-LM Test: F-stat 1	0.466483		0.466483	
BG-LM Test: F-stat 2	0.750313		0.750313	
B-P-G Het: F-stat	0.393497		0.393497	
Rest Test F-statistic	1.638920		0.944763	
ADF of Residual	-5.333056***		-5.333056***	

***significant at the 1% level, *significant at the 10% level

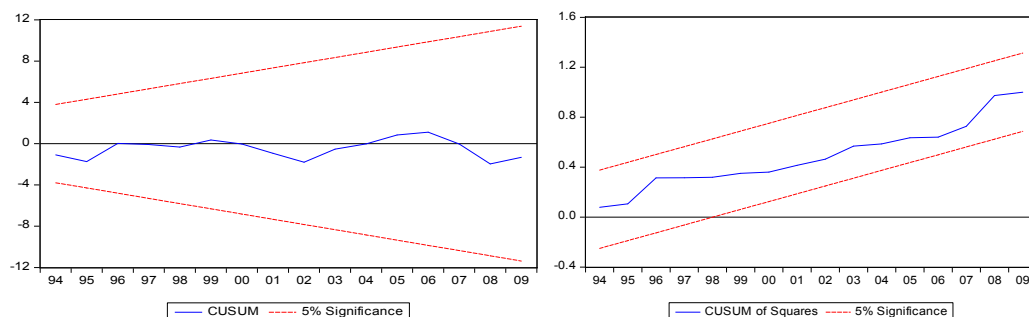


Figure 3 Stability test of coefficients

With the exception of the intercept term and export price which were found to have insignificant effects on volume of pineapple exports, similar associations were observed between volumes of export and all the other variables. Lagged volume of export is observed to have insignificant positive effect on both value and volume of export. This once again affirms the lower share of Ghana's pineapple exports on the world market and potentially, a relatively positive image of previous exports from Ghana. In as much as exports of larger exporting nations could induce an adding-up effect, thereby causing a decrease in price of future exports and possible decrease in exports (both volume and value), the effect observed in case of Ghana is not statistically significant. A total of 97.52% of variations in volume of pineapple exports are explained by the associations observed in this study. By this, with the exception of the insignificant effect of real effective exchange rate and export price observed for output of equation 3, all associations observed are in conformity with our a priori expectation. Associations observed in this study apply only to pineapple exports and may not necessarily reflect effects on agricultural exports in the broader sense.

A one percent increase in domestic production of pineapple leads to a 0.98% increase in both value and volume of exports, significant at the 1% level. Increasing production of pineapple ensures adequate volumes of the produce for both domestic consumption and for exports. Most of the processing and exporting firms in the country are reported by [12] to be out of operation due to lack of pineapples for processing and export. With majority of the smallholders (who supplied about 50% of total volume of exports in the developmental stages of the industry) drifting from the subsector following recent development in the destination markets, as well as decreased productivity driven by changes in other key indicators and policy environment, the annual volumes of pineapple in the country available for export and for meeting domestic consumption needs has decreased significantly, and this in part could be a relevant cause of the recent decline in exports. Increasing production of pineapple in the country, through drafting of incenting measures could go a long way to revitalize the industry. In as much as domestic production has a "boosting" or "pushing" effect on exports, domestic consumption on the other hand, as suggested by [6] has a "pulling effect" on both export volume and value. In the present study, a one percent increase in domestic consumption leads to a 0.31% decrease in both volume and value of export, significant at the 1% level. This observation affirms a suggestion by [Ball, 1996] that at relatively higher levels of domestic demand, the quantity of resources devoted to export is lower. By this, at lower domestic demand, the surpluses obtained from production lead to increased volume (and probably value) of exports. Neutralization of this significant "pulling effect" could be ensured through increasing volumes of production at rates equal to or well above that for domestic consumption

A one percent increase in export price faced by the country leads to a 0.85% increase in value of exports (significant at the 1%), but no significant effect on volume of exports.

Lagged volume of export is noted to have no significant effect on both value and volume of exports. From this we infer that value of Ghana's pineapple exports has been driven more by price faced by exporters than by actual volumes exported. This affirms competitiveness of Ghana in pineapple exports, thus a price-driven export rather than quantity driven exports. In addition export demand is in theory believed to increase with a drop in price and vice versa, however, the inverse association observed in this study between price and volume of exports is insignificant. This is an indication of competitive advantage of Ghana in export of the commodity. Improving on the quality of the country's exports, and attracting higher prices could therefore go a long way to increase value of pineapple exports from Ghana. The index of openness to trade (capture by Term-of-Trade index of exports) is observed to be positively associated with both value and volumes of export. A one percent increase in this index leads to a 0.76% increase in both value and volume of export, significant at the 10% level. Being open to trade opens doors to greater opportunities for countries that are purposed on diversifying their exports. In addition, it promotes efficiency in production and export through exposing the countries involved to fierce competition on the global market. Such exposure ensures drafting and implementation of export-growth enhancing policy measures, which go a long way to firmly anchor beneficial export trade in such countries. The effect of the index of openness to trade on exports as observed in this study is in conformity with a study by [19] for Uganda.

The index of competitiveness (captured by CEP-Comparative Export Performance) is observed to enhance both value and volume of exports, and the effect is significant at the 10% level. In as much as the association is positive and significant, the responsiveness is quite low, implying that increase in share and quality of pineapple exports from Ghana, although increase volumes and value of exports, such increases have been quite low. This is due to the fact that increases in volume of exports haven't been continuous and there equally have been quite some quality challenges in the sector. Slow adaptation of the country to shifts and developments in the global pineapple market, generally precludes the country from exploiting beneficial (or profitable) developments to the maximum. With the country's export having no significant adding up effect on world exports, increasing both the volumes and quality of pineapple exports from the shores of Ghana could help revitalize the sector and position it positively in wait for profitable developments in the near future.

Noted in empirical literature, the role of FDI in export promotion in developing countries has been quite controversial. In as much as some studies find a positive effect of FDI on export promotion [e.g. 20], others find insignificant or weak effect of FDI on exports [e.g. 14]. Highlighted in such studies, the effect of FDI depends on the motive for such investment. Tariff-jumping types of investment that have a primary purpose of capturing domestic market mostly do not contribute to export growth [18], while export-oriented investments generally contribute to export growth by taking advantage of a country's comparative and competitive advantages. Observed in Ghana, most of the investments noted so far have been towards capturing domestic markets (with majority being towards value addition to meet domestic demand and jumping tariff through establishment of both local and foreign centers of trade). Such investments tend to hamper trade, and the pineapple industry is not an exception with this experience. In the present study, a one percent increase in net inflow of foreign direct investment is associated with a 0.013%³ decrease in both value and volume of pineapple exports, significant at the 10% level.

In summary, should there be no major improvements in current economic, policy and marketing environment, value of pineapple exports will decrease significantly with time, although the decrease in volume may not be significant. In as much as value of exports is

³ 0.013% = 100(e^(-0.000132)-1), where "e" represents exponential.

driven by prices faced by exporters, the effect of export volumes on the value is relatively insignificant. Both value and volume of pineapple exports from Ghana are noted to increase with increases in production, openness to trade and improvements in export performance. They however decrease with increases in domestic consumption and net inflow of foreign direct investment, based on the domestic market capturing and tariff jumping nature of majority of such investment. Real effective exchange rate (as a surrogate measure of incentive) is found to have no significant effect on both value and volume of pineapple exports from Ghana.

4. CONCLUSION

In identifying the key determinants of pineapple exports from Ghana, effort was made to estimate separate regressions with value of exports and volume of exports being the explained variables in the respective regressions. The study reveals that, should conditions for all the variables considered remain constant, value of pineapple exports from Ghana would with time decrease significantly. This reflects the highly competitive nature of the pineapple industry globally, and a need for Ghana to learn to adapt appropriately to market shifts in the shortest possible time. Both value and volume of exports were found to have a positive association with production, openness to trade and improvement in quality and share of exports (captured by the CEP index). Both however have negative association with domestic demand and foreign direct investment, with effect from the latter case being attributed to the tariff-jumping and domestic market capturing motive of majority of such investments in the country. A positive association was as well observed between export price faced by exporters and the value of pineapple exports. The corresponding association in terms of volume of exports however was not significant. The effect of lagged volume of export on both current value and volume of export was not significant. This implies that, Ghana's pineapples export is more price-driven than volume driven, an attribute reflecting competitive advantage of the country in pineapple export. To increase both value and volumes of export, incensing measures should be put in place to attract more farmers into the pineapple subsector to ensure increased volume of pineapples for exports and domestic processing. In addition measures should be put in place to improve the quality of pineapples (both Smooth cayenne and MD2) exported from the country and current and possible future distortions to trade should be minimized and if possible avoided. Although foreign direct investments are generally perceived to complement efforts by domestic industries to restructure production and export facilities and institutions, efforts made in the future to attract foreign direct investment should place strong emphasis on identification of the motive behind such investment. In so doing, emphasis should not only be placed on achieving benefits from FDI inflows, but in attracting FDI with export growth motive; hence if attraction of such investment is to enhance export growth, domestic market capturing and tariff jumping types of investment should be minimized.

COMPETING INTERESTS

No competing interests exist

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APPENDIX 1: WORLD EXPORTS OF PINEAPPLE

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Region/Country	2007/2008	2008/2009	2009/2010	2010/2011	4-year average	Share, %
Volume of exports (tonnes)						
World	2,884,571	2,849,733	2,908,082	3,146,214	2,947,150	
Africa	102,568	94,103	81,516	130,032	102,055	3.463
Americas	1,870,632	1,889,129	2,041,255	2,114,977	1,978,998	67.150
Asia	328,478	250,105	208,368	304,534	272,871	9.259
Europe	582,860	616,259	576,836	596,588	593,136	20.126
Oceania	33	137	107	83	90	0.003
Belgium	234,123	273,014	229,022	217,359	238,380	8.088
Brazil	32,566	19,818	1,886	2,238	14,127	0.479
Costa Rica	1,458,975	1,511,458	1,677,702	1,749,363	1,599,375	54.269
Cote d'Ivoire	69,201	54,443	54,956	64,116	60,679	2.059
Germany	30,648	31,263	37,545	41,604	35,265	1.197
Ghana	17,819	19,112	9,971	45,999	23,225	0.788
Italy	18,500	18,566	21,875	20,480	19,855	0.674
Netherlands	216,131	197,038	175,193	184,464	193,207	6.556
Philippines	219,825	209,532	164,650	263,019	232,257	7.881
United Kingdom	9,294	21,364	19,032	25,535	18,806	0.638
United States of A.	90,512	88,108	99,076	103,300	95,249	3.232
European Union	582,492	615,831	576,419	596,317	592,765	20.113
Value of exports (\$1000)						
World	1,555,447	1,513,907	1,543,218	1,727,204	1,584,994	
Africa	43,172	35,882	32,462	91,174	50,673	3.197
Americas	814,171	839,997	919,315	962,169	883,913	55.769
Asia	80,557	70,583	63,916	89,479	76,134	4.804
Europe	617,493	567,270	527,379	584,230	574,093	36.222
Oceania	54	175	146	152	132	0.008
Belgium	239,429	240,854	206,754	208,312	223,837	14.123
Brazil	16,381	10,580	980	1,402	7,336	0.463
Costa Rica	574,921	604,517	677,392	718,725	643,889	40.625
Cote d'Ivoire	29,110	21,528	21,528	27,112	24,820	1.566
Germany	37,588	35,887	42,407	47,804	40,922	2.582
Ghana	6,260	6,692	3,531	51,144	16,907	1.067
Italy	18,032	16,117	18,270	17,234	17,413	1.099
Netherlands	224,055	179,581	150,628	170,327	181,147	11.429
Philippines	61,653	53,115	42,359	67,491	56,155	3.543
United Kingdom	9,960	17,485	15,808	22,145	16,350	1.032
United States of A.	93,405	89,096	102,735	107,659	98,224	6.197
European Union	616,925	566,792	526,887	583,708	573,578	36.189

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Region/Country	2007/2008	2008/2009	2009/2010	2010/2011	4-year average	Share, %
Volume of Imports (tonnes)						
World	2,634,601	2,557,583	2,714,371	2,918,151	2,706,177	
Africa	5,997	5,709	6,919	10,695	7,330	0.271
Americas	857,595	845,671	955,589	1,047,269	926,531	34.238
Asia	303,681	279,832	310,136	378,552	318,050	11.753
Europe	1,459,246	1,420,659	1,434,977	1,477,502	1,448,096	53.511
Oceania	8,082	5,712	6,750	4,133	6,169	0.228
Belgium	309,156	290,252	258,827	232,054	272,572	10.072
China	19,310	23,027	34,216	59,737	34,073	1.259
Germany	173,060	202,557	183,325	191,956	187,725	6.937
Italy	149,255	140,453	142,105	151,300	145,778	5.387
Netherlands	228,079	198,087	213,781	232,850	218,199	8.063
Switzerland	19,170	21,420	22,716	21,980	21,322	0.788
United Arab Emir.	26,468	10,837	10,263	12,110	14,920	0.551
United Kingdom	125,932	144,518	155,257	167,513	148,305	5.480
United States of A.	713,584	712,945	815,872	817,131	764,883	28.264
European Union	1,384,862	1,349,788	1,350,407	1,392,416	1,369,368	50.602
Value of Imports (\$1000)						
World	2,328,083	2,113,159	2,208,242	2,373,622	2,255,777	
Africa	3,785	3,676	4,521	5,362	4,336	0.192
Americas	641,863	629,823	698,701	699,731	667,530	29.592
Asia	200,452	192,940	214,604	275,069	220,766	9.787
Europe	1,474,373	1,280,652	1,283,358	1,388,453	1,356,709	60.144
Oceania	7,610	6,068	7,058	5,007	6,436	0.285
Belgium	292,932	239,201	209,280	201,388	235,700	10.449
China	11,731	13,835	20,788	38,221	21,144	0.937
Germany	185,502	195,870	179,339	200,509	190,305	8.436
Italy	144,871	122,539	122,270	134,850	131,133	5.813
Netherlands	218,588	160,079	175,212	195,699	188,895	8.374
Switzerland	27,005	27,437	28,098	30,374	28,229	1.251
United Arab Emir.	19,483	4,358	4,964	4,660	8,366	0.371
United Kingdom	141,203	137,219	138,751	157,236	143,602	6.366
United States of A.	531,854	527,180	585,167	550,420	548,655	24.322
European Union	1,398,160	1,207,915	1,193,479	1,287,694	1,271,812	56.380

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608 Source: Authors computation with data from FAO (Agricultural Trade Database)

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