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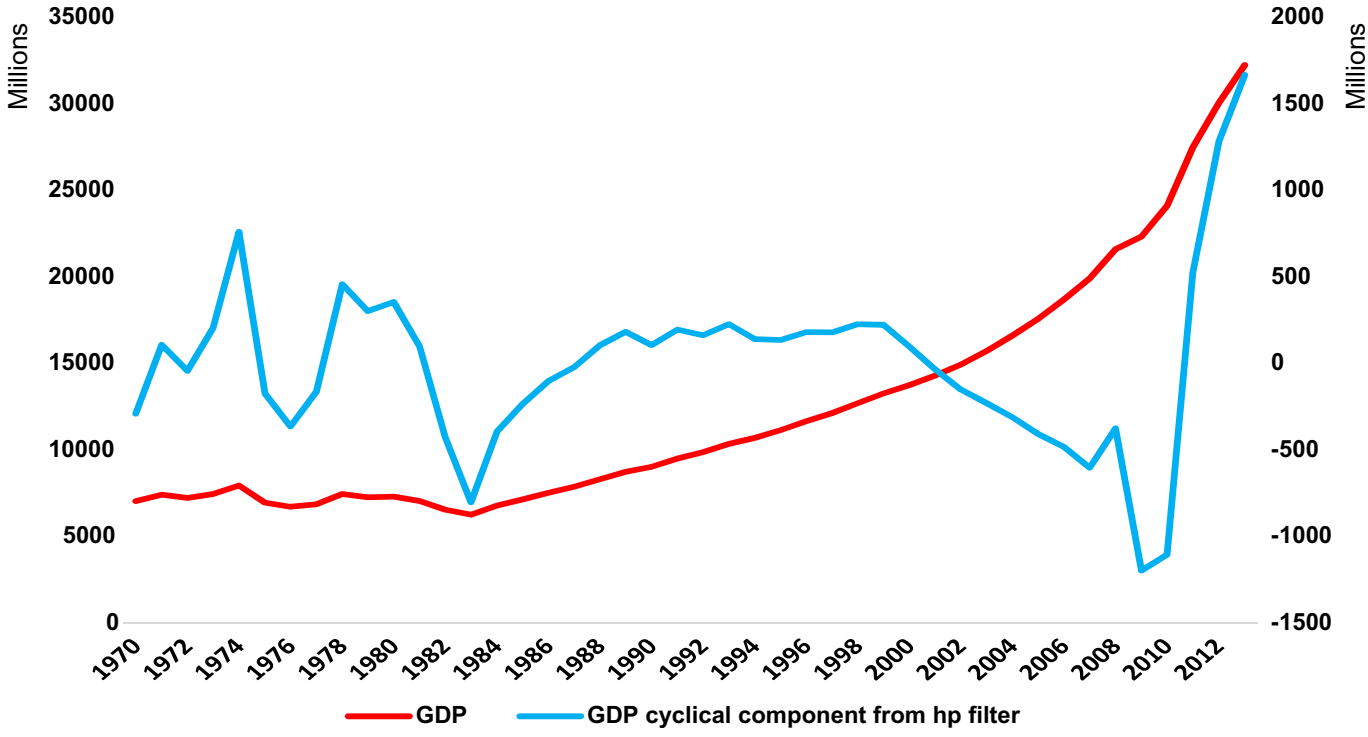

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Trade openness and economic growth volatility: An empirical investigation

Kwame Mireku[1]*, Ellen Animah Agyei[2#] and Daniel Domeher[1]

Abstract: This paper investigated the impact of trade openness on economic growth volatility of Ghana from 1970 to 2013, using cointegration and error correction techniques. Our findings show that both the long and short run economic growth volatility is positively influenced by changes in trade openness. Volatility in domestic credit to private sector, shocks after the economic liberalization and financial openness contributed negative to economic growth volatility in the short run. The major policy implication of our paper is that developing economies should take into consideration their own realities in their trade policies to limit economic growth volatility.

Subjects: Economics; Political Economy; Finance

Keywords: Ghana; trade openness; economic growth volatility; ARDL cointegration

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1. Introduction

Despite being the integral force behind technological change, economic growth and development of developing economies have remained susceptible to the uncertainties of trade liberalization (see Di Giovanni & Levchenko, 2009; Haddad, Lim, Pancaro, & Saborowski, 2013). Many are of the view that trade openness increases capital mobility and as such necessary to augment economic growth and

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Daniel Domeher is a banking and finance lecturer. Domeher's research interest includes Real Estate Financing in the Developing World, Property Rights Economics, Financial Innovations, Risk Management, Economic Growth and Poverty Reduction amongst others.

Since economic growth has rippling effect on the Ghanaian economy and we have interest in conducting research into how the economic growth of Ghana can be improved we came together to conduct this study. Ellen has been researching on trade openness for some time now so it was quite fascinating to link this area to economic growth. Base on our research interest, we want to explore further by looking at financial stability, financial innovations and economic growth.

PUBLIC INTEREST STATEMENT

The extent to which a developing country trades (imports and exports) with the rest of the world may increase or decrease the uncertainty in its economic growth. However, in Ghana, it is not yet known whether trade amplifies or curtails economic growth uncertainty. This study used world Development data (1970–2013) to find out the relationship between trade and economic growth uncertainty in Ghana. The results show that more trade in Ghana increases the uncertainty in economic growth in both the short run (within a year) and the long run (beyond a year). Hence, Ghana should promote policies that would promote the technical knowledge and skills of manufacturing imported goods and incentives to increase export so as to promote economic growth and facilitate the fight against poverty.

welfare. Others, argue that more openness could exacerbate the economies response to external vulnerability and shocks (Haddad et al., 2013). Emerging economies are therefore faced with the challenge of striking a balance between the benefits and risks of trade openness. In fact, many of the crises and instabilities in developing countries have been linked to shocks from international trade. But this ideology is not far-fetched as trade openness can bring better risk sharing and well-diversified investment portfolios vital in mitigating shocks on economic growth and development (Bekaert, Harvey, & Lundblad, 2006). This said, countries with higher trade openness are less prone to volatility partly due to the increased sectorial specialization which increases trade volume and decline in output volatility (see Calderon, Loayza, & Schmidt-Hebbel, 2006; Haddad et al., 2013). Conversely, Razin, Sadka, and Coury (2003) show that trade openness can exhibit adverse effect on economic growth by amplifying uncertainties in the macroeconomic fundamentals.

In Ghana's experience, there has been periods of steady growth as well as instability (see Bawumia, 2010; Quartey, 2005). Numerous policy directions and changes have reflected in the trends of the economic growth in the country (see Figure 1). After independence, Ghana sought to industrialize its economy by adopting import-substitution policies as the way to promote economic growth. The free market ideology that favoured outward-oriented, export-led trade regime was rejected for an inward-oriented, import-substitution trade policies. This was done by restricting imports of manufactured goods which already had a domestic demand. Although the country continued to follow substitution approach to growth until the 1980s, Ghana had to borrow heavily from the international market in order to cope with its trade-deficit problems (Baldwin & Winters, 2004; Quartey, 2005).

Trade liberalization policy was first introduced as part of Ghana's Economic Recovery Program (ERP) and the Structural Adjustment Program (SAP) to increase the free flow of goods and services amongst its trading partners. Ghana's trade regime shifted towards more open, market-oriented and outward-oriented policies (Idun & Aboagye, 2014; Sakyi, Villaverde, & Maza, 2015). With the adoption of trade liberalization policies, it was believed that the country would derive the benefits already outlined above which would work together to ensure macroeconomic stability and sustained economic growth (Sakyi et al., 2015). The economic impact of trade openness, however, remains persistent in most policy debates in Ghana. Fundamental to these policy debates is the issue of trade openness on the economic growth volatility. Openness increases an economy's susceptibility to external shocks and could lead to higher volatility in trade flows and economic growth. Therefore, the relationship between trade openness on the economy should not be limited to just economic growth but also economic growth volatility. There is however, currently no known study that examines empirically the impact of trade openness on economic growth volatility in Ghana. The current paper thus seeks to contribute to the existing literature by empirical evidence to support the

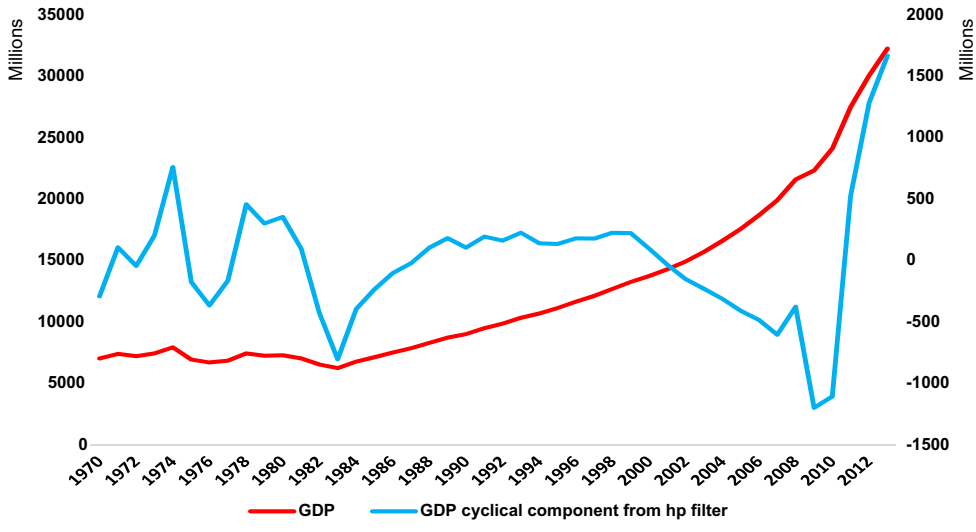

Figure 1. Historical trend of real GDP and GDP volatility in Ghana (1972–2013).

trade openness and economic growth volatility argument in Ghana. The paper has important policy implications. From academic point of view, this study presents additional evidence concerning the impact of trade openness on economic growth of developing economies with similar characteristics such as Ghana. Similarly, the findings of the study would provide policy-makers with relevant empirical evidence relating to the effect of free trade on Ghana's economic growth and development.

Our results suggest that changes in trade openness contribute to both short- and long-run economic growth volatility in Ghana. We find that the erratic growth volatility in Ghana is negatively affected by domestic credit to private sector and financial openness in the short run. Shocks after the economic liberalization are also found to pose negative effect on economic growth volatility.

The next section presents a brief literature review followed by data and methodology, Section 4 discusses the empirical results and Section 5 concludes with policy implication.

2. Literature review

2.1. Trade openness and economic growth volatility

Theoretically, the relation between trade openness and economic growth volatility has been advanced through the compensation hypothesis (see Down, 2007; Ehrlich & Hearn, 2013). According to this theory, economic growth volatility is seen as the consequential effects of exposure to international markets. This said, the proponents of the theory suggest that increased trade exposure heightens domestic economic volatility. The theory assumes that economies with larger public sectors tend to be more opened and susceptible to economic shocks due to the likelihood of external risk to government spending. However, Down (2007) argued that the expansion of international trade into more stable and larger markets should facilitate risk diversification by promoting rather than deteriorating economic stability. A divergent approach based on economic theory also conclude that smaller economies have higher tendencies of greater volatility than larger economies. This therefore exacerbates their level of insecurity in the global market (Ehrlich & Hearn, 2013).

Though, research has been conducted on the trade openness–economic growth nexus, most these studies are based on developed economies (Down, 2007; Ehrlich & Hearn, 2013). This said, paucity of empirical research exist on the relationship between trade openness and economic growth volatility in developing economies especially Sub-Saharan Africa, whose economies are heavily dependent on international trade. Since the impact of trade openness on economic growth volatility varies greatly due to country-specific characteristics, an empirical studies from developing economies on the said "theme" should be encouraged. Sakyi et al. (2015) using panel data on a sample of 115 developing economies from the period 1970–2009 found a positive bidirectional relationship between trade openness and economic growth, which the authors attributed to the consequential effects of the trade openness. Using cross-country data on 141 countries from 1970–2002, Cavallo and Frankel (2008) show that trade openness reduces the vulnerability of economies to severe sudden stops and currency crashes, and that the relationship is even stronger when correcting for the endogeneity of trade.

Employing industry-level panel data-set of manufacturing production and trade from 1970–1999, DiGiovanni and Levchenko (2009) found that the positive and significant relationship between trade openness and overall volatility. Openness increases an economy's susceptibility to external shocks and could lead to higher volatility in trade flows and economic growth. Contrary, Cavallo (2005) concludes that trade openness reduces growth volatility. By reinforcing this argument, Calderon and Schmidt-Hebbel (2008) reveal a negative relationship between openness and volatility only when export is diversified. The authors also established that countries with higher trade openness were less prone to output drops, and countries with higher financial openness were more likely to experience sharp drops in real output only if their external liabilities are more biased towards debt than

equity. Razin et al. (2003) argue that trade openness is associated with economic growth instability and as a result can lead to economic recession. Calderon et al. (2006) find strong varying effects of openness towards external shocks on growth and volatility. Kose et al. (2003) show that trade openness increases the volatility of output and consumption growth in emerging market economies and reduces the volatility of consumption growth relative to that of income growth. Easterly, Islam, and Stiglitz (2001) conclude on bidirectional effect of trade openness on economic growth. The authors reveal that whilst trade openness enhances growth and specialization, shocks from terms of trade may exacerbate the economies vulnerability thereby raising growth volatility. Employing data on 85 countries, Kose, Prasad, and Terrones (2006) find positive relationship between economic growth volatility and trade integration. However, the authors found no relationship between financial integration and economic growth volatility from period 1960–2000. Similarly, using data from the period 1996–2009, Fujii (2015) finds significant positive association between trade openness and output volatility in Japan.

3. Methodology

3.1. Data and model specification

We employ World Bank annual time series data on Ghana from the periods 1970–2013 for the analysis. We use the autoregressive distributed lags (ARDL) bound tests to cointegration to examine the long- and short-run trade openness and economic growth nexus (Pesaran, Shin, & Smith, 2001). In addition, we control for the effects of financial sector development volatility, financial openness, inflation and exchange rate. As these factors influence the variability of Ghana's economic growth and development. Following Di Giovanni and Levchenko (2009) and Baliamoune-Lutz and Ndikumana (2007), we estimate the following specific stochastic regression model:

$$YVOL_t = \alpha_0 + \beta_1 OPN_t + \beta_2 DVOL_t + \beta_3 KAOPEN_t + \beta_4 INF_t + \beta_5 EXC_t + \beta_6 DUM_t + e_t \quad (1)$$

where $YVOL_t$ represents of the output growth volatility[1]; OPN_t measures of trade openness; $DVOL_t$ is financial sector development volatility (proxied by the cyclical component of domestic credit to private sector as a percent of GDP); INF_t is inflation; EXC_t is the average period exchange rate; $KAOPEN_t$ [2]represent financial openness (proxied by intensity of capital controls), we account for potential structural break in the dependent variable by constructing a shift dummy taking the value of zero (0) for periods before the economic and financial liberalization (i.e. 1970–1983) and one (1) periods after the liberalization (i.e. 1984–2013), which accounts for the regime change after the implementation of the ERP and SAP programmes in Ghana. All variables are in their natural log forms except KAOPEN which contains negative values and the regime change variable.

3.2. Empirical strategy

Estimating the model in equation using time series data is not without challenges. Since the assumptions underlying standard estimators do not hold in many macroeconomic time series studies, estimating our model using by ordinary least squares would be inappropriate. To overcome this, our identification strategy follows three sequential steps. The first step involves determining the order of integration of the individual series by allowing for endogenous detection of structural breaks. This allows us to discriminate between variables that are non-stationary and those that are stationary but with significant break in either the mean or trend or both. Both Philip–Perron Unit root and Perron and Vogelsang (1992) additive test for unit root and endogenous detection of structural breaks are used. The second step involves testing for the existence of level (cointegration) relationship between the variables. To achieve this, we employ autoregressive distributed lag model (ARDL) bounds test approach to cointegration due to Pesaran et al. (2001). The ARDL approach does not only offer some advantages[3] over the conventional cointegration technique but also fits well with the nature of the data used in this present study. The ARDL approach which is a single reduced form equation allows the long-run relationship of variables to be estimated irrespective of their order of integration; whether purely $I(0)$ or $I(1)$ or mutually or fractionally integrated. However, the ARDL fits well for small samples (see Pesaran et al., 2001). To estimate the error correction model of the ARDL

framework of the effect of trade openness on economic growth volatility in Ghana, the following transformed version of Equation (1) is used:

$$\Delta YVOL_t = \alpha_0 + \sum_{i=1}^{m} \phi_1 \Delta YVOL_{t-1} + \sum_{i=1}^{l} \gamma_i \Delta V_{t-1} + \lambda_1 YVOL_{t-1} + \lambda_2 V_{t-1} + \delta_3 \mathrm{ECT}_{t-1} + \varepsilon_t \quad (2)$$

where V is a vector of natural log of the explanatory variables: trade openness, financial sector development, inflation, exchange rate and financial openness. ϕ, γ represent the short-run coefficients and δ shows the extent of disequilibrium correction from short to long run. *ECT* represents the error correction term. The existence of a long-run relationship is estimated using the computed *F*-statistics. The null hypothesis of no cointegration amongst the variables in Equation (2) is stated as $H_0{:}\lambda_1 = \lambda_2 = 0$ against the alternate hypothesis of $H_0{:}\lambda_1 \neq \lambda_2 \neq 0$. The decision on whether to reject or not to reject the null hypothesis of no cointegration depends on the size of the computed *F*-statistic as against the upper and lower critical values. If the computed *F*-statistic is more than the upper critical value, the null hypothesis of no cointegration is rejected and the conclusion of cointegration made that the explanatory variables and the dependent variable share long-run level relationship. If the calculated *F*-statistic is lower than the lower critical value, then the null hypothesis of no cointegration cannot be rejected irrespective of the order of integration (Pesaran et al., 2001).

4. Empirical results and discussion

In this section, we present and discuss the empirical results from the unit root tests, cointegration and the long- and short- run results of the ARDL framework. The unit root results are presented in Table 1. The results suggest that all the variables are non-stationary in levels except economic growth volatility, financial sector development and inflation at 1, 5 and 10% levels of significance, respectively. To test for structural breaks in the series, we use the Perron and Vogelsang (1992) Additive outlier test. The results of the structural break test largely indicate absence of unit root without structural breaks except for the economic growth volatility, financial sector development volatility and financial openness indicators which correspond with the periods where the Ghanaian economy experienced series of economic shocks. Given the blend of level and first-order variables, the series achieved stationarity after the first difference. Thus, the presence of both $I(0)$ and $I(1)$ clearly justifies our use of the ARDL bound test to cointegration framework.

Given the above order of integration, we proceed to test whether or not a long-run relationship exists between the economic growth volatility and its covariates. We proceed to test the cointegration relationship using the bound test. The results of the cointegration test is presented in Table 2. The results of the bound test to cointegration suggest the rejection of the null hypothesis of no cointegration relationship between the series as the estimated *F*-statistics for the model is greater

Table 1. Unit root and structural break test

	Phillip-Perron		Perron and Vogelsang (1992) Additive outlier		
	Without trend	With linear trend	Break in mean	Break in trend	Break in both
YVOL	−3.892***	−3.855**	−4.951 (1979)**	−4.650 (2013)**	−5.120 (1986)*
DVOL	−4.509***	−4.468***	−5.425 (1982)***	−4.721 (1982)**	−5.760 (1983)***
OPN	−1.127	−2.260	−3.081 (1974)	−3.079 (1976)	−4.040 (1981)
INF	−2.681*	0.091	−2.370 (1977)	−2.764 (1988)	−3.008 (1981)
EXC	−0.760	−1.119	−3.012 (1980)	−3.211 (1999)	−3.185 (1998)
KAOPEN	−2.495	−2.507	−6.289 (1992)***	−2.914 (2013)	−6.256 (1992)***

Note: Structural break dates in parenthesis.

*$p < 0.1$ significance level.

**$p < 0.05$ significance level.

***$p < 0.01$ significance level.

Table 2. Bounds test for cointegration relationship

Critical values bounds of *F*-statistics intercept and no trend						
K	99%		95%		90%	
	I(0)	*I*(1)	*I*(0)	*I*(1)	*I*(0)	*I*(1)
6	3.15	4.43	2.45	3.61	2.12	3.23
Model		Computed *F*-statistics			Decision	
F_{YVOL} (YVOL|, OPN, DVOL, KAOPEN, INF, EXC, DUM)		4.220482***			Cointegration	

Note: *K*—number of regressors. Simulated critical based on Pesaran et al. (2001).

***$p < 0.01$ level.

than the critical values of the upper bounds at 5% level. This therefore suggests the existence of a stable long-run relationship between the variables used in each of the models. Having established the presence of cointegrating relationship for the growth volatility model, we present and discuss the long- and short-run relationship in Tables 3 and 4, respectively.

Tables 3 and 4 report the summaries of the long-run and short-run elasticities of our model specification, respectively. In line with prior studies (see DiGiovanni and Levchenko 2009; Kose et al., 2006), we find positive and significant relationship between trade openness and economic growth volatility ($\beta = 0.071$, $p < 0.1$). Intuitively, the results reveal that a percentage point increase in trade openness would "all things being equal" raise economic growth volatility by approximately 0.07%. This finding is of threefold. First, the positive trade openness–economic growth volatility nexus could be attributed to the direct impact of the rise in foreign direct investment and multinational firms operating in the country. Thus, oil-related foreign direct investment from the discovery and production of crude oil in commercial quantities could have boosted the growth in output hence the rise in economic growth volatility. This notwithstanding, the rise in the economic growth volatility in Ghana mimics the rising pattern of cross-border investments from China, Dubai and Saudi Arabian multinational firms in the mining and tourism subsectors (IMF, 2014).

Secondly, the results may be linked to the series of bilateral and multilateral trade advantages the economy has experienced after the economic liberalization. Thus, the increased access of the economy to international capital market and trade agreements such as the African Growth and Opportunity Act (AGOA), increased Ghana's economic growth prospects hence the volatility. Thus, reiterating findings of prior studies (see Down, 2007; DiGiovanni and Levchenko 2009; Ehrlich & Hearn, 2013), the positive nexus between trade openness and economic growth volatility is explained by the compensations that come with trade openness as demonstrated by the compensation hypothesis. Third, the positive linkage between trade openness and economic growth volatility could be associated with the change of trade policies from restrictive and import-led substitution policies to export-led policies. Thus, the change to export-led trade policies decreased the erratic trend in economic growth experienced after the Economic Recovery and Structural Adjustment

Table 3. Long-run estimates for the ARDL models

	Coefficient	Standard error	*t*-statistics
OPN	0.070584	0.038698	1.823956*
DVOL	0.000080	0.056503	0.001410
KAOPEN	−0.035029	0.017891	−1.957908*
INF	0.012892	0.022316	0.577680
EXC	−0.024691	0.028900	−0.854365
DUM	0.014984	0.036922	0.405824
Intercept	−0.427213	0.276093	−1.547351

*Significant at 10% level, Model selection is based on the Akaike Information criterion ARDL (1, 0, 2, 0, 0, 0, 1).

Table 4. Short-run error correction for the ARDL models

	Coefficient	Standard error	*t*-statistics
Δ OPN	0.052261	0.028705	1.82063*
Δ DVOL	−0.052437	0.024928	−2.103529**
Δ KAOPEN	−0.025936	0.013778	−1.882345*
Δ INF	0.009545	0.016411	0.581647
Δ EXC	−0.018282	0.021091	−0.866809
Δ DUM	−0.088395	0.033352	−2.650338**
Intercept	−0.316312	0.201050	−1.573295
ECT_{t-1}	−0.740408	0.132947	−5.569189***
F-statistics	5.202356***		
DW-statistics	1.979488		
Normality	0.937486 [0.6258]		
Serial Correlation	0.870961 [0.4292]		
Heteroscedasticity	1.712218 [0.1223]		
Misspecification	0.403077 [0.6898]		
CUSUM	Stable		
CUSUMQ	Stable		

*Significant at 10% levels.

**Significant at 5% levels.

***Significant at 1% levels.

Model selection is based on the Akaike Information Criterion ARDL (1, 0, 2, 0, 0, 0, 1).

Programmes (see Bawumia, 2010; Quartey, 2005) due to the institution of import controls and import substitution agenda of the government which negatively influence the balance of payment position of the country.

Theoretically, capital openness measures the restriction to cross-border capital flows. It is assumed that elimination of restrictions on cross-border financial transactions increases the extent of economic growth volatility via increase foreign direct investment. Contrary to this evidence, we report negative relationship between the financial openness and economic growth volatility ($\beta = -0.035$, $p < 0.1$). Thus, the results show that a percentage point rise in the financial openness would reduce economic growth volatility by approximately 0.035%. This outcome is intuitive for the case of Ghana. The reason for the negative nexus may be attributed to attempts of the country to shield itself from risk associated with fluctuations in international capital movement. This notwithstanding, capital flight and repatriation of profits by multinational firms operating in the country could also be linked to the negative nexus between financial openness and economic growth volatility (Idun & Aboagye, 2014). Consequently, we report insignificant relationship for financial sector development volatility, inflation and exchange rate in the long run.

Our short-run results from the ARDL framework and its associated diagnostic tests are reported in Table 3. To check the reliability of our results, we compute a series of diagnostic tests after the error correction model. The diagnostic tests suggest that our model passes all specification tests applied in the regression. The results mainly suggest the absence of model misspecification, serial correlation, heteroskedasticity errors and non-normality in the residuals. The estimated *F*-statistic of 5.202356 ($p < 0.01$) shows a very good fit of the model, confirming its predictive ability. The ECT_{t-1} is the lagged error correction term measuring the speed of adjustment following a shock to the system; thus linking the short-run deviations to long-run equilibrium. Our results show a significant negative coefficient for the $ECT_{t-1,}$ suggesting the magnitude of the speed of adjustment from the short-run to long-run equilibrium is very high. The convergence speed to the equilibrium is corrected

annually by 74.04 in the model. The CUSUM and CUSUMQ from Brown, Durbin, and Evans (1975) also indicate model stability at the 5% significance level.

Consistent with our long-run results, we report a positive and significant short-run relationship between trade openness and economic growth volatility ($\beta = 0.052$, $p < 0.1$). A percentage point rise in trade openness is likely to increase output growth volatility by 0.052% in the short run. This confirms evidence from Kose et al. (2003), DiGiovanni and Levchenko (2009) and Fujii (2015) in Japan, suggesting that increased trade exposure heightens domestic economic volatility. This finding is imperative for the case of Ghana partly due to the over dependence of the service sector on imports. Thus, trade imbalances contribute to the upswings in the output growth. Similarly, we argue that the output growth volatility may be associated with the economy lack of comparative advantage over the production and processing of certain primary commodities. Thus, fluctuations in world market prices of these commodities inherently translates into higher or lower output growth.

Contrary to the long-run elasticity, we report negative and significant relationship between economic growth volatility and financial sector volatility ($\beta = -0.052$, $p < 0.05$). The negative magnitude of the impact affirms the fact that crowding out effect on financial sector fluctuations remains an important issue to output growth in Ghana. Intuitively, we argue that the negative nexus may emanate from the fact that fluctuations in the growth of domestic credit is influenced by excessive government borrowing which channel majority of inflows into external debt servicing. This therefore, reduces the amount of capital available to the private sector. Similarly, this finding could be linked to the savings behaviour amongst households and firms. Consistent with the long-run results, we show negative but significant relationship between financial openness and economic growth volatility ($\beta = -0.035$, $p < 0.1$), revealing that less restriction on capital inflow and outflow raises economic volatility by approximately 0.035 per cent annually. Though, the magnitude is minimal the ensuing effect could trickle down to other sectors of the economy which may hamper growth. However, the highly significant and negative nexus between the dummy variable and economic growth volatility ($\beta = -0.088395$, $p < 0.01$) in the short-run suggest that output growth has been erratic after the periods of the economic liberalization. This finding in imperative for Ghana. Like many developing economies in Sub-Saharan Africa, Ghana has experienced severe macroeconomic instabilities from external shocks after the liberalization. For instance, the high cost of capital, inflationary pressure, pronounced exchange rate depreciation and fall in world prices culminated into economic growth uncertainties after the liberalization (see Bawumia, 2010). We report insignificant impact of inflation and exchange rate on Ghana's economic growth volatility over the sample period.

5. Concluding remarks

This paper investigated the impact of trade openness on economic growth volatility of Ghana from 1970 to 2013, using cointegration and error correction techniques. Our findings suggest that the long-run economic growth volatility is positively influenced by changes in trade openness but negative with financial openness. The short-run results, on the other hand, reveal that economic growth volatility in Ghana is positively influenced by trade openness. The findings further show that volatility in the domestic credit to private sector and financial openness have negative impact on economic growth volatility in the short run. Notwithstanding, the results also suggest that the erratic volatility in the economic growth is negatively influenced by inherent shocks after the economic liberalization. Our findings provide important policy implications. First, the trade openness–economic growth volatility nexus supports the compensation hypothesis as economic growth becomes susceptible to shocks from excessive government spending which trickles to the productive sectors of the economy. This said, to promote trade openness policy in Ghana, specialization in the production of certain commodities should be encouraged especially through tax-incentive policies and capacity building programmes that contribute to an increase in exports volume and risk diversification. This will help reduce the over-reliance of the Ghanaian economy on imports hence correct the worsening terms of trade and balance of payment position of the country. Also, we recommend to policy-makers to give more credence and priority to the service sector by extending the current level of technical knowledge to increase the economy's comparative advantage over the production of certain services.

Lastly, we encourage policy-makers to implement policies that may increase financial openness but restrict the outflow of capital from the economy. This will help stabilize the inherent volatility in the economy. This notwithstanding, stabilization in the flow of domestic credit is recommended via lower lending rates in the financial sector to improve private sector participation hence economic growth.

Each study has got its limitation, the current study is limited to Ghana and hence cannot be generalized to other geographical jurisdictions. It would be interesting to extend this study to include other economies as well as investigate whether the compensation hypothesis holds.

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Notes
1. We employ HP filter to decompose the real GDP and domestic credit to private sector into their cyclical and permanent components. The cyclical component is then used as the volatility indicator for the analysis. Cariolle and Goujon (2015) provides advantages for the use of HP filter in measuring volatility.
2. KAOPEN refers to the intensity of capital controls. KAOPEN is based on the binary dummy variable that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (see Chinn & Ito, 2008; Ito, 2006).
3. The ARDL framework does not impose strict exogeneity assumptions and allows the inclusion of regressors with stationarity and non-stationarity or fractionally distributed properties. Comparative to the conventional cointegration techniques, the ARDL is applicable in estimating cointegration with small sample size.

Cover image
Source: Author.

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