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Does Informality and Trade Openness Impact Long Run Growth? Empirical Evidence from Ghana

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Abstract

Using an Autoregressive Distributed Lag (ARDL) technique, and the Granger causality test, this paper examines the dynamic relationship between economic growth, the size of the informal economy, and trade openness in Ghana. Our results provide evidence of a positive and bidirectional causality between the size of the informal economy and economic growth. Moreover, we find that openness to trade has a significant causal effect on the prevalence of informal activities and economic growth.

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1. Introduction

Openness to trade and curbing informal economic activities has become a common policy target for many developing economies. This is in part, due to the largely supported notion that trade liberalization stimulates the economy, whereas, informality impedes economic growth. Indeed, conventional theories posit that openness to trade can boost economic growth by facilitating the efficient allocation of resources. Informality, on the other hand, is argued to be characterized by inefficient production and resource misallocation which slows down economic growth. But, recent theories have concluded that the effect of trade openness and informality on economic growth can be both positive and negative, and varies across countries (Zahonogo, 2016; Kim et al., 2012).

Economic theory also links the prevalence of informal economic activities with trade liberalization within the dynamic efficiency wage framework of Goldberg and Pavcnik (2003). The model posits that by fostering greater domestic competition for local producers, openness to trade creates a real option value for informal employment as local firms shed formal labor (inputs) to reduce cost. Conversely, trade openness could reduce the incidence of informality as it provides incentives for firms to become formalized (Aleman-Castilla, 2006). For example, if international prices are higher than local prices, openness to trade could provide local firms access to profitable international markets that often require strict adherence to global standards and formalization. Thus, lowering the propensity for informality. There is also a widespread assumption that informality is counter-cyclical, decreasing during periods of economic growth, and, expanding during economic downtowns. However, employment trends from developing economies suggest a much faster growth in the informal economy even in countries that have experienced higher rates of growth (see, Heintz, 2006). This in line with the structuralist hypothesis where economic growth and development fail to absorb those in the informal economy. The informal economy thus creates employment opportunities which in turn, influence income, economic activities, and growth. Schneider and Enste (2000), notes that at least 66% of the income earned in the informal economy are spent in the formal economy, consequently, stimulating the overall economy.

Many studies have attempted to empirically rationalize these theoretical assertions with mixed results. For example, Gries and Redlin (2012), and Liu et al. (2009) find that there exist a positive long-run relationship and bi-directional causality between trade openness and economic growth. In contrast, Polat et al. (2015) and Musila and Yiheyis (2015) find that openness to trade impedes long-run growth. For the informality-growth nexus, previous empirical studies have focused on establishing correlations rather than causation. For instance, Elgin and Birinci (2016) find the size of the informal economy to be positively (negatively) correlated with economic growth in high (low) income economies. Fugazz and Fiess (2010) also find that informality increases with trade liberalization, while Aleman-Castilla (2006), show that import tariff reductions mitigate the likelihood of informality in Mexico.

This lack of consensus in the empirical literature stems partly from the differences in methodologies, data used, and in particular, the lack of consistency in the measures of informality.

Duarte, (2017) for instance, find contradictory results while studying the causal relationship between different measures of informality and economic growth in Spain. A meta-analysis of the previous literature by Afonso et al. (2020) also reveals no publication bias[1] in the contrasting dynamics between the informal economy and economic growth. The authors attribute the lack of clarity on the subject to the unique differences in informal economies and country structure.

With the prevailing ambiguity, this paper contributes to the existing literature by investigating the dynamic relationship between informality, trade openness, and economic growth in Ghana using the Autoregressive Distributed Lag (ARDL) approach. Further, we use the granger causality test to disentangle if causality exists, and then establish the direction of causality. We minimize the noise in our data series by employing the dynamic general equilibrium estimate of the informal economy by Elgin and Oztunali (2012). Compared to the other measures of informality, this method encompasses the complex structure of the informal economy.

We focus on the country Ghana for three main reasons: (1) The country has undergone major trade reforms over the last three decades and has become an advocate for free trade across Africa (2) It is one of the fastest-growing economies in the world (3) There is a growing local and international pressure to curb rising informal activities. Thus, findings from this study have significant implications not only for public policy in Ghana but also, for other developing economies with similar challenges and economic structures.

Our results show the existence of a complementary long-term relationship between the size of the informal economy and economic growth in Ghana over the period 1980-2014.

The remainder of this paper is organized as follows: The next section outlines the data, empirical methodology, followed by a summary of the main findings. The last section contains concluding remarks.

2. Data

Our empirical analysis is based on annual data spanning 1980-2014. Data on trade openness and the real GDP growth are obtained from the World Development Indicators database (WDI). Data on the size of the informal economy, defined as a percentage of GDP is obtained from a two-sector dynamic general equilibrium (DGE) model by Elgin and Oztunali (2012). Given that the size of the informal economy is relatively unknown, the authors developed a DGE model where the whole economy is represented as a two-sector (formal and informal) economy with different production technologies. The model is first solved to characterize a steady-state informal and formal labor with key parameters. Using data such as the aggregate consumption, government spending, and formal employment from the Penn World Table (PWT), the parameters needed to estimate the unobserved informal economy are calibrated. This information is then used to estimate the size of the informal economy.

[1] Publication bias may stem from the failure of researchers to publish results on the informality-growth linkages due to predominantly insignificant estimates, thus, further compounding the ambiguity in the literature.

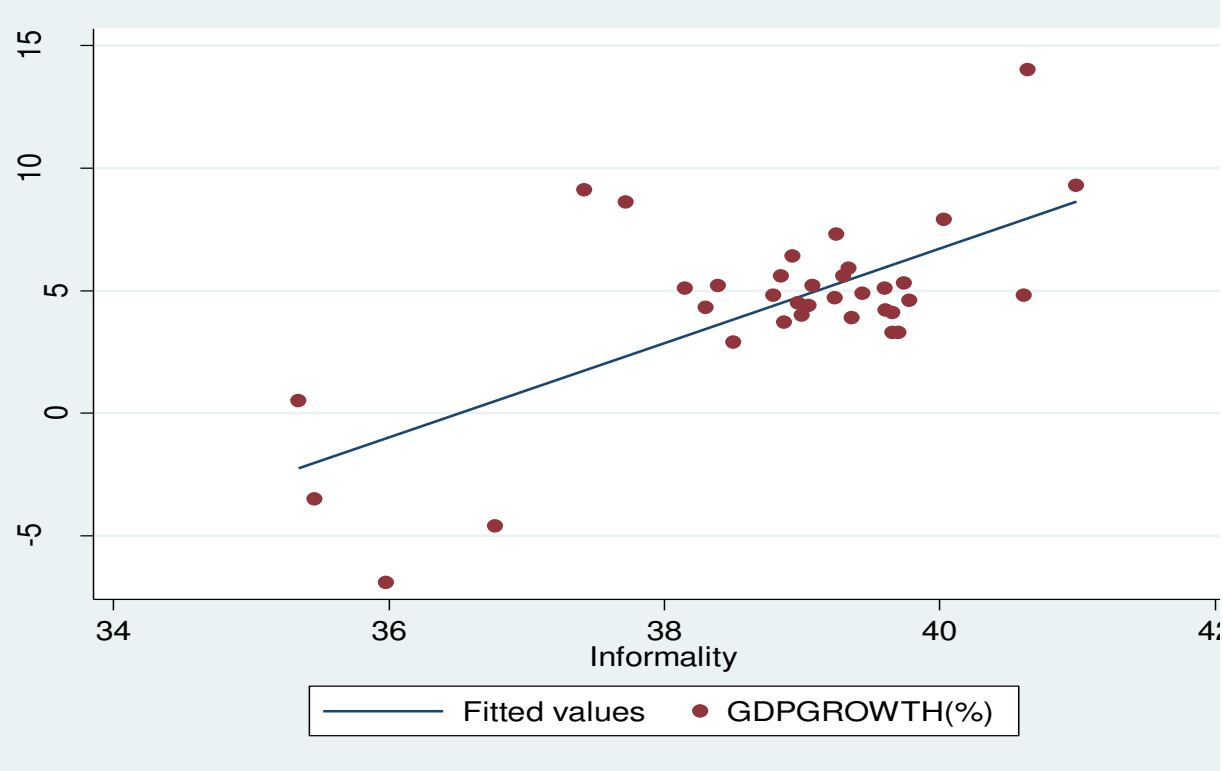
Although this approach has been criticized for its reliance on conventional assumptions of the informal economy, its estimates provide perhaps the most reliable and consistent informal economy dataset available in the literature. This is due to its clear theoretical foundation, and in particular, wide country and time-series coverage. Table I presents the summary statistics of our data while Figure 1 shows the naïve correlation between the informal series and economic growth. The evolution of Ghana's informal economy, GDP growth, and trade openness are also presented in Figures 2, 3, and 4 in the appendix.

Table I : Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
INF	34	38.843	1.322	35.34	40.99
Trade	34	61.554	29.787	6.3	116
GDPG	34	4.5	3.762	-6.9	14

Where, INF denotes the informal economy or informality, defined as a percentage of GDP, Trade represents trade openness which is defined as the sum of import and exports (total trade) as a percentage of GDP, while GDPG represents GDP growth.

Figure 1: Correlation between informality and GDP growth in Ghana



3. Empirical methodology

3.1. The Unit Root Test

We use the Augmented Dicky Fuller (ADF) and Phillips-Perron tests to investigate the order of integration of the data. These tests suggest under the null hypothesis that a data series of a given variable has unit-roots (non-stationary). The results show that, under both the ADF and Phillips-Perron framework, only the GDP growth data series is consistently stationary at levels (Table II). However, all the variables are stationary at first difference.

Table II: ADF and Phillips-Perron results for Unit Root test

Variables	Constant (Levels)		Constant & Trend (Levels)	
Variable	ADF Statistics	Phillips-Perron	ADF Statistics	Phillips-Perron
INF	-3.353***	-3.045**	-2.652	-2.287
Trade	-1.920**	-1.602	-1.379	-1.171
GDPG	-3.200***	-2.753 **	-3.540**	-3.306**
Constant (First difference)			Constant & Trend (First difference)	
Δ.INF	-3.483***	- 5.985***	-3.905***	-6.462***
Δ.Trade	-5.559 ***	-6.462***	-5.587***	-5.901***
Δ. GDPG	-5.387***	-6.896 ***	-5.583***	-7.043 ***

Δ. denotes the first difference operator, INF represents informality, Trade denotes trade openness while GDPG represents GDP growth. ***, **, * denotes rejection of the null hypotheses for unit roots at the 1%, 5%, and 10% level respectively.

3.2. The Error Correction Model

Considering that the variables in this study are I (0) and I (1) processes, we proceed to estimate the long-run relationship using the ARDL bound test proposed by Pesaran et al. (2001). Given that there exists a cointegrating relationship between our variables, we estimate an error correction model. The dynamic unrestricted error correction model for this study can be represented as follows:

$$\Delta GDPG_t = \beta_{01} + \sum_{i=1}^{p} \alpha_{1i} \Delta GDPG_{t-i} + \sum_{i=0}^{q} \alpha_{2i} \Delta INF_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta Trade_{t-i} + \lambda_1 EC_{t-1} + \varepsilon_{1t} \quad (1)$$

$$\Delta INF_t = \beta_{02} + \sum_{i=1}^{p} \alpha_{1i} \Delta INF_{t-i} + \sum_{i=0}^{q} \alpha_{2i} \Delta GDPG_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta Trade_{t-i} + \lambda_2 EC_{t-1} + \varepsilon_{2t} \quad (2)$$

$$\Delta Trade_t = \beta_{03} + \sum_{i=1}^{p} \alpha_{1i} \Delta Trade_{t-i} + \sum_{i=0}^{q} \alpha_{2i} \Delta GDPG_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta INF_{t-i} + \lambda_3 EC_{t-1} + \varepsilon_{3t} \quad (3)$$

Where Δ represents the first difference operator, p, q, and k denotes the Akaike's information criterion (AIC) selected optimal lags while ε_{1t} , ε_{2t} , and ε_{3t} denotes the independent and

identically distributed error (iid) terms. GDPG denotes the growth of real GDP, Trade represents trade openness, and INF represents the size of the informal economy. EC_{t-1} denotes the error correction term which is derived as residuals from the bounds test. The coefficient of the error correction term λ represents the speed of adjustment to long-run equilibrium. This term is expected to be negative and statistically significant.

4. Empirical Results

4.1. Bound test for cointegration

Table III, presents the results from the ARDL bounds test. The results show that there exists a long-run relationship between GDP growth, trade openness, and informality. That is, the F-statistics exceeds the upper critical bounds at either 1%, 5%, or 10% significance levels.

Table III: The results of the ARDL cointegration/Bounds test

Estimated model	Optimal lags	F-Statistics	I(0)	I(0)	I(0)	I(1)	I(1)	I(1)
Critical Values			1%	5%	10%	1%	5%	10%
GDPG~INF + Trade	(1, 0, 0)**	6.288	5.15	3.79	3.17	6.36	4.85	4.14
INF~GDPG + Trade	(1, 1,1)*	4.702	5.15	3.79	3.17	6.36	4.85	4.14
Trade ~INF +GDPG	(1, 0, 0)	1.970	5.15	3.79	3.17	6.36	4.85	4.14

*** p < 0. 01, ** p < 0. 05, * p < 0. 1.

4.2. Long-run and short-run estimates

The results of the unrestricted dynamic error correction model (ECM) are presented in Table IV. The results confirm the existence of a long-run relationship between trade, the size of the informal economy, and economic growth. As shown in the table, the size of the informal sector has a significant positive impact on economic growth. A 1% increase in the size of the informal economy is associated with a 1.6% growth in GDP in the long run. Also, a 1% growth in the GDP and trade openness is associated with 0.173% and 0.16% increases in the size of the informal economy respectively. As expected, the coefficients of the lagged error correction term EC_{t-1} are negative and statistically significant at the 1% level of significance for the two cointegrating vectors. This implies convergence towards long-run equilibrium. Our results did not change qualitatively when tested with the robust Newey standard errors. A test of model stability (cusum and cusumsq) also reveals that the coefficients in the error correction models are stable at the 5% significance level (see, Figure 1 and Figure 2 below).

The positive growth effect of informality is in line with the structuralist view, whereby, the informal economy is considered an important source of competition, innovation, and entrepreneurship that compliments the formal economy via its positive spillovers (see, Schneider

and Enste, 2013). Besides, our result is empirically similar to Nguyen et al (2020), and Saunoris (2018) who find that factor productivities in low-income countries are much greater in the informal sector than the formal sector. This is plausible for the case of Ghana where bureaucratic bottlenecks (i.e. corruption, administrative delays), and high input costs often discourage the accumulation of productive resources in the formal sector. The informal economy thus provides a cheaper alternative with positive multiplier effects that can spur growth. Our result also reflects the so-called new informal economy in Ghana (Obeng-Odoom and Ameyaw, 2014). Unlike the conventional informal economy which is characterized by low-skilled workers, this new informal economy is characterized by highly educated graduates with high levels of efficiency and productivity. The positive effects of economic growth and trade openness on the informal economy are also consistent with the findings of Baklouti and Boujelbene (2018), and Keho (2017) respectively.

4.3. Granger causality

Table V presents the results from the Granger causality test[2]. The results indicate that trade openness has an important causal impact on economic growth and the size of the informal economy. The results also show a strong bidirectional causal relationship between economic growth and informality; namely, the size of the informal economy influences economic growth and vice-versa. However, there is no evidence that economic growth and the size of the informal economy causes trade openness.

4.4. Further robustness check

As a robustness check, we investigate whether the main results obtained for the informality growth nexus holds when we account for other relevant variables. More specifically, we re-estimate equation (1) with two more controls, inflation (INFL) and foreign direct investment (FDI). The results for the bounds test and the error correction model are presented in Table VI and Table VII in the appendix. Overall, the results and conclusion are qualitatively similar to those presented in the main findings. While the effect of the informal economy remains positive and statistically significant, we find that the magnitude of the effect is much smaller. The result also highlights the major contribution of foreign direct investment to the growth of Ghana's economy. Also, and consistent with the findings of Runganga, (2020), we find that increases in inflation have a dampening effect on long-run growth. Details of these results are presented in the appendix.

5. Conclusions and policy implications

There is a growing theoretical and empirical ambiguity on the consequences of trade liberalization and informality especially for developing economies. Using the ARDL-Bounds, and Granger causality tests, this paper examines the long-run relationship and causality between the size of the

[2] It must be noted that the Granger causality (GC) approach is not without shortcomings. Song and Taamouti (2019) for instance, highlight the complications when more than two variables are considered. More specifically, the approach does not consider the indirect causal transmission from a third variable. For example, an internationally competitive industry with high proportions of informality could influence both informality and economic growth. Moreover, the approach is most applicable in testing linear causal relationships (Troster, 2018). Nonetheless, GC remains a useful approach in analysing dynamic causal relationships due to its small sample and power properties.

informal economy, trade openness, and economic growth in Ghana. The results show that there exists a long-run relationship between trade openness, economic growth, and informality for the period 1980-2014. The results suggest informality as one of the main forces driving economic performance in Ghana. We also find that in the long run, the size of the informal economy increases with greater openness to trade, and rising economic growth. These findings contradict the popular notion that informality decreases as economies grow. The positive effect of growth on informality highlights a classical case for developing economies where economic growth does not necessarily translate into improving people's standard of living or better employment opportunities.

Further, our results show that openness to trade and the size of the informal economy has a causal effect on economic growth. Likewise, economic growth and trade openness on the size of the informal economy.

Whereas this paper does not advocate for the promotion of informal economic activities, it does agree that its prevalence and growth presents a major challenge for policymakers. On the one hand, informality could limit economic growth via production inefficiencies and resource misallocation, as well as the loss of potential tax revenues. On the other hand, and as shown in this study, the presence of the informal economy could provide important growth benefits. It is therefore difficult to provide a unique policy that addresses the multifaceted dynamics between informality, trade openness, growth. Nonetheless, our research findings suggest that rather than criminalizing or terminating the informal economy, policies should be guided towards formalization. However, prior considerations should be given to improving the quality of institutions, to protect against potential bottlenecks that could make formalization counterproductive.

Table IV: ARDL Long and Short Run Results

Δ.GDPG	Coef.	Std. Err.	t	Prob.
Error Correction estimates				
Constant	0.028	0.114	0.059	0.953
$\Delta GDPG_{t-1}$	0.028	0.482	1.324	0.196
ΔINF	0.4322	0.706	0.6123	0.545
ΔTrade	0.017	0.043	0.391	0.699
EC_{t-1}	-0.934	0.222	-4.196	0.00***
R-squared	0.42			
Adj. R-Squared	0.33			
GDPG				
Long-Run Estimates				
constant	-60.828	17.144	-3.548	0.00***
Trade	0.020	0.020	0.98	0.331
INF	1.649	0.460	3.5850	0.00***
R-squared	0.47			
Adj. R-Squared	0.44			
Δ.INF	Coef.	Std. Err.	t	Prob.
Error Correction estimate				
Constant	0.063	0.115	0.551	0.586
ΔINF_{t-1}	0.041	0.171	0.224	0.809
ΔGDPG	0.030	0.0366	0.8285	0.415
$\Delta GDPG_{t-1}$	0.0396	0.0388	1.0186	0.318
ΔTrade	0.017	0.010	1.694	0.102
$\Delta Trad_{t-1}$	0.010	0.010	1.046	0.305
EC_{t-1}	-0.482	0.1314	-3.69	0.00***
R-squared	0.43			
Adj. R-Squared	0.30			
INF				
Long-Run Estimates				
Constant	37.087	0.359	103.4	0.00
GDPG	0.173	0.048	3.585	0.00***
Trade	0.016	0.006	2.586	0.01***
R-squared	0.55			
Adj. R-Squared	0.52			

*** p < 0. 01, ** p < 0. 05, * p < 0. 1.

Table V: Granger Causality Results

Dependent variable	Short-run causal effects (F-statistics)			Long Run t-Stat.	Strong Causality: Joint Short- and Long Run		
	Δ.GDPG	Δ.INF	Δ.Trade	EC_{t-1}	Δ. GDPG. EC_{t-1}	Δ.INF. EC_{t-1}	Δ. Trade. EC_{t-1}
Δ.GDPG		0.256 (0.62)	0.129 (0.72)	-0.89 (0.00)***		7.90 (0.00)***	7.25 (0.00)***
Δ.INF	1.037 (0.32)		1.096 (0.31)	-0.482 (0.00)***	7.050 (0.00)***		4.95 (0.02)**
Δ.Trade	0.166 (0.69)	1.428 (0.24)		-0.144 (0.12)	1.493 (0.24)	2.034 (0.15)	

P values are in parentheses. *** p < 0. 01, ** p < 0. 05, * p < 0. 1.

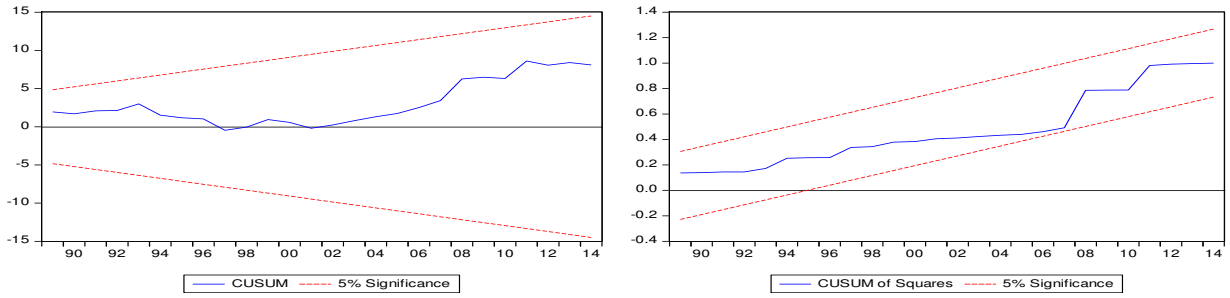


Figure 1: Cusum and Cusumsq for equation (1)

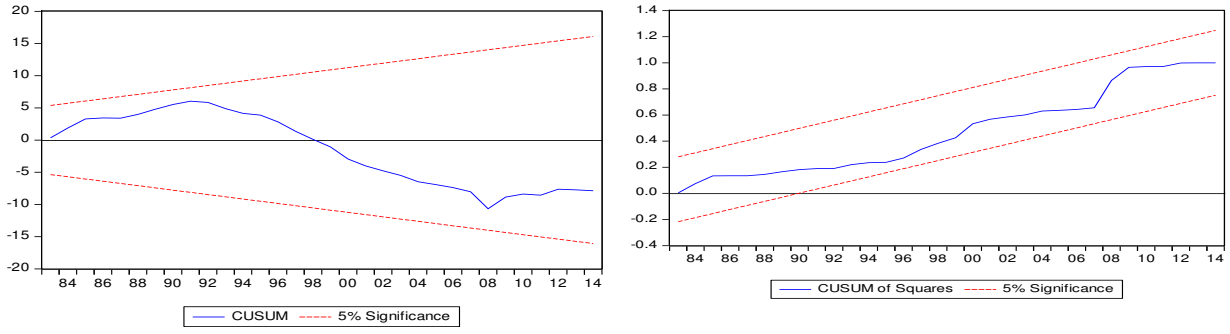


Figure 2: Cusum and Cusumsq for equation (2)

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Appendix

Table VI: The results of the ARDL cointegration/Bounds test for equation (1) with Inflation and FDI

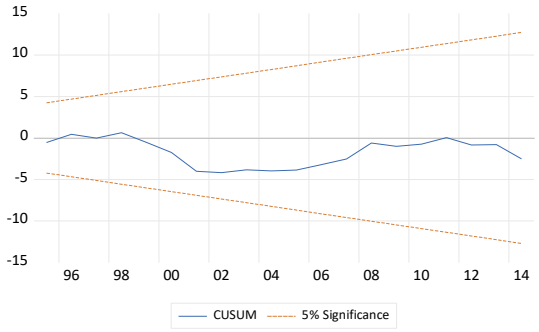
Estimated model	Optimal lags	F-Statistics	I(0)	I(0)	I(0)	I(1)	I(1)	I(1)
Critical Values			1%	5%	10%	1%	5%	10%
GDPG~INF + Trade + INFL +FDI	(2,1, 2, 2, 2)***	4.487	3.07	2.26	1.9	4.44	3.48	3.01

Where GDPG denotes economic growth, INF represents informality, Trade denotes trade openness, INFL is the indicator for inflation while FDI is the foreign direct investment. *** , ** and * evidence of cointegration at the 1%, 5% and 10% respectively

Table VII: ARDL Long and Short Run Results with Inflation and FDI as additional controls

Δ.GDPG	Coefficient	Std. Error	t-Statistic	Prob.	
Error Correction Estimates					
$\Delta GDPG_{t-1}$	0.763100	0.247232	3.086580	0.0058	***
ΔINF	-0.782227	0.704541	-1.110265	0.2801	
ΔTrade	-0.015152	0.038403	-0.394553	0.6973	
$\Delta Trade_{t-1}$	0.092596	0.039230	2.360346	0.0285	**
ΔFDI	0.080712	0.377067	0.214051	0.8327	
ΔFDI_{t-1}	-0.751684	0.358844	-2.094735	0.0491	**
ΔINFL	-0.046650	0.024612	-1.895395	0.0726	*
$\Delta INFL_{t-1}$	0.078280	0.022292	3.511611	0.0022	***
EC_{t-1}	-0.792683	0.176018	-4.503415	0.0001	***
R-squared	0.63				
Ad. R-squared	0.51				
Long-Run Estimates					
INF	0.228989	0.042510	5.386753	0.0000	***
Trade	-0.022825	0.015307	-1.491192	0.1515	
FDI	0.277307	0.135967	2.039509	0.0548	**
INFL	-0.124014	0.029303	-4.232100	0.0004	***

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.



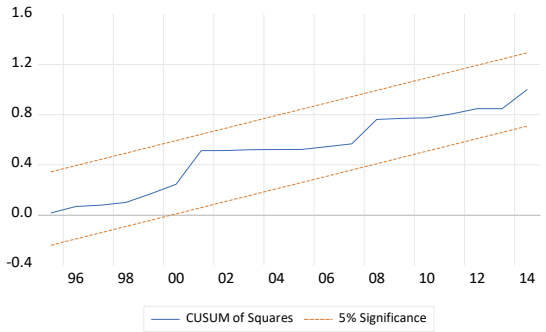


Figure 3: Cusum and Cusumsq for equation (1) with inflation (INFL) and foreign direct investment as additional controls

Figure 2

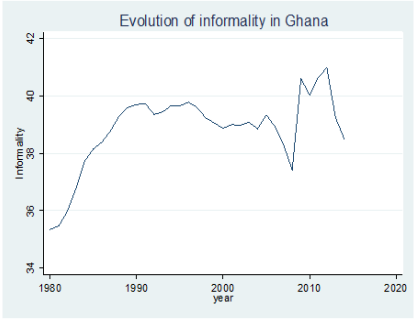


Figure 3

Figure 4