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## Article

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# Unemployment and Foreign Direct Investment Nexus: Empirical Evidence from Ghana

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ARTICLE INFO	ABSTRACT
Article History	<b>Purpose:</b> The paper examines the effect of foreign direct investment on unemployment in Ghana.
Received 20 July 2022	<b>Design/methodology/approach:</b>
Accepted 8 December 2022	The paper uses annual data spanning from 1990 to 2020 and employed the Autoregressive Distributed Lag (ARDL) estimation technique.
JEL Classifications: C22, E24, F21, F14	<b>Findings:</b> The paper found that unemployment has a long-run relationship with foreign direct investment, gross domestic product, export and gross capital formation. Foreign direct investment and GDP has a negative long-run relationship with unemployment. On the contrary, export of goods and services positively relate to unemployment in the long-run devoid of gender. Lastly, we also found a mediating effect of GDP on FDI in reducing unemployment rate in Ghana.
	<b>Research limitations/implications:</b> The finding that export of goods and services relate positively with unemployment in the long run does not necessarily imply that Ghana should stop exporting goods and services in order to solve unemployment challenges in the country. Rather we should adopt the attitude of adding value to our raw products before exporting. And to reduce unemployment in the country, government should adopt incentivized tax policies to foreign investors to attract more FDI inflows into the economy.
	<b>Originality/value:</b> Not only does the present paper extend to more recent data, but it is also the first of its kind to the best of our knowledge in studying the nexus between FDI and unemployment rate in Ghana and also bringing to bear the gender dynamics of such relationship.
<b>Keywords:</b> Unemployment, Foreign Direct Investment, Ghana, ARDL	

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## 1. Introduction

With varied levels of development in their economic, political, and social systems, labor unemployment is one of the most significant issues that nation states throughout the globe are currently dealing with, particularly in light of the COVID-19 epidemic. History has it that almost all countries around the world have faced the problem of unemployment at one time or the other (Angela et al., 2013; ILO, 2020). Following the Great Depression, the unemployment issue first emerged in North America in 1929, where 4.3 million people were made unemployed in a matter of one year. This continued to the western countries soon after the World War II (Overy, 2020). Given this as a global challenge, the United Nations Agenda 2030 for sustainable development acknowledged the need for all nations to achieve full and productive employment and decent work for all and equal work of equal value. According to the World Bank, current unemployment rate in Sub-Saharan Africa (SSA) is above the world unemployment rate of 6.6%, and compared to other SSA countries, Ghana has a relatively low average of 4.7% unemployment rate (World Bank, 2022). Though this figure appears low, unemployment rate has grown by 11.37% between 2017 and 2021.

Several economic theories and studies have tried to explain the concept of unemployment, its determinants and consequences and how to reduce it. While the Classical and Neo-Classical theories recognise only voluntary and frictional unemployment, the modern theories argued that unemployment is as a result of imperfections in the labour market (Felbermayr et al., 2011) as cited in Mustafa and Azizun (2020). The study of the relationship between unemployment and foreign direct investment (FDI) is so an important topic in the economic literature and to policy decision makers, more especially in Sub-Saharan Africa where FDI inflows hit a record high of USD83 billion in 2021 and USD 2.6 billion to Ghana in the same year (World Investment Report, 2022). More so, it is hypothesised that

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FDI will increase government investment spending through increases in state tax-revenue, seasonal unemployment stabilization, and the generation of intensive-labour projects which are characterised by the use of contemporary technology and therefore the creation and diversity of new work prospects (Mustafa and Azizun, 2020). Several governments in Ghana since independence have tried reducing unemployment challenges in the country at one time or the other by focusing on economic growth and assuming that higher economic growth will lead to higher employment rate. The question that arises is how does FDI inflow affect the situation of unemployment in the country, more especially in the period of Ghana beyond aid?

In responding to the question, the current study seeks to explore empirically the relationship between unemployment rate and FDI in Ghana. This study is unique and important as it is the first of its kind to the best of our knowledge in studying the nexus between FDI and unemployment rate in Ghana and also bringing to bear the gender dynamics of such relationship. Results of the study will not only help government and policy decision makers but will also help contribute to the debate from Ghana's perspective in fashioning out policies toward reducing unemployment by the African Continental Free Trade Agreement (AfCFTA).

## 2. Review of Literature

Foreign direct investment's contribution to the successes of economies of nations cannot be overemphasised, more especially to those with less developed financial markets. It is believed by many economists and policy practitioners to have the tendency of reducing unemployment, widening the frontiers of business prospects and elevating the income levels of people of receiving nations.

Mukit (2020) examined if macroeconomic variables substantially affect unemployment in the long run by using annual data starting from 1991 to 2018. Applying the vector autoregression and Johansen cointegration models for its cointegration test, the study concluded that inflation, gross domestic product, population growth, foreign direct investment and foreign debt affect the unemployment level of the Bangladesh economy. Dijan and Senad (2017) analysed the effect of FDI on unemployment rate in west Balkan countries from 2000 to 2014. Using OLS regression, the study revealed no positive impact of FDI on unemployment. Similarly, Mehmet and Tahir (2013) examined the unemployment impact of FDI in seven developing countries. The study applied panel cointegration and panel causality test on yearly data from 1981 to 2009 and conclude that FDI positively affect unemployment in the long run. The causality test however only shows a relationship from FDI to unemployment in the long run. Using panel data analysis techniques and data from 1994 to 2014, Kunofiwa (2018) investigated the employment impact of FDI in the BRICS. The findings revealed that high levels of economic expansion, financial development and human capital are necessary conditions in BRICS for FDI's to positively affect employment generation. In their study, Hisarciklilar et al. (2014) examined the contribution of FDI in employment creation in Turkey from 2000 to 2008 at a sectoral level. Using a panel data analysis, the study found a positive but weak relationship between employment and FDI. Johnny et al. (2018) investigated the unemployment impact of FDI in Nigeria for the period 1980 to 2015. Using OLS and cointegration test, the study posed a negative and insignificant impact of FDI on unemployment and a positive but significant effect of capital formation on unemployment. Similarly, Irpan et al. (2018) explored the unemployment impact of FDI in Malaysia using a 32-year annual data for its analysis. Adopting the ARDL model technique, the study observed GDP, FDI and number of foreign workers to significantly affect and reduce unemployment rate in Malaysia.

Mkombe et al. (2021) studied the youth unemployment impact of FDI in Southern African Development Community (SADC) region for the period 1994 to 2017. Applying the Feasible Generalized Least Squares (FGLS) technique, the study revealed an insignificant negative effect of FDI on youth unemployment in the SADC region. Khan et al. (2022) explored the effect of FDI on employment creation in Pakistan from 1900 to 2019. Using the ARDL bound test approach; the study found that increases in FDI, industrialization and gross capital formation increases the opportunities for people to be employed both in the short and long-run. From the above review, it is clear that the pool of studies has failed to give a clear-cut answer on the exact effect of foreign direct investment on unemployment rate. Also, the effect of foreign direct investment on unemployment differs from country to country and therefore results from such studies cannot be used to generalize and therefore the need to conduct a study using Ghana as case study. It is also worthwhile to mention that for the past two decades, Ghana is the second largest recipient of FDI in West Africa after Nigeria (Bekoe and Abdul Rahaman, 2021) and therefore choosing Ghana for this kind of study cannot be underestimated.

## 3. Methodology

The section explores the various statistical tools and packages used for data analysis. We started by conducting a basic descriptive analysis of the variables under consideration. Secondly, the study checked for the presence of unit roots of the time series data such that none of the variables is stationary of order two (Giles, 2013). The study applied the Phillips-Perron (PP) (Phillips, 1991) and Augmented-Dickey-Fuller (ADF) (Dickey & Fuller, 1979) tests for its unit root test. The null hypothesis of ADF and PP is that the series are non-stationary and therefore has unit root. If the critical value at a significant level of 5% is less than the  $t$ -statistic, the null hypothesis is rejected in favour of the alternative and concludes that the series are stationary. Having investigated the unit roots and confirming that the variables are integrated, the next step is to determine whether the variables have a long-term relationship. We can then proceed to use the autoregressive distributive lag (ARDL) model once the cointegration between the variables has been established. The bound test's null hypothesis is that there is no long-run association between the series being examined. The decision rule for the bound test is that the null hypothesis is rejected in favour of the alternative if the calculated F-statistic exceeds the critical value of the upper bound I (1). If the F-value on the other hand is lower than

the critical value of the lower bound I (0), the null hypothesis of no cointegration among the variables is accepted. After the bound test verified the long-term association, we used the ARDL model to get the long and short-term estimates. The functional form of the model to be estimated is thus presented as:

$$UEMP = f(FDI, CRED, GCF, GDP, EXP, INF) \quad (1)$$

where the UEMP is unemployment rate, FDI is foreign direct investment, CRED is the domestic credit to private sector, GDP is the gross domestic product, GCF is gross capital formation, EXP is export and INF is the inflation rate. Data is sourced for these variables spanning from 1990 to 2020 for analysis. Equation 1 can be expressed in linear form as follows:

$$UEMP_t = \alpha_0 + \alpha_1 FDI_t + \alpha_2 CRED_t + \alpha_3 GCF_t + \alpha_4 GDP_t + \alpha_5 EXP_t + \alpha_6 INF_t + \varepsilon_t \quad (2)$$

For the ARDL model to be applied, the variables must be stationary at either its levels, I (0), its first difference, I (1), or a mixture of both. The ARDL is used because of its inherent ability to handle different levels of integration and also the ability to simultaneously estimate the short and long-run coefficients (İşık, 2013) makes it superior to traditional models like the Johansen cointegration (Johansen, 1991) and Engle and Granger (Engle & Granger, 1987). The ARDL model also provides reliable results for small sample size (Khan et al., 2019) and lastly, the trouble of endogeneity is also resolved by incorporating lags into the model (Asteriou et al., 2020; Khan et al., 2019). The ARDL model as used in the current study is therefore specified as follows:

$$\begin{aligned} \Delta UEMP_t = & \beta_0 + \beta_1 UEMP_{t-1} + \beta_2 FDI_{t-1} + \beta_3 CRED_{t-1} + \beta_4 GCF_{t-1} + \beta_5 GDP_{t-1} + \beta_6 EXP_{t-1} + \beta_7 INF_{t-1} + \\ & \sum_{j=1}^k \gamma_1 \Delta UEMP_{t-j} + \sum_{j=1}^r \gamma_2 \Delta FDI_{t-j} + \sum_{j=1}^r \gamma_3 \Delta CRED_{t-j} + \sum_{j=1}^r \gamma_4 \Delta GCF_{t-j} + \\ & \sum_{j=1}^r \gamma_5 \Delta GDP_{t-j} + \sum_{j=1}^r \gamma_6 \Delta EXP_{t-j} + \sum_{j=1}^r \gamma_7 \Delta INF_{t-j} + \mu_t \quad (3) \end{aligned}$$

Where  $\beta_0$  is the intercept term while  $\beta_1$  to  $\beta_7$  denotes the long-run coefficients and  $\gamma_1$  to  $\gamma_7$  are the short run coefficients, k reports the lag for unemployment rates, r represents lags of the regressors,  $\mu_t$  report the error residuals and  $\Delta$  represent the difference operator. However, if there is cointegration or long-run association between the variables after the bounds test, both short-run and long-run relationships would be specified. Therefore, the error correction model (ECM) is adopted to specify the long-run relationship as specified in equation (4) below:

$$\begin{aligned} \Delta UEMP_t = & \sum_{j=1}^k \gamma_1 \Delta UEMP_{t-j} + \sum_{j=1}^r \gamma_2 \Delta FDI_{t-j} + \sum_{j=1}^r \gamma_3 \Delta CRED_{t-j} + \sum_{j=1}^r \gamma_4 \Delta GCF_{t-j} + \sum_{j=1}^r \gamma_5 \Delta GDP_{t-j} + \\ & \sum_{j=1}^r \gamma_6 \Delta EXP_{t-j} + \sum_{j=1}^r \gamma_7 \Delta INF_{t-j} + \phi ECM_{t-1} + \mu_t \quad (4) \end{aligned}$$

Where  $\phi$  which is the coefficient of the lagged error correction term (ECM), is used to determine the speed of adjustment of the parameter in the long-run, and it is expected to be negative and significant. ECM is the error correction term which accounts for the long run representation in the specified model (Darko, 2016). After estimating the short and long-run coefficients, some diagnostic and stability test will be conducted to ensure that the model is free from serial correlation, heteroskedasticity and also stable.

## 4. Results and Discussions

### 4.1 Stationarity Test

Regression analysis with non-stationary series produces spurious outcomes which cannot be used for analysis, forecasting or policymaking (Bashar, 2015; Emeka and Aham, 2016), thus the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests was employed to test the unit roots.

**Table 1: Results of Unit root test (ADF and PP)**

Level Form					First Differenced			
Variable	ADF		PP		ADF		PP	
	Intercept	Prob	Intercept	Prob	Intercept	Prob	Intercept	Prob
UNEMP	-2.2199	0.2039	-3.1216	0.0356**	-3.4360	0.0177**	-3.4427	0.0175**
FDI	-2.7209	0.0823*	-2.7519	0.0774*	-4.4474	0.0015***	-4.3031	0.0021***
GDP	-3.1550	0.0331**	-3.1435	0.0339**	-6.1623	0.0000***	-7.5402	0.0000***
INF	-3.8669	0.0062***	-3.8669	0.0062***	-5.4166	0.0002***	-18.7997	0.0001***
EXP	-2.5099	0.1232	-2.4812	0.1299	-5.6556	0.0001***	-5.6556	0.0001***
GCF	-2.9804	0.0487**	-2.7612	0.076*	-5.0885	0.0003***	-5.2715	0.0002***
CRED	-1.7518	0.3961	-1.7510	0.3965	-6.6258	0.0000***	-6.4908	0.0000***

**Source:** Author's construct, 2022.

Table 1 present results of the unit root test and indicate that when intercept is considered, all variables were stationary at levels except unemployment rate (UNEMP), export of goods and services (EXP) and domestic credit to private sector (CRED) but become stationary after first differencing. This shows that only I (0) and I(1) series are present. Hence the Autoregressive Distributed Lag (ARDL) method is appropriate.

#### 4.2 Bounds Test for Cointegration

After determining if the series is stationary, we perform the bound test for cointegration. The prognosis for testing the existence of long-run relationship is anchored by the bounds-test for cointegration. This is required when using the ARDL model. Table 2 present the bound test result for cointegration.

**Table 2: Results of Bounds Test for Cointegration**

F-bounds Test				
H <sub>0</sub> : No long-run relationship				
Test Statistic	Value	Sig	I(0)	I(1)
F-Stat	9.1618	10%	2.03	3.13
K	7	5%	2.32	3.50
		2.5%	2.60	3.84
		1%	2.96	4.26

Source: Author's construct, 2022.

The F-statistic value of 9.1618 as shown in Table 2 exceed the upper bound value, I (1) at 5% significant level and therefore the null hypothesis of no long-run relationship is rejected in favour of the alternative that there is a long-run joint cointegration. Having established the presence of long-run relationship between unemployment and the covariates using the bound test for cointegration, the ARDL framework was employed to estimate the long-run coefficients. Results from Table 3 revealed that unemployment has a long-run relationship with foreign direct investment (FDI), gross domestic product (GDP), export (EXP), gross capital formation (GCF) and interaction of GDP and FDI. The coefficient of FDI is negative and significant at 5%, indicating the presence of a negative long-run relationship between foreign direct investment and unemployment. A unit increase in FDI reduces unemployment in Ghana by 39.7% holding all other variables constant. This result is expected as FDI is expected to boost government investment expenditure and therefore creating job opportunities, leading to reduction in unemployment rate. This finding is congruous with the results of Hamidah et al. (2016) and Mehmet and Tahir (2013) who found negative long-run association between FDI and unemployment in Malaysia and Thailand respectively. By gender, we found a negative but significant long-run correlation between FDI and Male unemployment rate. A unit increase in FDI reduces male unemployment rate by 77.3% all else constant. FDI appears to promote female unemployment though not statistically significant. Similarly, gross domestic product (GDP) is found to negatively influence unemployment in the long run. Impliedly, a unit increase in GDP will reduce unemployment rate in Ghana by 25% and with male unemployment rate by 32.6% holding all other variables constant. This result conforms to Tegep et al. (2019) finding that GDP and provincial minimum wage reduces unemployment rate in Indonesia. It also supports the Okun's law which states that a 1 percentage point decrease in unemployment rate will results to a 3 percent rise in GDP.

**Table 3: Results of long-run effect of FDI on Unemployment rate**

Levels Equation			
Case 3: No Trend and Unrestricted Constant			
Variable	Female Coefficient	Male Coefficient	Pooled Coefficient
FDI	0.148387	-0.772581***	-0.397348**
	(-0.355059)	(0.250195)	(-0.152531)
GDP	-0.159291	-0.325901***	-0.250003***
	(-0.156856)	(0.085052)	(-0.080613)
CRED	0.139272	0.443265*	0.272679
	(-0.520341)	(0.235935)	(-0.254607)
EXP	2.405586**	1.056595***	1.528402***
	(-0.874461)	(0.287437)	(-0.334721)
GCF	0.861	1.758154**	1.211932***
	(1.232165)	(0.72623)	(-0.401931)
INF	0.513586**	0.122588	0.33632***

	(0.229147)	(0.109634)	(-0.088254)
	0.009577	0.045306***	0.029998***
GDP_FDI	(0.023634)	(0.016583)	(-0.010897)

Note: Numbers in parenthesis represents standard errors.

Source: Author's construct, 2022.

Also, export of goods and services (EXP), Gross capital formation (GCF) and inflation (INF) are found in the long run to positively influence unemployment rate. Thus, increases in export by one unit, increases unemployment rate by 1.53 units. This has the same distributional effect on gender. Economic theory tells us that trade can help boost employment, but with a caveat. This depends on whether the country involved in export has a comparative advantage in producing the exported goods. This implies that, countries with comparative disadvantage in producing exported goods are more likely to lose their labour force, thereby increasing unemployment. Perhaps Ghana could be exporting goods it has comparative disadvantage<sup>1</sup> in and therefore increasing export will lead to increasing unemployment all else remain constant. This result is at variant to the study of Mustafa and Azizun (2020) who found export to negatively influence unemployment in the Middle East and North Africa and that of Dritsakis and Stamatiou (2018) study which report a bidirectional and inverse relationship between unemployment rate and export in fifteen old EU Members. The coefficient of inflation (INF) is positive and significant for the pooled and female unemployed, suggesting that inflation has a positive long-run correlation with unemployment. A 1% increase in inflation, increases unemployment by 33.6% holding all other variables constant. This result contradicts the studies by Arslan and Zaman (2014) and Mustafa and Azizun (2020) who found inflation to have negative impact on unemployment in Turkey and Middle East and North Africa respectively. Finally, the coefficient of the interacting variable (GDP\_FDI) is significant, suggesting that FDI affect unemployment rate at different levels of economic growth. In fact, increases in FDI inflows will continue to decrease unemployment rate if growth rate in Ghana remains within a threshold of 13.2<sup>2</sup> percent all things being equal.

### 4.3 Short-run Dynamics

The ARDL has three components: the error-correction term (ECT), the short-run and the long-run. From Table 4, ETC (CointEq) has a negative coefficient and it is significant at 1% level. This is expected as it confirms the existence of a long-run relationship among variables as earlier on established. The error-correction term can be interpreted to mean that fluctuations in unemployment (that is above or below its equilibrium level) are adjusted at a speed of 34.4% to ensure long-run convergence to equilibrium. The short-run estimates revealed a negative and significant association between FDI and unemployment. A one percent increase in FDI will reduce unemployment in the short run by 3.7% holding other variables constant. Similarly, gross capital formation (GCF) negatively affects unemployment in the short run. The coefficient suggests that a 1% increase in capital investment reduces unemployment rate by 10.8 and 10.7% respectively for the pooled and female category. This result is expected and conforms to the studies of Limosani and Monteforte (2017) and Boianovsky (2015) who made the case that capital growth boosts production capacity, thereby generation more jobs and lowering the unemployment rate in the country. The one-lagged period of GCF also presented a mixed (positive and negative) significant impact on unemployment for the female and male categories. In a similar vein, one-lagged period for FDI and GDP presents a negative significant effect on unemployment. Finally, though the interaction variable does not significantly affect unemployment in the short-run, its one-lagged period positively and significantly affects unemployment for the pooled and male categories.

**Table 4: Short Run Effects of FDI on Unemployment in Ghana**

ARDL Error Correction Regression			
Case 3: No Trend and Unrestricted Constant			
Variable	Female Coefficient	Male Coefficient	Pooled Coefficient
C	1.9575*** (-0.1971)	3.1440*** (0.3132)	2.6389*** (0.2384)
D(FDI)	-0.1012*** (0.0270)	0.0510** (0.0209)	-0.0369* (0.0202)
D(FDI(-1))		-0.1076*** (0.0290)	-0.0693*** (0.0208)

<sup>1</sup>More especially where most of our exported goods like Cocoa, Gold among others does not receive value addition before its export. As a result, potential jobs that will have been created along the value chain are being exported, thereby creating more unemployment in the country.

<sup>2</sup>UNEMP = 0.03GDP\*FDI-0.3973FDI

D(GDP)	-0.0228** (0.0094)	0.0036 (0.0089)	-0.0081 (0.0085)
D(GDP(-1))	-0.0165*** (0.0043)	-0.0669*** (0.0100)	-0.0368*** (0.0083)
D(CRED)	0.1017 (0.0802)		0.0210 (0.0669)
D(EXP)	0.0027 (0.0636)	0.0318 (0.0627)	-0.0278 (0.0543)
D(EXP(-1))	0.2418*** (0.0651)	0.2217*** (0.0593)	0.2643*** (0.0584)
D(GCF)	-0.1069* (0.0559)	-0.0712 (0.0580)	-0.1083** (0.0470)
D(GCF(-1))	-0.1138** (0.0517)	0.1669** (0.0648)	
D(INF)		-0.1261*** (0.0166)	
D(INF(-1))		-0.0636*** (0.0139)	
D(GDP_FDI)	0.0001 (0.0012)	-0.0040*** (0.0012)	-0.0014 (0.0011)
D(GDP_FDI(-1))		0.0071*** (0.0014)	0.0031*** (0.0010)
CointEq(-1)*	-0.1896*** (0.0189)	-0.4403*** (0.0436)	-0.3435*** (0.0308)
Observation	29	29	29
R-squared	0.9162	0.9468	0.9379
S.E. of regression	0.0487	0.0396	0.0400
F-statistic	19.6910	20.5451	23.3295
Prob(F-statistic)	0.0000***	0.0000***	0.0000***

Source: Author's construct, 2022.

#### 4.4 Residual and Stability Diagnosis

Having estimated the short and long-run effects of the covariates on the dependent variable, the residual and stability diagnosis was conducted and the result is presented in Table 5. The study has employed the Jarque-Bera test for normality, Breusch-Pagan residual test for heteroskedasticity and the serial correlation LM test for serial correlation.

**Table 5: Residual and Stability Tests Results**

Method	F-Statistic	Prob
Serial correlation	2.2108	F (2,8) = 0.1720
Heteroscedasticity	1.146	F (18,10) = 0.4268
Normality (Jarque-Bera)	0.2476	0.8836, Normal
CUSUM	Within 5% critical region	Stable
CUSUMSQ	Within 5% critical region	Stable

Source: Author's construct, 2022.

The probability values of the F-statistic in all scenarios are all more than the 5% level of significance, showing that there is neither a serial correlation nor a heteroskedasticity, and so the no serial correlation and heteroskedasticity null hypothesis is accepted. Last but not the least; the study used the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of the square recursive residual (CUSUMSQ) test to check for parameter stability. Figures 1,

2 and 3 in the appendix report results of the CUSUM and CUSUMSQ for the pooled, female and male categories respectively. As can be observed from the graphs, all the blue lines fall inside the red lines' borders, suggesting that the models employed in the study are stable.

## 5. Conclusion and Recommendations

This study explored the nexus between foreign direct investment and unemployment rate in Ghana. Annual data was sourced from the World Bank Development indicators' website spanning from 1990 to 2020 and used for analysis. Using the ARDL bound test of cointegration to examine the long-run relationship, the study revealed that unemployment has a long-run relationship with foreign direct investment, gross domestic product, export and gross capital formation. The increasing flow of foreign direct investment into the economy of Ghana helps reduce unemployment rate both in the long and short run. When disaggregated by gender, males unemployed appear to benefit from such inflows. As expected, growth in GDP negatively affect unemployment rate in the long run. This could be explained by the fact that expansion of the economy provides avenues for job creation and therefore unemployment rate is reduced. The coefficient of export is positive and significant for all categories, indicating that export of goods and services in the long-run increases unemployment rate irrespective of gender. The result also shows that gross capital formation negatively affects unemployment rate in the short-run for the pooled and female categories. Whiles this may be refreshing, capital formation tends to promote unemployment in the long-run. Finally, the mediating effect of GDP on FDI negatively affects unemployment rate in the long run. Thus, increases in FDI inflows will continue to reduce unemployment rate if growth rate in Ghana remained within a threshold of 13.2 percent. Based on the afore mentioned conclusions, the study recommends that beyond government flagship programs of introducing the Nation Builders Corps (NABCO) and Planting for Food and Jobs (PFJ) to reduce youth unemployment in Ghana, government should implement incentive-based tax policies to foreign investors to attract more FDI inflows into the economy. Policy makers should formulate and repackage existing policies that is geared towards growing the economy as growth in GDP has the tendency of reducing both short and long-run unemployment. For instance, the government planting for food and jobs program be repackage by making its operations more transparent and apolitical. Government should also encourage and facilitate new and existing entrepreneurs who want to delve into small-scale industry business to acquire capital at much lower rate to enable them expand their businesses. This will facilitate the creation of new job avenues. Finally, it is recommended that government should formulate policies to reduce (if not possible to stop) the exportation of raw commodities such as cocoa, timber, gold among others without value addition. This will help create more job avenues along the value chain, thereby reducing unemployment rate in the long run.

The study was not without limitations. First, institutional factors such as level of democracy, legal framework and corruption were not considered in the study. These are key takeaways for foreign investors and therefore influence the amount of investment they commit to a given country. Also, whiles we found FDI to reduce unemployment in Ghana, the study could not account for the gender differentials in its reduction. Future studies should consider addressing this and extending the analysis to include other African countries.

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Appendix

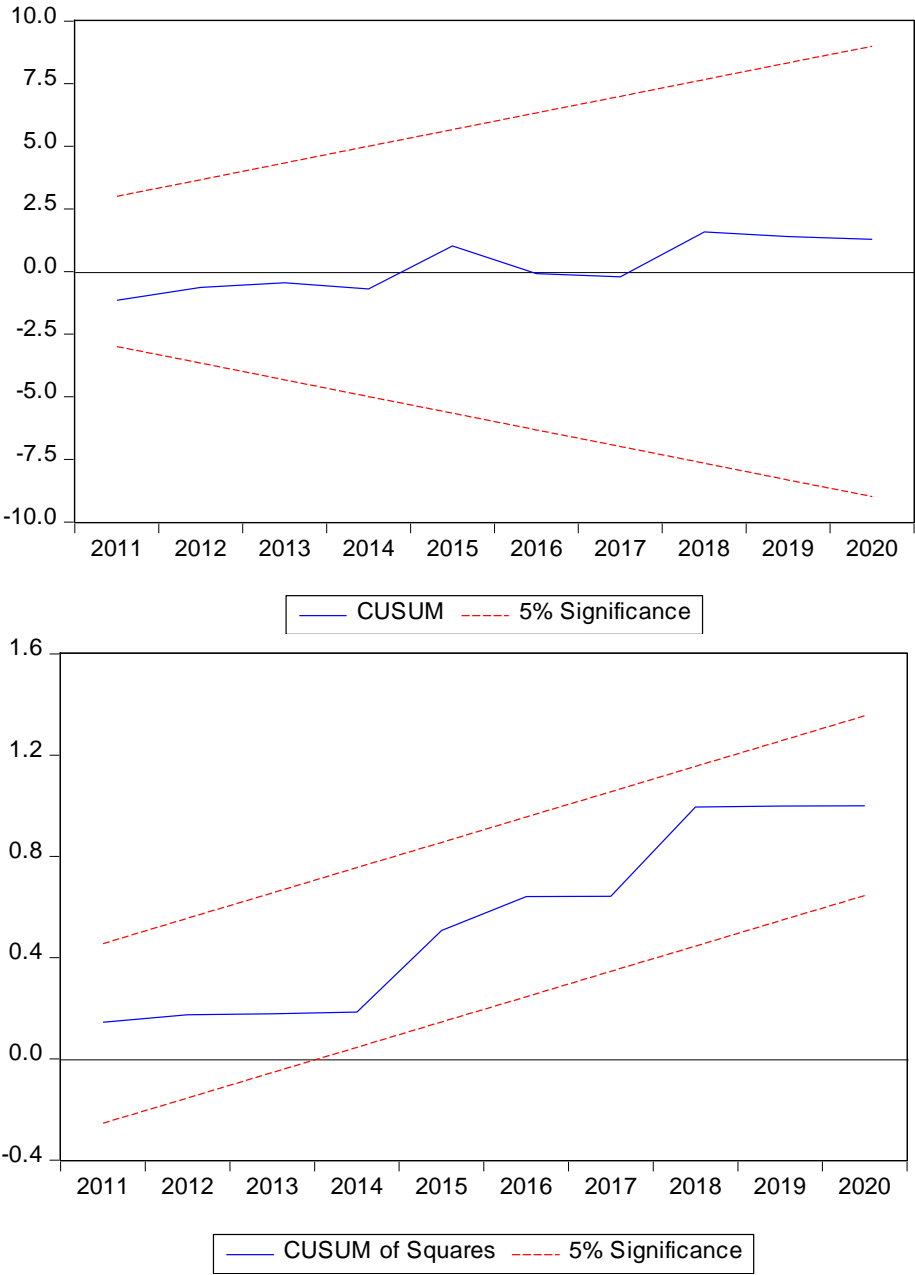
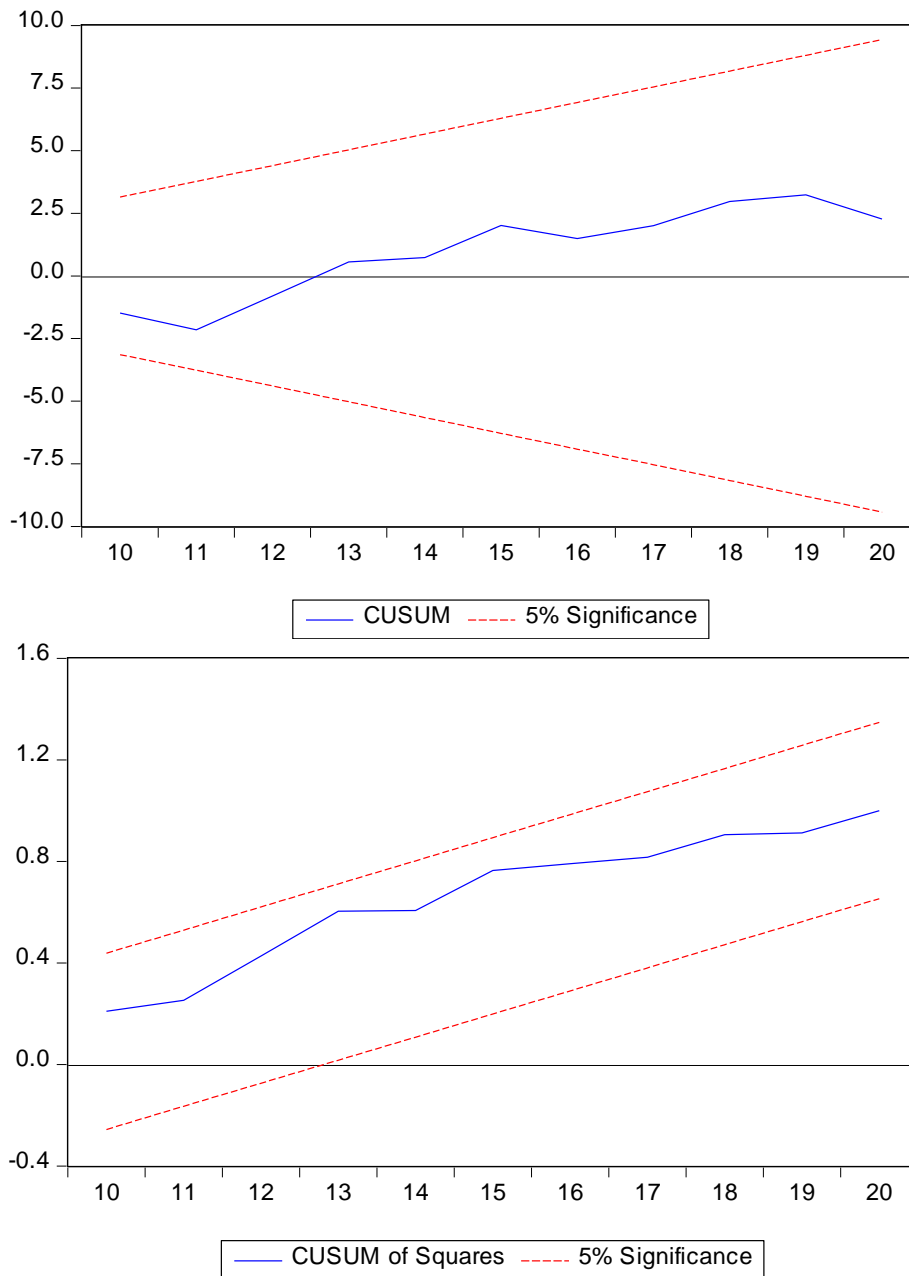
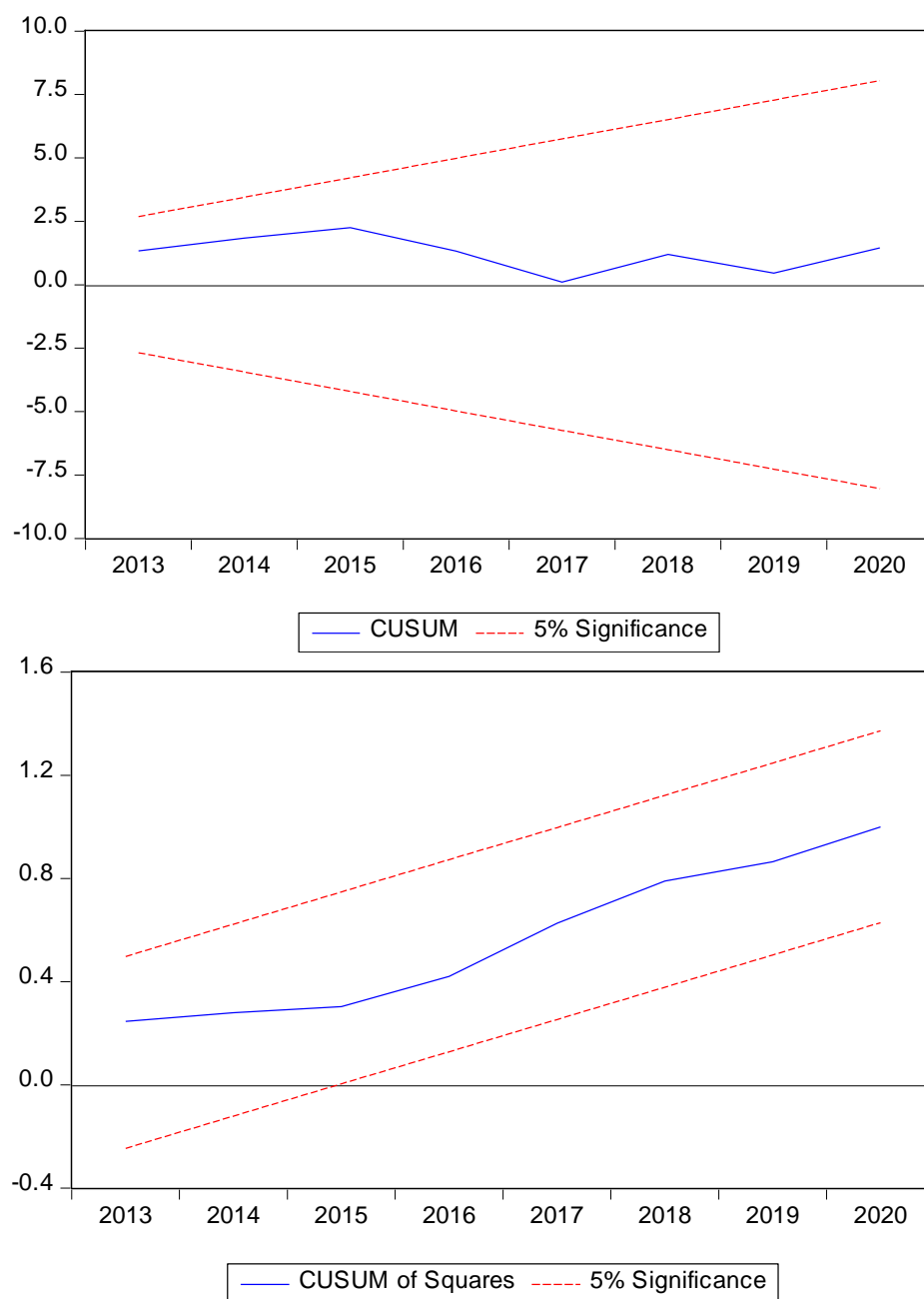


Figure 1: CUSUM and CUSUMSQ plots for the pooled category



**Figure 2:** CUSUM and CUSUMSQ plots for the Female category



**Figure 3:** CUSUM and CUSUMSQ plots for the Male category

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