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GENERAL AND APPLIED ECONOMICS | RESEARCH ARTICLE Unemployment and remittances nexus in Ghana: The gender perspective

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Mohammed Ridwan Saani¹*, Abdul-Malik Abdulai¹ and Mubarik Salifu¹

Abstract: The present study aims at investigating the nexus between unemployment and remittances in Ghana, with a focus on the gender perspective. Using time-series data spanning from 1990 to 2021, the ARDL model is estimated. According to the findings, remittances, inflation, FDI, exports of goods and services, and gross capital formation all have a long-run association with the unemployment rate. Remittances positively correlate with unemployment in the long run. All else being equal, remittances in Ghana tend to also increase female unemployment in the long run. In the short run, while the contemporaneous coefficient is negative, the lagged remittance positively correlates with the unemployment rate in Ghana. The lagged remittance further positively correlates with female and male unemployment in the short run. Finally, we also found a mediating effect of GDP on remittances in reducing the unemployment rate in Ghana. The study therefore recommends that, for remittances to reduce unemployment in the short run, policymakers ought to incentivize deposits of remittances in Ghanaian banks using attractive interest rates. As a result, this might encourage savings, investment, and economic growth, which would eventually result in a decrease in the unemployment rate in the long run.

Subjects: Economics; Macroeconomics; Labour Economics

Keywords: unemployment; remittances; gender perspective; ARDL

1. Introduction

Around the world, policymakers and experts frequently point out unemployment as a significant labor market challenge and a key contributor to problems of economic development. Additionally, unemployment poses a challenge to the globalization of many economies. According to Kuhn et al. (2018), about 192.7 million (5.6%) people were reported to be unemployed worldwide in 2017, with emerging countries reporting the greatest unemployment rates (143.0 million), followed by developed countries (34.1 million) and developing countries (15.6 million). It is also predicted that 207 million people will be unemployed worldwide by the end of 2022; this will be a a 21 million increase over the 2019 figure. The world labor market is also adversely affected as a result of the COVID-19 pandemic by way of job losses and a drastic reduction in the number of hours worked (ILO, 2021). Compared to their male colleagues, women and young (15- to 24-year-old) employees are more afflicted by this pandemic. Relative to the adult unemployment rate of 3.7 percent, the youth unemployment rate has risen to 8.7 percent. The COVID-19 pandemic's economic effects are visible in Africa, where sub-Saharan Africa has the worst unemployment rates in the world as of 2020 (Aoyagi, 2021). Sub-Saharan Africa's average unemployment rate is 7.7%. This figure is relatively lower compared to the unemployment rate of 13.9% in Ghana.





© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent. Given this as a national challenge, several governments in Ghana have made attempts by way of formulating policies to address the unemployment crisis. Some of these policies include Ghana Vision 2020, the Ghana Shared Growth Development Agenda I and II, the Ghana Poverty Reduction Strategy (GPRS) I and II, and the Coordinated Programme of Economic and Social Development Policies (CPESDP). Along with these basic policies, which served as Ghana's "blue print," several specific policies have been created to address the myriad of problems the nation is currently experiencing. Among these are the National Youth Policy (NYP) and the National Employment Programme (NEP), which were developed to address the high unemployment rate, particularly among the youth. Other initiatives include the Nation Builders Corps (NABCO), the Youth Employment Programme (YEP), the Youth in Agriculture Programme (YAP), the National Entrepreneurial and Innovation Programme (NEIP), the Planting for Food and Jobs program, and the Youth in Agriculture Programme (YAP), all of which are made in an effort to combat Ghana's high unemployment rate. The attempts of many governments, including Ghana, to effectively meet the majority, if not all, of the Sustainable Development Goals (SDGs) by 2030 appear to have been slowed down by the alarming trends in unemployment.

While unemployment is on the rise, remittances are also attracting the attention of economists and policymakers, not just because of the volumes of remittances received in the past decades but also because of their contribution to national development. Remittances hold a significant position in poor countries when it comes to financing development since they are more stable and reliable than other international financial flows (World Bank, 2019). Due to their economic significance and substantial role as a source of household resilience, remittances from migrants to their home countries have been gradually rising, and this trend has stayed at the top of the policy agenda. For instance, the overall remittances to sub-Saharan Africa (SSA) in 2019 were US\$48 billion, rising to US\$49 billion in 2021, and anticipated to reach US\$55 billion by the end of 2022 (Bisong et al., 2020; Brookings, 2021). Due to its effects on alleviating poverty and boosting economic growth, the government of Ghana views remittances as a significant source of foreign exchange inflows with a high policy interest (BoG, 2016). More importantly, from 2018 to 2020, personal remittance inflows to Ghana surged from 5.2% to 6.6% of GDP. Given the high inflows of remittances and the high incidence of unemployment, can nation-states leverage remittances to deal with the spate of unemployment? What will be the effect of remittance inflows on unemployment in Ghana, especially in the era of Ghana beyond aid? Moreso, how will the unemployment-remittance nexus affect gender in the case of Ghana?

The current study attempts to answer the question by empirically examining the connection between Ghana's unemployment rate and remittances. 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 remittances and the unemployment rate in Ghana and also bringing to bear the gender dynamics of such a relationship.

2. Literature review

It is impossible to overstate how important remittances are to a country's economic prosperity, particularly for those with less developed financial markets. Many economists and policymakers think it has a propensity to encourage investment, boost household consumption, and boost welfare. The connection between remittances and unemployment has been extensively studied in the literature. Drinkwater used panel data to study how remittances affected the dynamics of the labor market in a sample of 20 nations from 1970 to 2000. They found that remittances are a negligible factor in determining unemployment, but they are favorably correlated with investment, according to the research. Remittances are negatively correlated with unemployment, according to a study by Kim (2007) in Jamaica, because remittancereceiving families frequently earn higher reservation wages and decrease their labor supply by leaving the labor force. In his analysis of the relationship between migrant remittances and self-employment and welfare in Nigeria using data from the migration and remittances household survey, Salman (2016) also discovered that remittances decreased receivers' likelihood of becoming self-employed by 28.4%. Using the Two-Stage least squares approach, Okeke (2021) investigated the impact of offshore remittances on unemployment in Nigeria. The results show that there is a uni-directional relationship between these two variables, with international migrant remittances having a negative impact on unemployment.

Asad et al. (2016) also draw the conclusion that Pakistan's unemployment rate will undoubtedly decline as a result of the favorable effects of remittances on levels of production and economic activity. In Pakistan, Mazher et al. (2020) discovered that both foreign remittances and foreign direct investment reduce unemployment rates over the long run. They further posit that both FDI and foreign remittances have statistically insignificant short-run effects on unemployment. Other studies also exist on remittances and some macroeconomic variables. Remittances have been found to have a long-run positive impact on a nation's macroeconomic performance through the expansion of foreign exchange reserves, the financing of trade deficits (Rapoport & Docquier, 2006), and the enhancement of other nations' credit ratings (Newland et al., 2007). Notably, in Ghana, a number of studies were also conducted on remittances and some variables. Using pooled panel data sets for Ghana, the counter-cyclicality of remittances was established by Quartey and Blankson (2004). They discovered that the removal of household credit restrictions and the increased possibility of better investment options and mobilizing savings are the main significance of remittances at the micro level. A probit model was employed by Quartey et al. (2018) to determine the connection between remittances and the likelihood of saving. The results show that receiving remittances significantly affects a household's propensity to save. When compared to households that solely get local remittances, those that receive foreign remittances appear to be more inclined to save money. Remittances have a long-lasting effect on living standards, according to certain other research, which is reflected in improvements in household consumption patterns. Therefore, a sizable portion of unrequited private transfers is used to pay for necessities like clothing, food, and medical care. As a result, poverty is reduced and overall well-being is enhanced (Quartey, 2006; Sow et al., 2014; aylor & Castelhano, 2016).

From the above review, it is clear that the body of research has not been able to conclusively state how exactly foreign remittances affect the unemployment rate. Also, the effect of remittances on unemployment differs from country to country, so results from such studies cannot be used to generalize, hence the need to conduct a study using Ghana as a case study. Further, despite the fact that the Sustainable Development Goals demand that every country create decent jobs and close the gender gap, previous studies failed to examine the gender aspects of the unemployment-remittance nexus. This study seeks to bridge that lacuna in the literature by empirically examining the remittances and unemployment nexus and bringing to bear the gender dynamics of such relationships.

3. Methodology of the study

The theoretical foundation and numerous statistical tools required for data analysis are examined in this section. From 1991 to 2021, annual data were obtained from the World Bank's Development Indicators website. The variables were initially subjected to a statistical descriptive analysis. Second, the bound test of cointegration and the ARDL are performed after the stationarity test using the ADF and the Philip Perron (PP) test.

3.1. Theoretical framework

The concept of the "new economics of labor migration" takes into account how remittances affect the global economy. This hypothesis states that remittances aid in the macroeconomic development of the home country by removing credit limitations for firms, raising capital stock to an appropriate level, and reducing unemployment (E. J. Taylor, 1999). Additionally, according to the labor market search matching model created by Drinkwater, the unemployment rate may be impacted by international remittances in two completely different ways. First off, because these employees are risk-averse, they improve search utility and can influence the unemployment rate in both favorable and adverse ways. Secondly, they loosen the credit restrictions that businesses must adhere to, bringing down the unemployment rate and increasing capital stock to an appropriate level. Remittance income reaches its ideal level when it is sufficiently high, at which point any additional growth merely has a search effect.

3.2. Empirical model specification

We estimate the following model in accordance with Maqbool et al. (2013) and Arslan and Zaman (2014) to analyze the effect of remittances on the unemployment rate.

$LNUNEMP_{t} = \beta_{0} + \beta_{1}REM_{t} + \beta_{2}FDI_{t} + \beta_{3}GDP_{t} + \beta_{4}LNINF_{t} + \beta_{5}LNGCF_{t} + \beta_{6}LNGDP * REMIT_{t} + \varepsilon_{t}$ (1)

Where UNEMP is the unemployment rate, which represents the dependent variable. The regressors are foreign direct investment as a percentage of GDP (FDI), REM is remittance as a percentage of GDP, GDP is gross domestic product, INF is inflation rate, GCF is gross capital formation and GDP*REMIT is the interaction term, with GDP as the mediating factor. It is envisaged that remittances will reduce unemployment when invested productively in an economy. Thus, high remittance investment will lead to a low unemployment rate. FDI is also expected to reduce unemployment. FDI represents one major source of foreign capital flows, which, when invested, can increase economic growth and cause the unemployment rate to fall. Theoretically, high GDP growth should result in lower unemployment. Okun's law (1962), which holds that GDP growth and unemployment are theoretically related, provides a powerful argument in favor of this. The Phillips curve suggests a trade-off between unemployment and inflation in terms of these two variables. At high inflation rates, the rate of unemployment is low, and vice versa. Generally speaking, an economy's capacity to increase its total output and, consequently, its ability to reduce unemployment depends on how high its capital formation rate is.

3.2.1. The ARDL model estimation

The study made use of the ARDL cointegration model created by Pesaran et al. (2001). The autoregressive distributed lag model has a number of benefits over other time-series cointegration models, such as the Engle and Granger cointegration (Engle & Granger, 1987) approach, which is used to look into the long-run relationship between two variables, and the Johansen's cointegration test, which is used to look into the long-run relationship for multiple variables. While ARDL can be used for small sample sizes, the Johansen and Juselius approach is preferable in some circumstances because it does not deal with small sample sizes and all variables should be integrated in the same order, such as the first difference (Pesaran & Shin, 1995). One advantage of the ARDL model is its ability to simultaneously estimate short-run and long-run parameters. ARDL can be applied when the series are I (0), I (1), or a combination of the two. According to Pesaran and Pesaran (1997) and Ouattara (2004), ARDL cannot be used if any variable is stationary at I (2) since the findings will be unreliable.

Consequently, we define the model as follows within the ARDL specification:

$$\theta + \sum_{i=1}^{n} \theta_{1i} \Delta LNUNEMP_{t-1} + \sum_{i=1}^{n} \theta_{2i} \Delta FDI_{t-1} + \sum_{i=1}^{n} \theta_{3i} \Delta REM_{t-1} + \sum_{i=1}^{n} \theta_{4i} \Delta GDP_{t-1} \\ + \sum_{i=1}^{n} \theta_{5i} \Delta LNINF_{t-1} + \sum_{i=1}^{n} \theta_{6i} \Delta LNGCF_{t-1} + \sum_{i=1}^{n} \theta_{7i} \Delta LNGDP * REMIT_{t-1} + \beta_{1}LNUNEMP_{t-1} \\ + \beta_{2}FDI_{t-1} + \beta_{3}REM_{t-1} + \beta_{4}GDP_{t-1} + \beta_{5}LNINF_{t-1} + \beta_{6}LNGCF_{t-1} + \beta_{7}LNGDP * REMIT_{t-1} + \mu_{t}$$
(2)

In equation 2, the coefficients θ_1 to θ_7 measure the short-run dynamics while β_1 to β_7 represents the long-run dynamics. Consequently, the null hypothesis, which denotes no long-run relationship, $H0: (\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0)$ is verified against the alternative hypothesis for the existence of a long-run relationship $H1: (\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7)$.

Then, using the error correction model, which may be specified as follows, the short-run dynamics and stability of the model are established:

$$\Delta LNUNEMP_{t} = \theta + \sum_{i=1}^{p} \theta_{1i} \Delta LNUNEMP_{t-1} + \sum_{i=1}^{p} \theta_{2i} \Delta FDI_{t-1} + \sum_{i=1}^{p} \theta_{3i} \Delta REM_{t-1} + \sum_{i=1}^{p} \theta_{4i} \Delta GDP_{t-1} + \sum_{i=1}^{p} \theta_{5i} \Delta LNINF_{t-1} + \sum_{i=1}^{p} \theta_{6i} \Delta LNGCF_{t-1} + \sum_{i=1}^{p} \theta_{7i} \Delta LNGDP * REMIT_{t-1} + \delta_{1}ECT_{t-1} + U_{t}$$
(3)

where δ_1 which is the coefficient of the lagged error correction term (ECT_{t-1}), is used to determine the speed of adjustment of the parameters in the long run with the expectation that it will be negative and significant. After estimating the short- and long-run coefficients, some diagnostic and stability tests were conducted to ensure that the model is free from serial correlation, heteroskedasticity, and is also stable.

4. Results and discussion

4.1. Unit root test results

Prior to using the ARDL limits test approach, it is essential to prove the stationarity property of the variables in order to prevent the emergence of spurious regression. A variable's mean value and variances are tested using the unit root test to see if they are time-invariant, constant over time, or fixed over time. Augmented Dickey Fuller (ADF) and Philip Perron tests are used to confirm the stationarity properties of the variables under consideration before we start the estimation process. Table 1 displays the outcomes of the unit root ADF and Philip Perron (PP) tests that were used to determine the order of integration of the time-series variables employed in this investigation. It is obvious from the results that, using the ADF test, all the variables were stationary at the level except unemployment and remittances. However, all the variables turn stationary after the first difference. Similarly, for the Philip Perron test, it is clear that except unemployment, remittances, and FDI, all other variables were stationary at level, but at first difference, all these variables were found to be stationary. This suggests that none of the variables are integrated of order I (2) and that all of them represent a combination of I (0) and I (1). The ARDL approach can therefore be used in this investigation. The F statistic was used in the analysis to make a decision.

4.2. Cointegration test

After determining if the series is stationary, we carry out the cointegration test. A long-run equilibrium between two or more time-series variables that are all non-stationary in shape is referred to as cointegration (Gujarati, 2012). In order to determine whether the approved models contain relationships that are empirically significant, the co-integration check becomes essential. This is evident from the integration of order zero I (0) and order one I (1) values for our variables in Table 2, which validates the sufficient requirement of the ARDL-Unrestricted Error Correction Model (UECM).

We reject the null hypothesis that there is no lengthy relationship between the variables in favor of the alternative, which is that there is a long-run relationship between the variables, given that the F-stat for all of the categories is greater than their upper bound values. The ARDL framework was used to estimate the long-run coefficients after the bound test for cointegration was used to confirm the presence of a long-run relationship between unemployment and the variables. Results from Table 3 reveal that unemployment has a long-run relationship with remittances, Inflation, FDI, exports, gross capital formation, and the interaction between GDP and remittances. Remittance inflows are found to have a favorable and considerable effect on unemployment in Ghana. Specifically, a 1% increase in remittances was found to increase unemployment by 14.5% in Ghana. This result is unexpected since remittances are supposed to promote investment to spur economic growth and thus reduce unemployment. This phenomenon in Ghana could be attributed to the fact that remittances received in developing countries are used largely for consumption purposes and not for investment or productive purposes. This finding corroborates the studies by Anthony-Orji et al. (2018) and Kim (2007), who found remittances to be positively impacting unemployment in Nigeria and Jamaica, respectively. The result is, however, at variance with Mazher et al. (2020) and Asad et al. (2016), who found remittances to have a positive impact on production and economic activity levels, and so the unemployment rate in Pakistan surely reduces. By gender, we found a positive and significant long-run relationship between remittances and female unemployment. A 1% increase in remittances increases female unemployment by 9.4%, all else being constant. Remittances also appear to promote male unemployment, though this is not statistically significant. In a similar vein, inflation has been discovered to have a long-run, positive, and substantial impact on unemployment. Impliedly, a unit increase in inflation increases the unemployment rate by 1.2 units, all things being equal. This result is unexpected, as inflation is expected to negatively impact unemployment. This finding is in congruence with Tenzin (2019), who found inflation to positively affect unemployment in the long run in Bhutan. By gender, we found a positive and significant long-run association between inflation and female unemployment. Thus, a unit increase in inflation increases female unemployment by 1.2 units, all other things being constant. Again, inflation seems to influence male unemployment, though it is not statistically significant.

Table 1. Results d	of unit root test (/	ADF and PP)						
Level Form						First Diff	ferenced	
	AL	DF	d	А	AI	ОF	đ	đ
Variable	Intercept	Prob	Intercept	Prob	Intercept	Prob	Intercept	Prob
LNUNEMPT	-2.0953	0.2479	-2.2778	0.1854	-3.2016	0.0305**	-3.225	0.0290**
REMIT	2.1919	0.9907	-1.4982	0.5203	-1.8505	0.0623*	-14.4189	0.0000***
LNINF	-3.6170	0.0116**	-3.617	0.0116**	-5.4588	0.0002***	-11.0497	0.0000***
FDI	-1.8374	0.3558	-1.8929	0.3308	-4.3769	0.0019***	-4.3385	0.0020***
LNEXP	-2.6676	0.0918*	-2.6323	0.0982*	-4.9018	0.0005***	-4.9018	0.0005***
LNGCF	-2.6824	0.0892*	-2.7575	0.0769*	-5.3556	0.0002***	-5.3742	0.0001 ***
GDP	-3.0107	0.0457**	-3.0016	0.0465**	-5.9739	0.0000***	-7.2593	0.0000***
Source: Authors const	ruct, 2022.							

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Table 2. Results of bounds test for cointegration

F-bounds Test H₀: No long-run relationship

Test Statistic	Value	Sig	I(0)	I(1)
F-Stat	9.1618	10%	2.03	3.13
К	7	5%	2.32	3.5
		2.50%	2.6	3.84
		1%	2.96	4.26
Female Category				
F-statistic	5.224928	10%	2.12	3.23
k	6	5%	2.45	3.61
		2.50%	2.75	3.99
		1%	3.15	4.43
Male Category				
F-statistic	5.010688	10%	2.12	3.23
k	6	5%	2.45	3.61
		2.50%	2.75	3.99
		1%	3.15	4.43

Source: Authors' construct, 2022.

Levels Equation

Table 3. Results of long-run effect of remittances on unemployment rate

Case 3: No Trend and Unrestricted Constant				
Variable	Female Coefficient	Male Coefficient	Pooled Coefficient	
REMIT	0.0943**	0.3301	0.1452***	
	(-0.0364)	(-0.2207)	(0.0390)	
LNINF	0.1534**	0.502	0.1460*	
	(0.0690)	(-0.3979)	(0.0744)	
FDI	0.0818***	0.1798	0.1081***	
	(-0.0245)	(0.1124)	(0.0263)	
LNEXP	1.7357***	3.4959*	1.9868***	
	(-0.2344)	(1.6155)	(0.2676)	
LNGCF	0.8735***	0.7344	0.8724***	
	(-0.1897)	(0.5780)	(0.2019)	
LNGDP_REMIT	-0.3509***	-0.8097	-0.4762***	
	(-0.0998)	(0.4837)	(0.0989)	

Notes: Numbers in parenthesis represent standard errors.

Similar findings were made on the long-run positive relationship between foreign direct investment (FDI) and unemployment. By implication, we found that a 1% increase in FDI increases unemployment by 10.8%, all else being constant. This result is unexpected, as FDI is expected to boost government investment expenditure and therefore create jobs, leading to a reduction in unemployment. The positive effect of FDI could perhaps be explained by the fact that such funds are not spent on productive economic activities and therefore do not create jobs for the unemployed. This result is inconsistent with Maqbool et al. (2013), Aqil et al. (2014), Arslan and Zaman (2014), and Zeb et al. (2013), who showed a reducing effect of FDI on unemployment, but supports that of Kamran et al. (2014), who established a positive association between FDI and unemployment in Pakistan.

By gender, we also found a positive and significant long-run association between female unemployment and FDI. This suggests that, when all else is held constant, a 1% increase in FDI causes an 8.2% rise in female unemployment. Furthermore, we discovered that, over the long run, exports had a favorable and significant association with unemployment. This implies that an increase in exports of one unit causes an increase in the unemployment rate of 7.3 units. This has the same distributional effect on gender. The positive effect could perhaps be explained by the fact that Ghana is exporting goods and services that it has a comparative disadvantage in, and therefore increasing exports will lead to increasing unemployment, all things being equal. Contrarily, Dizaji and Badri (2014) argue that exports and wages have a long-run, positive, and significant impact on employment in Iran.

In Ghana, it was observed that gross capital formation and unemployment were positively and significantly correlated. Consequently, a unit increase in gross capital formation caused an increase in the unemployment rate by 2.4 units. The association between female unemployment and gross capital formation was also found to be favorably significant. Thus, a unit increase in gross capital formation increases female unemployment by 2.4 units. Finally, the interaction term (InGDP * remit) has a negative and significant long-run relationship with Ghana's unemployment rate. This reveals that remittances have an impact on unemployment at various stages of economic growth. Thus, increases in remittance inflows will continue to decrease unemployment if the economic growth rate in Ghana remains above a threshold of 1.36%, all things being equal. This trend might be attributed to the mediating role of gross domestic product (GDP) in reducing unemployment.

4.3. Short-run dynamics

From Table 4, ETC (CointEq) has a negative coefficient and is significant at the 1% level. This is expected since it supports the existence of an a long-run relationship among variables as earlier established. The error-correction term can be interpreted to mean that fluctuations in unemployment are adjusted at a speed of 56.6% to ensure long-run convergence to equilibrium. A negative and significant relationship between remittances and unemployment was found in the short-run estimations.

For the pooled results, there is a short-run, negative, and statistically significant correlation between remittances and unemployment. Specifically, a one percent increase in remittances leads to a 1.39% reduction in unemployment, all else remaining constant. Interestingly, the one-lag period for remittance exhibits a positive and statistically significant relationship with unemployment. This has the same distributional effect on gender. Both male and female unemployment rates were positive and significantly correlated with remittances in the short run. Specifically, for the pooled results, a 1% increase in remittances caused unemployment to increase by 4.5%. By gender, we found that a 1% rise in remittances also increased female and male unemployment by 3% and 2.1%, respectively. In Ghana, FDI has a negative and significant effect on both female and pooled unemployment. Thus, a 1% increase in FDI reduces the unemployment rate in Ghana by 4.4%. Similarly, a 1% increase in FDI reduces the female unemployment rate in Ghana by 3.1%. The one-lag period of FDI also exhibits a negative and statistically significant impact on unemployment. From the findings, exports of goods and services do not significantly affect the unemployment rate in the short run, but the one-lag period does positively affect the unemployment rate. Gross capital formation shows a negative and statistically significant association with unemployment in Ghana in the short run. Consequently, unemployment drops by 37.32% for a 1% increase in gross capital formation in the short run. There is also a reduction in female unemployment and male unemployment by 29.55% and 10.99%, respectively, from a 1% rise in gross capital formation. Finally, although the interaction variable turns out to be statistically insignificant, its one-lag period is found to negatively affect the unemployment rate in the short run. This has the same distributional effect on gender.

Table 4. Short-run effects of remittances on unemployment in Ghana

Levels Equation				
Case 3: No Trend and Unrestricted Constant				
Variable	Female Coefficient	Male Coefficient	Pooled Coefficient	
С	4.0917***	3.1053***	4.5652***	
	(0.5367)	(0.4219)	(0.5200)	
D(LNMEMPT(-1))	-0.3459**	0.5282***		
	(0.1459)	(0.1150)		
D(REMIT)	-0.0083	-0.0075	-0.0139*	
	(0.0067)	(0.0074)	(0.0076)	
D(REMIT(-1))	0.0299***	0.0212**	0.0348***	
	(0.0082)	(0.0088)	(0.0082)	
D(FDI)	-0.0312***		-0.0444***	
	(0.0091)		(0.0105)	
D(FDI(-1))	0.0186**		0.0215**	
	(0.0071)		(0.0079)	
D(LNEXP)	0.0756	0.0727	0.0372	
	(0.0673)	(0.0735)	(0.0683)	
D(LNEXP(-1))	0.5609***	0.3941***	0.6108***	
	(0.1065)	(0.1017)	(0.1000)	
D(LNGCF)	-0.2955***	-0.1099*	-0.3732***	
	(0.0572)	(0.0518)	(0.0716)	
D(LNGCF(-1))		-0.1250**		
		(0.0462)		
D(LNGDP_REMIT)	-0.0208	-0.0092	0.0095	
	(0.0158)	(0.0175)	(0.0193)	
D(LNGDP_REMIT(-1))	-0.1359***	-0.0533**	-0.1270***	
	(0.0273)	(0.0234)	(0.0211)	
CointEq(-1)*	-0.5718***	-0.2208***	-0.5659***	
	(0.0748)	(0.0300)	(0.0644)	
Observation	30	30	30	
R-squared	0.8883	0.9040	0.8775	
S.E. of regression	0.0451	0.0496	0.0504	
Prob(F-statistic)	0.0000***	0.0000***	0.0000***	

Source: Author's construct, 2022.

Table 5. Residual and stability tests results				
Method	F-Statistic	Prob		
Serial correlation	0.612552	F(2, 9) = .5631		
Heteroscedasticity	1.239134	F(16, 11) = .366		
Normality (Jarque-Bera)	1.46895	0.479757, Normal		
CUSUM	Within 5% critical region	Stable		
CUSUMSQ	Within 5% critical region	Stable		

Source: Author's construct, 2022.

4.4. Residual and stability diagnosis

The residual and stability diagnoses were carried out after estimating the short- and long-run impacts of the covariates on the dependent variable. The results are shown in Table 5. The study used the LM test for serial correlation, the Breusch-Pagan residual test for heteroskedasticity, and the Jarque-Bera test for normality.

The probability values of the F-statistics in all scenarios are all greater 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. Finally, to determine the model stability, we used the CUSUM and CUSUM of squares test. Figures 1–3 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.



Figure 1. CUSUM and CUSUMSQ plots for the pooled category.

Figure 2. CUSUM and CUSUMSQ plots for the female category.



5. Conclusions and recommendations

Policymakers continue to be quite concerned about unemployment because it poses political, social, and economic risks to the economy that could slow down development and progress. Because of this, lowering unemployment has continued to be a core component of macroeconomic policy decisions in all emerging countries, including Ghana. As a result, the contribution of international remittances to Ghana's efforts to combat increasing unemployment has become crucial. The study analyzes the impact of remittances on Ghana's unemployment rate from a gender viewpoint. The data used for this research, which covered the years 1990 to 2021, was examined using the ARDL technique. The study revealed that unemployment has a long-run relationship with remittances, inflation, FDI, export and gross capital formation. The increasing flow of remittances presented mixed results in the runs. Remittances are found to promote unemployment in the long-run but reduce it in the short-run. This implies that while remittances may be invested in the short run to reduce unemployment, they are mainly used for consumption purposes towards the long run in Ghana. When disaggregated by gender, female unemployed appear to suffer from these inflows. By gender, the results suggest that in both short run and long run remittances turn to encourage female unemployment but also promote male unemployment only in the short run in Ghana, all else equal. The results further reveal that in the short run, there is a negative contemporaneous correlation between remittances and unemployment, but a positive correlation between lagged remittances and unemployment for both males and females. In the long run, we found export to promote the unemployment rate in Ghana, all else equal. This might be attributed to the fact that most of our exported goods (e.g. cocoa, gold and oil,

Figure 3. CUSUM and CUSUMSQ plots for the male category.



among others) are exported without adding value, where the potential jobs that could have been created are equally exported. The results further suggest that the interaction term (InGDP*Remit) is negative and significantly associated with unemployment in Ghana in the long run. This suggests that remittances promote employment at various stages of economic growth in Ghana. Remittance inflow will therefore continue to reduce unemployment if Ghana's economic growth rate stays over a threshold of 1.36%, all else being equal. This trend might be attributed to the mediating role of gross domestic product (GDP) in reducing unemployment. Furthermore, the interaction term (InGDP*Remit) was found to reduce female unemployment in the long run.

Based on the afore-mentioned conclusions, the study recommends that beyond the flagship programs of Government such as the Nation Builders Corps (NABCO), The Youth Employment Programme, Planting for Food and Jobs, government should introduce policies to attract more remittances through the formal channels. For remittances to reduce unemployment in the short run, the government and policy-makers should offer attractive interest rates for deposits of remittances in the Ghanaian banks. This might encourage the saving and investment of remittances into productive ventures. Consequently, this might spur economic growth and reduce unemployment in Ghana towards the long run. Secondly, due to the mediating role of GDP in reducing unemployment government should create conditions for the economy to grow over a threshold of 1.36%, in order that remittance can reduce unemployment in Ghana. By extension, remittances are also found to reduce female unemployment through the mediating role of GDP. Therefore, to reduce female unemployment the Government should stimulate economic growth by boosting productive economic activities. Thirdly, export was found to increase unemployment in the long run and to reverse the trend government should develop policies to ensure value addition to our exports. This might help create more job avenues along the value chain, thereby reducing the unemployment rate in the long-run. Finally, as FDI and gross capital formation reduce unemployment in the short run, government should implement a tax incentive program for foreign investors in order to increase FDI into the economy. In our opinion and by best practice policy recommendations are highly valuable to help grow the Ghanaian economy. We also recommend that future research into the unemployment remittances nexus with a gender focus should be done using quarterly data.

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