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Impact of credit expansion and contraction on unemployment

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Abstract

The literature has not examined the factors leading to tight labor markets or unemployment in West African countries. We investigate the impact of private credit expansion and contraction on the unemployment rate in Economic Community of West African States (ECOWAS) countries. Credit expansion and contraction are measured using a three-level criterion. The fixed effect panel regression model was used to estimate the impact of private credit contraction and expansion on the unemployment rate in ECOWAS countries. Private credit contraction significantly increases the unemployment rate in ECOWAS countries. Private credit expansion does not have a significant effect on the unemployment rate. Real GDP growth has a significant negative effect on the unemployment rate which supports the prediction of the Okun's Law while the inflation rate has a positive and insignificant effect on the rate of unemployment in ECOWAS countries which contradicts the prediction of the Phillips curve. Policymakers in ECOWAS countries need to be cautious when introducing policies that lead to private credit contraction as it could increase unemployment. Policymakers in ECOWAS countries should also find the "threshold" below which private credit contraction will worsen the unemployment rate and introduce policy measures to ensure that private credit contraction does not fall below the threshold.

Keywords: unemployment, credit, economic growth, ECOWAS, legal system, inflation, domestic private credit to private sector.

JEL code: E24, O40, O47, J64, G21

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1. Introduction

We investigate the impact of private credit expansion and contraction on the rate of unemployment in the Economic Community of West African States (ECOWAS) countries.

The unemployment rate in West African countries has severely deteriorated in the last decade. It is estimated that nearly 24.8 million people in the ECOWAS region are unemployed out of a total of 414 million since 2021 according to data from the International Labour Organisation. The unemployment rate in ECOWAS countries has become an important socioeconomic issue which policymakers are dealing with in recent times due to the broader consequences of unemployment such as the loss of income, higher indebtedness, poor health, protest, violence, political instability and increase in poverty (Brand, 2015; Jarosch, 2023). Also, in the academic literature, there has been many debates about the determinants or causes of rising unemployment in African countries. The commonly cited determinants of unemployment include GDP growth, inflation, labour productivity, foreign direct investment, external debt, and population growth (Anyanwu, 2013; Folawewo and Adeboje, 2017). We add to this literature by investigating empirically the impact of private credit contraction and expansion on the rate of unemployment using a panel of 10 ECOWAS countries spanning the period 1993 to 2021.

The literature show that private credit expansion and contraction affect the rate of unemployment through two channels. First, private credit expansion may have a positive impact on the unemployment rate because firms usually benefit from low financing cost during periods of credit expansion (Monacelli et al, 2023). Firms will obtain cheaper credit for production and investment activities during periods of credit expansion, and it will lead to higher profitability and more job vacancies through business growth or business expansion, thereby reducing the unemployment rate (Gu et al, 2019). In contrast, private credit contraction is considered to have a negative impact on the unemployment rate because firms usually experience difficulty in obtaining external finance during periods of credit contraction (Gu et al, 2019). As a result, firms will delay investment and decrease output which will lead to decrease in the profitability of firms and delay in hiring decisions, thereby increasing the rate of unemployment (Borsi, 2018). The

literature also shows that the overall effect of credit expansion and credit contraction on the rate of unemployment depends on whether the change in private credit is abnormal or unexpected (Ozili et al, 2023). These findings in the literature are based on evidence from developed country studies. But what is true for developed economies may not be true for West African countries due to the presence of frictional credit markets and a tight labor market in West African countries.

We revisit the finance-labor relationship and investigate the effect of private credit expansion and contraction on the rate of unemployment in the context of ECOWAS countries. In ECOWAS countries, credit markets have a great deal of imperfections and frictions that prevent firms from accessing cheap credit which they can use to increase investment that lead to more job vacancies. The presence of frictions discourage firms from accessing external financing. Also, lenders in ECOWAS credit markets often decrease or increase private credit unexpectedly depending on their incentives, regulation, the prevailing market condition and changing macroeconomic conditions (Ozili et al, 2022). Sudden decrease or increase in private credit is a common occurrence in the ECOWAS region due to high dependence on oil, high level of inflation and severe credit market imperfections in the region. Given these concerns, it is also important to determine whether abnormal private credit expansion and contraction have a significant effect on the rate of unemployment. Our study is the first study to examine the effect of private credit expansion and contraction on the unemployment rate in ECOWAS countries.

Using data for ECOWAS countries from 1993 to 2021, we find evidence that private credit contraction increases the unemployment rate in ECOWAS countries. We also find that real GDP growth has a significant negative effect on the unemployment rate which supports the prediction of the Okun's Law while the inflation rate has a positive and insignificant effect on the rate of unemployment in ECOWAS countries which contradicts the prediction of the Phillips curve.

The main contribution of this paper lies in investigating how changes in private credit affect labour market dynamics especially the rate of unemployment in ECOWAS countries. Second, the study contributes to the economic literature that assess the finance-labor relationship. Existing studies in this literature include Acemoglu (2001), Dromel et al (2010), Monacelli et al (2023),

Petrosky-Nadeau (2014), Borsi (2018) and Herkenhoff (2019). Our study contributes to this literature by analyzing the potential effect of private credit expansion and contraction on the rate of unemployment with particular focus on ECOWAS countries. Third, the article explores the hypothesis that abnormal private credit expansion and contraction could lead to severe unemployment in ECOWAS countries due to the presence of frictional credit markets in the region. Fourth, the role of legal institutions and central bank assets are considered, since variation in labor market dynamics may stem from central bank intervention and the quality of legal institutions.

The rest of the paper is structured as follows. Section 2 presents the literature review. Section 3 presents the research methodology. Section 4 presents the empirical results. Section 5 presents the conclusion.

2. Theory and literature review

2.1. Credit-unemployment theory

In the theoretical literature, Bernanke and Gertler (1989) and Kiyotaki and Moore (1997) propose that credit is a determinant of unemployment. They argue that credit availability affects labour markets through its impact on investment and hiring decisions. They argue that credit expansion compels employers to increase investment and employ more workers because of the availability of credit and lower financing costs during periods of credit expansions. Conversely, credit contraction compels employers to decrease investment and fire workers or delay new hirings because of a reduction in credit availability and lower financing costs during periods of credit contraction. Subsequent studies such as Perotti and Spier (1993) and Dasgupta and Sengupta (1993) argue that firms can use credit or debt to reduce the bargaining power of workers and to justify the payment of low wages which in turn increases the incentive of firms to employ more workers. In support of this argument, Michaels et al. (2019) show evidence that firms with higher debt pay workers fewer wages while Matsa (2010) show that the reverse is the case if workers have more bargaining power because they will use their labor unions to demand more wages

even when firms have large debt and this in turn will reduce the incentive of firms to hire new workers.

2.2 Literature review

Several studies examine the determinants of unemployment and show that access to credit markets and firm's credit condition are determinants of unemployment. For instance, Herkenhoff (2019) shows that access to credit markets is an important determinant of employment. Gu et al (2019) examine the effect of firms' credit condition on labor market performance and show that better credit condition has a positive impact on the labor market because better credit condition enable firms to save on financing cost, improve profitability and create more job vacancies, thereby reducing the unemployment rate.

Other studies examine how changes in credit availability affect the unemployment rate. Borsi (2018) investigates the impact of private credit contraction on labor market performance among 20 OECD countries from 1980 to 2013, and find that credit contraction increase total unemployment rate, and the effect is stronger for youth unemployment. Monacelli et al (2023) developed a model which show that the ability to borrow can make firms incur high debts, and higher debt allows employers to bargain lower wages which in turn increases the incentive to create jobs and decrease the unemployment rate; however, such firms can cut hiring after a credit contraction because the credit contraction reduces their ability to borrow which then provides a disincentive to increase hiring. Hsu et al (2013) examine the impact of unemployment insurance (UI) on consumer credit markets. They find that UI helps the unemployed to avoid defaulting on their debt; and lenders respond to the decline in default risk by expanding access to credit for low-income households who are at risk of being unemployed.

A number of studies also examine how credit market frictions may affect the finance-labor relationship. Acemoglu (2001) shows that credit market friction contributes to high unemployment in countries where credit markets do not function efficiently; as a result, job creation is constrained by credit market imperfections, and it leads to high unemployment. Petrosky-Nadeau (2014) extends the Acemoglu (2001)'s argument by showing that the level of unemployment could increase when vacancy costs require some external financing from credit

markets that have high frictions. The friction in credit markets would make it difficult for recruiters to access credit to hire new recruits; as a result, lack of access to credit or inefficient access to credit would increase the unemployment rate (Petrosky-Nadeau, 2014). Similarly, Dromel et al (2010) show that credit market imperfections impact not only the level of unemployment, but also impacts its persistence; in other words, credit market imperfections significantly increase the persistence of unemployment. Mitra and Wei (2023) examine the effect of credit supply shocks in several US counties. They construct U.S. county-level credit supply shocks by interacting the mortgage growth of multi-market lenders with a county's initial exposure to those lenders. They find that credit shocks did not increase unemployment during credit booms but it increased unemployment during the great recession. They also find that, although local unemployment rates reduced after the great recession, wages did not increase.

Recent studies document evidence for some of the determinants used in our study particularly inflation, GDP growth, private domestic credit, and the role of central banks. But evidence is lacking for ECOWAS countries. For instance, Alam et al (2020) examine the determinants of unemployment in Bangladesh from 1995 to 2019. They find that GDP and foreign direct investment are significant determinants of unemployment in Bangladesh while inflation is not a significant determinant of unemployment in Bangladesh. Azolibe et al (2022) examine the determinants of unemployment in Nigeria and South Africa from 1991 to 2018. They document that private domestic credit and the inflation rate have a more significant effect on unemployment in South Africa than in Nigeria. Long et al (2022) examine central bank responsiveness to mitigate the negative shock of the COVID-19 pandemic on the macroeconomy. They examine 38 countries from January 2020 to June 2021 and find that although the COVID-19 pandemic increased inflation and unemployment, central bank response to the pandemic decreased the inflation rate but it did not decrease the unemployment rate across countries. Bayar and Diaconu Maxim (2020) investigate the effect of employment laws on unemployment focusing on the labor market and business regulations in 11 EU transition economies from 2000 to 2016. They find that market-oriented labor market regulations reduce unemployment in Bulgaria, Poland, and Romania, but they increase unemployment in Hungary, Latvia, Lithuania,

and Slovenia. Their result suggest that the effect of laws and regulations on unemployment may be country specific.

Meanwhile, in African countries, Folawewo and Adeboje (2017) analyse the relationship between macroeconomic aggregates and unemployment in ECOWAS countries and find that gross domestic product (GDP) growth has an insignificant effect on unemployment rate, while the inflation rate has a positive impact on unemployment which is contrary to the prediction of the Phillips curve hypothesis. They also find that foreign direct investment and external debt have a negative impact on unemployment while population growth has a positive effect on unemployment. Ozili et al (2022) investigate the impact of abnormal credit expansion and contraction on the GDP per capita of ECOWAS countries and find evidence that abnormal credit contraction reduces the GDP per capita of ECOWAS countries. Their result implies that 'too little' credit does not improve growth per person in immature financial systems. Although few African studies have examined the effect of finance or credit on some macroeconomic indicators, no studies have examined the effect of private credit expansion and contraction on the unemployment rate in the African context or in ECOWAS countries. We fill this gap in the literature by narrowing our focus on ECOWAS countries.

3. Methodology

3.1. Data

Country-level secondary data were extracted from the World Development Indicators (WDI), the Global Financial Development indicators (GFDI), and the World Governance Indicators in the World Bank database (see table 1). We focus on ECOWAS countries which includes Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, the Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo. Of the 15 ECOWAS countries, only 10 ECOWAS countries have full reported data for the variables in the World Bank database, namely, Benin, Burkina Faso, Cote d'Ivoire, Ghana, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. The sample period is from 1993 to 2021 which is a 28-year period. The reason for choosing an extended

sample period is to ensure that the sample period is long enough to capture at least two full economic cycles where a full economic cycle is a 10-year interval. Six variables were used in the empirical analysis. These variables have been used in previous studies such as Sorić et al (2019), Ahmad et al (2023), and Ozili et al (2023). The dependent variable is the unemployment rate variable (UNEMP). The main explanatory variables are the private credit expansion and contraction variables (CS*CSH and CS*CSL). Four control variables were introduced in the model which include central bank assets to GDP (CG), the rule of law index (LAW), the consumer price index inflation rate (INF) and real GDP growth (RGDP).

Variable	Description	Measurement	Data source
UNEMP	Unemployment rate	Percentage change in annual total unemployment rate	World Development Indicators
CS	Domestic credit to the private sector (% of GDP)	Domestic credit to the private sector refers to financial resources provided to the private sector by other depository corporations (except central banks) as a proportion of GDP.	Global Financial Development indicators
CG	Central bank assets to GDP (%)	Measures the ability of the Central Bank to intervene to resolve financial and credit crises using the assets in its balance sheet. The higher the ratio, the better.	Global Financial Development indicators
LAW	Rule of Law index	Captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	World Governance Indicators
INF	Consumer price index, inflation	Consumer price index reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed in a yearly interval.	International Monetary Fund (IMF) International Financial Statistics
RGDP	Real gross domestic product growth rate	Annual percentage change in real gross domestic product	World development indicators

Source: World Bank, IMF

3.2. Model specification

We estimate two models. The first model estimates the effect of private credit contraction on the unemployment rate in ECOWAS countries. The second model estimates the effect of private credit expansion on the unemployment rate in ECOWAS countries. The two models are specified below.

$$\begin{aligned} UNEMP_{i,t} = & \beta_0 + \beta_1(CS * CSL)_{i,t} + \beta_2(CS * CSL1)_{i,t} + \beta_3(CS * CSL2)_{i,t} + \beta_4CS_{i,t} \\ & + \beta_5CSL_{i,t} + \beta_6CSL1_{i,t} + \beta_7CSL2_{i,t} + \beta_8CG_{i,t} + \beta_9LAW_{i,t} + \beta_{10}INF_{i,t} \\ & + \beta_{11}RGDP_{i,t} + e_{i,t} \dots Eqn1 \end{aligned}$$

$$\begin{aligned} UNEMP_{i,t} = & \beta_0 + \beta_1(CS * CSH)_{i,t} + \beta_2(CS * CSH1)_{i,t} + \beta_3(CS * CSH2)_{i,t} + \beta_4CS_{i,t} \\ & + \beta_5CSH_{i,t} + \beta_6CSH1_{i,t} + \beta_7CSH2_{i,t} + \beta_8CG_{i,t} + \beta_9LAW_{i,t} + \beta_{10}INF_{i,t} \\ & + \beta_{11}RGDP_{i,t} + e_{i,t} \dots Eqn2 \end{aligned}$$

Where, i = country; t = year. UNEMP = unemployment rate. CS = domestic credit to the private sector (% of GDP). CSL = a binary variable representing private credit contraction shock. CSH = a binary variable representing private credit expansion shock. CG = central bank assets to GDP ratio (%). LAW = rule of law index variable. RGDP = real GDP growth rate. INF = annual inflation rate based on consumer price index. e = error term.

The models are estimated using the fixed effect regression methodology. The Hausman test shows that the fixed effect regression model is the appropriate model for the panel regression estimation (see Hausman test in appendix A). Therefore, the models are estimated using the panel fixed-effect regression method. The fixed effect regression technique has been used in previous studies such as Alfaro et al (2021) and Ozili et al (2022).

3.3. Variable justification

The UNEMP variable is the dependent variable. Regarding the independent variables, the CS variable is used to measure the level of private domestic credit. The theoretical and empirical literature show that higher private domestic credit can stimulate investment which leads to business expansion and more job vacancies, thereby reducing the unemployment rate (Bernanke and Gertler, 1989; Kiyotaki and Moore, 1997; Borsi, 2018). Another argument is that higher private domestic credit may be due to lower financial costs which motivates firms to expand and

create new job vacancies, thereby reducing unemployment (Monacelli et al, 2023). Therefore, a negative relationship between the CS variable and the UNEMP variable is expected.

The INF variable is the inflation rate derived from the consumer price index. The literature show that high inflation increases financing costs and makes it difficult for firms to expand or increase investment. This will lead to business contractions and fewer job vacancies, thereby increasing the unemployment rate (Folawewo and Adebaje, 2017; Azolibe et al, 2022). Therefore, a positive relationship between the INF variable and the UNEMP variable is expected.

The RGDP variable is the economic growth variable. The literature show that the unemployment rate is often low during periods of low GDP growth or during periods of economic contraction. This is because economic contractions are associated with greater job losses which increases the unemployment rate while economic expansions are associated with greater investment and greater business expansion which lead to more job vacancies, thereby reducing the unemployment rate (Pissarides, 2013; Alam et al, 2020). Therefore, a negative relationship between the RGDP variable and the UNEMP variable is expected.

The CG variable is used to measure central bank intervention in the economy to reduce the level of unemployment using the assets in the balance sheet of the central bank (Ozili et al, 2022). A large central bank balance sheet means that the central bank has sufficient assets to intervene in labor markets to reduce the level of unemployment. This suggests a negative relationship between the CG and UNEMP variables. However, a positive effect may be observed if central banks refuse to use their assets to intervene in labor markets especially when central banks maintain the view that unemployment reduction is not a part of their core mandate.

The LAW variable is used to measure the quality of the legal system in countries. Existing research document evidence that a strong legal system will protect the rights of workers, reduce incessant layoffs, and prevent job discrimination for new entrants, thereby decreasing the unemployment rate (Arestis et al, 2023; Bayar and Diaconu Maxim, 2020).

3.4. Measuring credit expansion and contraction

3.4.1. Measuring credit contraction

In the analysis, we measure private credit contraction using three methods adopted in Kiley (2022) and Ozili et al (2023). The first method is based on the below-the-mean values of the CS variable. The values of the CS variable which are below-the-mean are captured using the CSL dummy variable which takes the value of 1 if the CS variable is below-the-mean and zero otherwise. Thereafter, we interact the CSL dummy variable with the CS variable to measure credit contraction. The second method uses a stricter criterion which is based on one standard deviation below-the-mean of the CS variable. The values of the CS variable which are one standard deviation below-the-mean of the CS variable are captured using the CSL1 dummy variable which takes the value of 1 if the CS variable is one standard deviation below-the-mean and zero otherwise. Thereafter, we interact the CSL1 dummy variable with the CS variable to measure private credit contraction. The third method uses a more stringent criterion which is based on two standard deviations below-the-mean of the CS variable. The resulting values are considered to be abnormal credit values. We consider all values of the CS variable which are two standard deviations below-the-mean of the CS variable to be abnormal, and we capture it using the CSL2 dummy variable which takes the value of 1 if the CS variable is two standard deviations below the mean and zero otherwise. Thereafter, we interact the CSL2 dummy variable with the CS variable to measure abnormal credit contraction.

3.4.2. Measuring credit expansion

In the analysis, we also measure private credit expansion using three methods adopted in Kiley (2022) and Ozili et al (2023). The first method is based on the above-the-mean values of the CS variable. The values of the CS variable which are above-the-mean are captured using the CSH dummy variable which takes the value of 1 if the CS variable is above-the-mean and zero otherwise. Thereafter, we interact the CSH dummy variable with the CS variable to measure credit expansion. The second method uses a stricter criterion which is based on one standard deviation above-the-mean of the CS variable. The values of the CS variable which are one standard deviation above-the-mean of the CS variable are captured using the CSH1 dummy

variable which takes the value of 1 if the CS variable is one standard deviation above-the-mean and zero otherwise. Thereafter, we interact the CSH1 dummy variable with the CS variable to measure credit expansion. The third method uses a more stringent criterion which is based on two standard deviations above-the-mean of the CS variable. The resulting values are considered to be abnormal credit values. We consider all values of the CS variable which are two standard deviations above-the-mean of the CS variable to be abnormal, and we capture it using the CSH2 dummy variable which takes the value of 1 if the CS variable is two standard deviations above-the-mean and zero otherwise. Thereafter, we interact the CSH2 dummy variable with the CS variable to measure abnormal credit expansion.

3.5. Descriptive statistics

Table 2 reports the average values for the data. For the individual countries, the domestic credit to private sector (CS) variable is highest in Togo, followed by Senegal, while the average CS variable is lower in countries like Sierra Leone and Niger. The average UNEMP variable is highest in Senegal, Mali, and Ghana, and is lower in Benin and Niger. Meanwhile, the average CG variable is highest in Sierra Leone and is lower in Benin and Burkina Faso. The average LAW variable is highest in Ghana and lowest in Nigeria. The average INF variable is highest in Ghana and Nigeria and is lower in Sierra Leone and Benin. The average RGDP variable is highest in Burkina Faso and Ghana and is lower in Cote D'Ivoire and Sierra Leone. Finally, in the full sample descriptive statistics in table 3, some variables such as the UNEMP, CS and INF variables have a low standard deviation relative to their means which indicates that there is little variation between the observed values and the mean of the two variables.

Table 2. Descriptive statistics for the variables

ECOWAS / Variables	UNEMP	CSL	CSH	CS	CG	LAW	INF	RGDP	
Countries	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	
1 Benin	1.61	0.13	0.53	16.21	2.15	-0.50	90.75	4.62	
2 Burkina Faso	4.08	0.10	0.63	18.62	3.11	-0.48	92.82	5.62	
3 Cote D'Ivoire	4.75	0	0.84	19.50	5.41	-1.03	93.18	3.57	
4 Ghana	6.27	0.13	0.34	12.71	13.32	0.02	98.36	5.42	
5 Mali	6.87	0	0.69	17.93	2.76	-0.48	91.69	4.63	
6 Niger	1.31	0.34	0.26	10.23	4.40	-0.63	92.62	4.38	
7 Nigeria	4.77	0.13	0.21	11.69	5.59	-1.11	95.22	4.14	
8 Senegal	7.44	0	0.81	20.17	3.98	-0.16	94.05	3.92	
9 Sierra Leone	3.96	0.91	0	4.36	15.05	-0.97	88.40	3.78	
10 Togo	3.71	0	0.87	25.78	4.75	-0.85	91.81	3.85	
<i>Full sample:</i>									
Mean	4.47	0.17	0.52	15.72	6.05	-0.62	92.89	4.39	
Median	4.22	0.00	1.00	14.51	4.34	-0.65	88.54	4.75	
Maximum	11.71	1.13	1.26	47.14	45.45	0.15	278.29	26.42	
Minimum	0.32	0.00	0.00	1.60	0.14	-1.47	3.51	-20.59	
Standard Deviation	2.40	0.38	0.51	8.92	6.81	0.40	44.57	4.16	
No of observations	290	290	290	290	290	230	290	290	

Source: Author computation using Eviews 13

3.6. Pearson correlation analysis

Table 3 presents the Pearson correlation analysis for the variables. Table 3 shows that the credit to private sector (CS) variable is significant and positively correlated with the UNEMP variable. The economic significance of this result is that an increase in domestic credit to the private sector is correlated with increase in the unemployment rate in ECOWAS countries. This means that the two variables move in tandem as increase in one is correlated with increase in the other. The two private credit binary variables (CSL and CSH) are significantly correlated with the UNEMP variable. The LAW and INF variables have a significant positive correlation with the UNEMP variable while the RGDP variable has a significant negative correlation with the UNEMP variable. Meanwhile, the CG variable has an insignificant correlation with the UNEMP variable. Overall, the correlation of the explanatory variables with the dependent variable is sufficiently low, therefore, multicollinearity is not a problem in the analysis.

Table 3. Pearson correlation for all the variables

Variables	UNEMP	CS	CSH	CSL	CG	LAW	INF	RGDP
UNEMP	1.000 -----							
CS	0.154** (0.02)	1.000 -----						
CSH	0.207*** (0.00)	0.722*** (0.00)	1.000 -----					
CSL	-0.195*** (0.00)	-0.553*** (0.00)	-0.490*** (0.00)	1.000 -----				
CG	0.066 (0.31)	-0.378*** (0.00)	-0.371*** (0.00)	0.365*** (0.00)	1.000 -----			
LAW	0.255*** (0.00)	0.125* (0.05)	0.152** (0.02)	-0.213*** (0.00)	0.014 (0.82)	1.000 -----		
INF	0.123* (0.06)	0.245*** (0.00)	0.071 (0.28)	-0.105 (0.11)	-0.228*** (0.00)	0.145** (0.02)	1.000 -----	
RGDP	-0.145** (0.03)	-0.011 (0.86)	0.015 (0.82)	0.055 (0.40)	0.052 (0.43)	0.052 (0.43)	-0.116* (0.07)	1.000 -----

P-values are in parenthesis. ***, **, * represent statistical significance at 1%, 5% and 10% levels.

Source: Author computation

4. Empirical Results

4.1. Effect of private credit on the unemployment rate

The result for the effect of private credit on the unemployment rate is reported in column (i) of table 4. The CS coefficient is insignificant in column (i). This indicates that private domestic credit does not have a significant effect on the rate of unemployment in ECOWAS countries. This result does not support Borsi (2018) who argue that increase in domestic credit to the private sector would decrease the unemployment rate through increase in investment that lead to more job vacancies (Borsi, 2018). Regarding the control variables, the CG coefficient is positive and significant in column (i) in table 4. This indicates that the size of central banks' balance sheet (CG) has a significant positive effect on the unemployment rate. This implies that central bank intervention in the economy of ECOWAS countries did not reduce the unemployment rate possibly because unemployment reduction is not a mandate of the central banks in ECOWAS countries. The LAW coefficient is positive and insignificant in column (i). This indicates that the 'rule of law' variable has an insignificant effect on the unemployment rate. The INF coefficient is insignificant in column (i) of table 4. This indicates that the inflation variable has an insignificant effect on the unemployment rate. The RGDP coefficient is negative and significant in column (i) of table 4. This indicates that real GDP growth has a significant depressive effect on the unemployment rate. The significant result is consistent with the expectation that the unemployment rate is lower during periods of economic expansion while the unemployment rate is higher during periods of economic contraction (Pissarides, 2013). The observed negative relationship between economic growth rate and the unemployment rate also supports the Okun's law which predicts a negative relationship between the unemployment rate and gross domestic product.

4.2. Effect of private credit contraction and expansion on the unemployment rate

This section analyses whether private credit contraction and expansion have a significant effect on the unemployment rate in ECOWAS countries. The result for the effect of private credit contraction on the unemployment rate is reported in table 4. The CS*CSL coefficient is positive and significant in column (ii). This indicates that private credit contraction significantly increases the rate of unemployment in ECOWAS countries. The result supports the findings of Borsi (2018) who show that credit contraction increases the rate of unemployment. The economic significance of the CS*CSL coefficient is that a unit increase in private credit contraction will increase the unemployment rate by 43.9 percent. This shows that private credit contraction increases the unemployment rate in ECOWAS countries. Therefore, the monetary authorities in ECOWAS countries should not use contractionary credit supply measures in controlling the rate of unemployment because it worsens the unemployment rate in ECOWAS countries. The CS*CSL1 coefficient is positive and significant at the 5% level in column (iii). This indicates that private credit contraction increases the rate of unemployment in ECOWAS countries. The result supports the findings of Borsi (2018) who show that credit contraction increases the rate of unemployment. The economic significance of the CS*CSL coefficient is that a unit increase in private credit contraction will increase the unemployment rate by 59.4 percent. This shows that private credit contraction increases the unemployment rate in ECOWAS countries. Therefore, the monetary authorities in ECOWAS countries should not use contractionary credit supply measures to control the rate of unemployment because it worsens the unemployment rate in ECOWAS countries. The CS*CSL2 coefficient is negative and insignificant in column (iv). This indicates that abnormal private credit contraction does not significantly affect the rate of unemployment in ECOWAS countries. The result does not support the findings of Borsi (2018) who show that credit contraction increases the rate of unemployment.

**Table 4. Panel fixed effect regression estimations:
Effect of credit contraction on the unemployment rate in ECOWAS countries**

	(i)	(ii)	(iii)	(iv)
	Baseline estimation	Baseline estimation	Sensitivity analysis	Sensitivity analysis
Variables	UNEMP	UNEMP	UNEMP	UNEMP
	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
c	5.212*** (5.04)	4.335*** (3.95)	4.199*** (3.86)	4.961*** (4.67)
CS	-0.036 (-1.19)	-0.018 (-0.58)	-0.019 (-0.65)	-0.034 (-1.13)
CS*CSL		0.439* (1.73)		
CS*CSL1			0.594** (2.19)	
CS*CSL2				-4.692 (-1.19)
CSL		-1.663 (-1.12)		
CSL1			-2.275 (-1.49)	
CSL2				8.987 (1.03)
CG	0.109*** (4.06)	0.139*** (4.36)	0.146*** (4.58)	0.132*** (4.27)
LAW	0.107 (0.83)	-0.111 (-0.21)	-0.191 (-0.37)	-0.037 (-0.07)
INF	0.0001 (0.98)	0.002 (0.36)	0.002 (0.44)	0.0004 (0.09)
RGDP	-0.094*** (0.00)	-0.084*** (-3.12)	-0.076*** (-2.79)	-0.094*** (-3.26)
Country fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
R ²	75.78	76.59	76.88	76.17
Adjusted R ²	71.27	71.93	72.28	71.44
F-statistic	16.78	16.44	16.72	16.07
P(F-statistic)	0.000	0.000	0.000	0.000

***, **, * represent statistical significance at the 1%, 5% and 10% level, respectively. CSL = binary variable representing private credit contraction shock variable (equal 1 if CS is less than 50% of the

average of the CS distribution; and equal zero otherwise). CSL1 = binary variable representing private credit expansion shock (equal 1 if CS is below one standard deviation from the mean; and equal zero otherwise). CSL2 = binary variable representing private credit expansion shock (equal 1 if CS is below two standard deviations from the mean; and equal zero otherwise).

Source: Author computation

The result for the effect of private credit expansion on the unemployment rate is reported in table 5. The CS*CSH coefficient is insignificant in column (i). This indicates that private credit expansion (CS*CSH) does not have a significant effect on the rate of unemployment in ECOWAS countries. This implies that the use of expansionary credit supply measures by the monetary authorities does not have a significant effect on the unemployment rate in ECOWAS countries. The CS*CSH1 coefficient is insignificant in column (ii). This indicates that private credit expansion does not have a significant effect on the rate of unemployment in ECOWAS countries. This implies that the use of expansionary credit supply measures by the monetary authorities does not have a significant effect on the unemployment rate in ECOWAS countries. The CS*CSH2 coefficient is insignificant in column (ii). This indicates that abnormal private credit expansion does not have a significant effect on the rate of unemployment in ECOWAS countries. Meanwhile, the three credit expansion shock variables (i.e., CSH, CSH1 and CSH2) report a negative coefficient and are insignificant.

Regarding the control variables, the CS coefficient is negative and significant in columns (i) and (iii). This indicates that the private credit variable has a significant negative effect on the unemployment rate in ECOWAS countries. This result supports the expectation that increase in domestic credit to the private sector variable (CS) would decrease the unemployment rate through increase in investment that lead to more job vacancies (Borsi, 2018). The economic significance of the CS coefficient is that a unit increase in private domestic credit decreases the unemployment rate by at least 5.9 percent. The implication is that the monetary authorities in ECOWAS countries should encourage financial institutions to increase the level of credit to the private sector in order to decrease the rate of unemployment in ECOWAS countries. The CG coefficient is also positive and significant in columns (i), (iii) and (iii) in tables 4 and 5. This

indicates that the size of central banks' balance sheet (CG) has a significant positive effect on the unemployment rate. This implies that central bank intervention in the economy of ECOWAS countries increases the unemployment rate rather than reduce it. This might be due to the fact that central banks do not make a deliberate effort to reduce unemployment because unemployment reduction is not a core mandate of the central banks in ECOWAS countries. The economic significance of the CG coefficient in columns (i), (iii) and (iii) is that a unit increase in the assets in central banks' balance sheet will increase the unemployment rate by at least 11 percent in ECOWAS countries. The LAW coefficient is insignificant in columns (i), (ii) and (iii) in tables 4 and 5. This indicates that the 'rule of law' variable has an insignificant effect on the unemployment rate. The INF coefficient is also insignificant in columns (i), (ii) and (iii) of tables 4 and 5. This indicates that the inflation variable has an insignificant effect on the unemployment rate. The RGDP coefficient is negative and significant in columns (i), (ii) and (iii) of tables 4 and 5. This indicates that real GDP growth has a significant negative effect on the unemployment rate. The significant result is consistent with the expectation that the unemployment rate is lower during periods of economic expansion while the unemployment rate is higher during periods of economic contraction (Pissarides, 2013). The observed negative relationship between economic growth rate and the unemployment rate also supports the Okun's law which predicts a negative relationship between the unemployment rate and gross domestic product.

**Table 5. Panel Fixed Effect Regression Estimations:
Effect of credit expansion on the unemployment rate in ECOWAS countries**

Variables	(i)	(ii)	(iii)
	Baseline estimation	Sensitivity analysis	Sensitivity analysis
	UNEMP	UNEMP	UNEMP
	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
c	6.053*** (5.14)	5.780*** (4.91)	5.635*** (5.19)
CS	-0.128* (-1.89)	-0.059 (-1.21)	-0.059* (-1.67)
CS*CSH	0.088 (1.52)		
CS*CSH1		0.067 (1.11)	
CS*CSH2			0.149 (0.69)
CSH	-1.111 (-1.43)		
CSH1		-2.216 (-1.37)	
CSH2			-5.452 (-0.59)
CG	0.114*** (4.20)	0.113*** (4.09)	0.114*** (4.17)
LAW	0.144 (0.28)	0.026 (0.05)	0.072 (0.14)
INF	0.003 (0.43)	-0.002 (-0.44)	-0.001 (-0.19)
RGDP	-0.096*** (-3.61)	-0.089*** (-3.38)	-0.094*** (-3.53)
Country fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
R ²	76.08	74.65	76.02
Adjusted R ²	71.32	69.92	71.25
F-statistic	15.99	15.79	15.94
P(F-statistic)	0.000	0.000	0.000

***, * represent statistical significance at the 1% and 10% level, respectively. CSH = binary variable representing private credit contraction shock variable (equal 1 if CS is above-the-mean; equal zero

otherwise). CSH1 = binary variable representing private credit expansion shock (equal 1 if CS is above one standard deviation from the mean; equal zero otherwise). CSH2 = binary variable representing private credit expansion shock (equal 1 if CS is above two standard deviations from the mean; equal zero otherwise).

Source: Author computation

5. Conclusion

In the study, we investigated the impact of private credit expansion and contraction on the unemployment rate in ECOWAS countries. We analysed private credit from two dimensions: private credit expansion which was measured using three-level criteria and private credit contraction which was measured using three-level criteria.

We found evidence that private credit contraction increases the unemployment rate in ECOWAS countries. We also found that private credit expansion did not have a significant effect on the unemployment rate in ECOWAS countries. Also, abnormal credit expansion and contraction did not have a significant effect on employment in ECOWAS countries. Real GDP growth has a significant negative effect on the unemployment rate which supports the prediction of the Okun's Law while the inflation rate has an insignificant effect on the rate of unemployment in ECOWAS countries which contradicts the prediction of the Phillips curve.

The implication of the findings is that policy makers in ECOWAS countries need to be cautious when introducing policies that lead to credit contraction in their countries. This is important because such policies can compel formal lenders in ECOWAS countries to decrease private credit supply for reasons that are unrelated to borrowers' ability to repay. Such decrease in the quantity of credit can significantly increase the unemployment rate. Therefore, policymakers should introduce policies and measures that prevent financial institutions from decreasing private credit due to its negative impact on the unemployment rate in ECOWAS countries.

The study has some limitations. First, the study focused on credit dynamics in aggregate terms. But such focus on aggregate credit does not take into account any other changes occurring in the loan portfolio of individual financial institutions in ECOWAS countries. The second limitation is

that the study focused only on ECOWAS countries. This means that the findings of the study cannot be generalized to all African countries.

Future studies can extend our research by investigating credit expansion and contraction in other regions outside Africa. Future studies can also extend our research by investigating credit dynamics at the individual bank level. Future studies can also extend the analysis to sub-Saharan African countries.

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Appendix

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	18.602775	7	0.0095

Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
CS	0.049054	0.058180	0.000047	0.1848
CS*CSH1	-0.015732	-0.032982	0.000075	0.0458
CSH1	-0.372681	0.089366	0.044913	0.0292
CG	0.053042	0.054613	0.000014	0.6756
LAW	-0.487669	-0.150520	0.034370	0.0690
INFCPI	0.006163	0.005437	0.000000	0.2166
RGDP	-0.072499	-0.075555	0.000005	0.1879

Cross-section random effects test equation:

Dependent Variable: UNEMP

Method: Panel Least Squares

Date: 03/08/24 Time: 08:37

Sample (adjusted): 1996 2021

Periods included: 23

Cross-sections included: 10

Total panel (balanced) observations: 230

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.111487	0.584236	5.325734	0.0000
CS	0.049054	0.028515	1.720300	0.0868
CS*CSH1	-0.015732	0.048247	-0.326075	0.7447
CSH1	-0.372681	1.340787	-0.277957	0.7813
CG	0.053042	0.022665	2.340234	0.0202
LAW	-0.487669	0.496008	-0.983189	0.3266
INFCPI	0.006163	0.002718	2.267538	0.0244
RGDP	-0.072499	0.024269	-2.987331	0.0031

Effects Specification

Cross-section fixed (dummy variables)			
R-squared	0.731320	Mean dependent var	4.642215
Adjusted R-squared	0.711137	S.D. dependent var	2.489991
S.E. of regression	1.338269	Akaike info criterion	3.491670
Sum squared resid	381.4752	Schwarz criterion	3.745789
Log likelihood	-384.5420	Hannan-Quinn criter.	3.594176
F-statistic	36.23528	Durbin-Watson stat	0.289240
Prob(F-statistic)	0.000000		