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Effect of Financial Stress on Economic Growth in the Waemu

Fayama Satiéba[1]
[1]Centre d'Etude de Documentation et de Recherche Economique Sociale (CEDES)
Email ID:-satiebafayama@gmail.com
***Coressponding Author**
Fayama Satiéba

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ABSTRACT

Financial markets are subject to periods of disruption that affect their functioning. Financial instability can also pose a significant threat to the real economy. However, the relationship between the financial system and economic activity is complex and poorly understood. This study analyses the effect of financial stress on economic growth in the WAEMU zone during the period 2000-2024. To do this, principal component analysis (PCA) was used to construct the financial stress index in the first instance, and panel vector autoregression (PVAR) modelling was used in the second instance. The results show that financial stress has negative consequences on economic growth in the WAEMU zone. From this perspective, it is necessary to use a financial stress index that helps identify the level of stress within the financial system and strengthen the stability of the financial system, which promotes investment

1. INTRODUCTION

The West African Economic and Monetary Union (WAEMU) has faced multiple crises in recent years. Recent macroeconomic studies have analysed the risk of uncertainty, particularly climate risk, on production (Bedeke, 2023; Fagbemi et al., 2023), terrorism and state fragility (Hata et al., 2023). However, this region is facing uncertainty due to institutional changes and the emergence of financial stress, which is undermining the development process. Financial stress can be defined as the external force exerted by uncertainty and changing losses on economic agents in financial markets and financial institutions. Hence, financial stress results from tensions, or even shocks, experienced by the financial system. For example, the recent crisis surrounding Burkina Faso's failure to be appointed to the presidency during the second ordinary session held in Lomé has had serious consequences on macroeconomic indicators (production, price levels, employment levels, decline in financing, credibility of monetary and fiscal policies). In response to this, the region is experiencing financial stress, particularly in the financial markets. The credibility problem hinders the functioning of the BRVM secondary market and the primary market. When the BRVM is not functioning or is shut down, the primary and secondary markets weaken, leading to problems in raising funds. The dysfunction of the BRVM market increases the financial stress on states, institutions, businesses and individuals. Similarly, when the state budget is not adopted, this has consequences for the financing of activities. What is the effect of financial stress on economic growth in the WAEMU

Economic and Monetary Union (WAEMU) has not remained immune to the phenomenon of financial globalisation, with the widespread movement of capital (Doucouré and Sène, 2014). However, the rise of capital markets in the financing of most developed and developing economies exposes countries' financial systems to the influence of global systemic events. Furthermore, Kose et al. (2006) and Moshirian (2008) point out that while financial integration provides direct and indirect benefits to the economy, it can increase countries' vulnerability to foreign-induced financial crises

Financial development promotes capital accumulation and innovation, which are prerequisites for sustained economic growth. However, financial development also brings with it financial instability, which fuels recurring financial crises that can reduce economic growth (Aglietta, 2014; Bassanini and Scarpetta, 2001). If the financial system becomes increasingly unstable and prone to crises as it develops, this risks undermining the beneficial effect of financial development on growth. Hence the need to measure financial stress using a tool such as the financial stress index in order to stabilise the financial system and ensure that financial development contributes effectively to economic growth

Global economic growth is volatile. It stood at 3.1% in 2018, compared with 3% in 2016 (World Bank report, 2018). In advanced economies, economic activity continues to grow, reaching 2.2% in 2018, compared to 1.7% in 2016. However, this modest economic growth in developed countries has not been enough to offset the slowdown in emerging countries. Emerging

countries have been hit by capital outflows and, according to the World Bank, economic growth in these countries is 4.5% in 2018, compared to 3.7% in 2016 (World Bank report, 2018). Moreover, although economic growth in developing countries is strong, it is volatile and below 7%, which seems insufficient to overcome poverty.

As a result, Hakkio and Keeton (2009) argue that increased financial stress leads to a decline in economic activity. Focusing on the effect of uncertainty, the real options theory developed by Merton (1973) suggests that financial stress leads to a decrease in investment spending. Financial instability has a negative impact on growth through investment instability. However, Davig and Hakkio (2010) find that such a close link is not always evident for the simple reason that the economy also goes through several years during which financial conditions appear to play a secondary role in economic activity in the United States of America. Slingenberg and de Haan (2011) reached the same conclusion. Ary Tanimoune (2011) showed that the WAEMU financial system was indirectly affected by the spillover effects of the 2008 financial crisis, particularly through the real sector. Furthermore, new financial products are constantly emerging and the financial system has become very large, offering a diverse range of products. It is therefore essential to use a measurement tool to assess the vulnerability of the financial system.

In the WAEMU zone, early warning systems and stress tests are designed as leading and potential indicators for predicting the likelihood of a financial crisis (Angora and Tarazi, 2011; Gbenou, 2015). However, econometric studies on warning indicators lack a solid theoretical foundation (Cartapanis, 2011). Berjaoui (2012) believes that stress testing should be a priority for banks to ensure that they can absorb financial shocks, but this analysis remains incomplete. As a result, Trichet (2011) and Jakubik and Slacik (2013) believe that a more in-depth analysis of financial stability is needed to identify all the vulnerabilities to which the financial system is exposed, but also to obtain information on the economy's risk absorption capacity.

The rest of the article is structured in three parts. The second part explores the theoretical and empirical relationship between financial stress and economic activity. The third part outlines the methodology and analyses the results, and the fourth part concludes and draws implications in terms of economic policy.

2. LITERATURE REVIEW: THE EFFECT OF FINANCIAL STRESS ON ECONOMIC GROWTH.

The effect of financial stress on growth has been studied in the literature, and possible sources of this link have been widely discussed. Although studies have empirically examined the effect of financial stress on economic growth, these studies are not unanimously accepted among researchers.

From this perspective, some authors argue that financial stress has a negative effect on economic growth. Illing and Liu (2006) studied the effects of financial stress in Canada. The results of their study suggest that high levels of stress destabilise the financial system and lead to significant losses in economic growth. Hakkio and Keeton (2009) showed that an increase in financial stress leads to more cautious behaviour on the part of credit institutions, a decrease in the total amount of loans granted and a decline in economic growth in the United States of America. Like Hakkio and Keeton (2009), Kliesen and Smith (2010) and Brave and Butters (2011) reach the same conclusion. Hatzius et al. (2010) study the link between financial conditions and the real economy. The results show that increased financial stress helps predict a decline in economic growth. These results corroborate those of Li and St-Amant (2008), who found, using a VAR model, that high financial stress is accompanied by lower output, higher interest rates and faster inflation.

Globalisation, financial innovations and technological advances have accelerated many financial processes and given rise to numerous new and more complex transmission channels. Against this backdrop, research into the relationship between financial stress and real economic activity continues to grow.

Cardarelli et al. (2011) showed that financial stress is not always a precursor to financial instability. Nevertheless, their conclusion shows that half of episodes of financial stress are followed by an economic slowdown or recession and that stress in the banking system is associated with a greater decline in output than stress originating in other sectors. In addition, Cevik et al. (2013) examined the link between financial stress and economic growth using a VAR model. To do this, industrial production, terms of trade and gross fixed capital formation were considered as macroeconomic variables. Granger's causality test shows that financial stress significantly affects economic activity (industrial production, foreign trade and overall investment). According to these authors, an increase in financial stress leads to a decrease in economic growth. As for Holló et al. (2012), they found in a VAR model a systemic crisis during which financial stress tends to depress economic growth. Creel et al. (2014) used the generalised moving average panel method with instrumental variables to test the relationship between economic performance and financial stability. Their work shows that financial stress negatively affects economic growth in the European Union. More specifically, financial stress has a negative effect on consumption, investment and disposable income. Although Creel et al. (2014) used a different method from that of Holló et al. (2012), they reached the same conclusion. In addition, Dumičić (2014) confirms the findings of Holló et al. (2012) by arguing that episodes of high stress had a negative impact on economic growth in Croatia. Malega and Horváth (2017) examined the relationship between financial stress and economic growth. Using the VAR model like Cevik et al. (2013), Malega and Horváth (2017) found more specifically that an increase in financial stress is associated with higher unemployment, lower prices and lower interest rates. However, the reaction of these variables occurs approximately one and a half years after the financial shock. Although they adopted a different method from that of Creel et al. (2014), they

arrived at similar results. Similarly, Monin (2017, 2019) examines the relationship between financial stress and economic growth in the United States. To do so, macroeconomic variables such as production, income, unemployment, employment and consumption are considered as indicators in his study. The results suggest that higher values of the index help predict a decline in economic growth, but not the reverse. Recently, Apostolakis and Papadopoulos (2019) found results similar to those of Monin (2019) using a PVAR model. Thus, stressful events in the financial sector can have serious negative consequences on economic growth in terms of production, employment and well-being.

However, some authors believe that it is economic activity that leads to financial instability. Rouabah (2007) analyses the link between the stress index and the macroeconomic environment and asserts that, in the absence of exceptional cyclical shocks or systemic events, the vulnerability of the Luxembourg banking sector remains reliable. Abbad et al. (2015) confirm Rouabah's (2007) findings in their work on assessing Algerian banking stability. Inspired by the relationship between financial stress and economic activity in the wake of the recent global financial crisis, Davig and Hakkio (2010) examined the effect of financial stress on economic growth. These authors find that such a close link is not always evident for the simple reason that the economy also goes through several years during which the financial system appears to play a secondary role in economic growth. However, considering the subprime crisis, it can be estimated that an increase in financial stress plays a role in the eventual shift of a strong economy into a state of distress. Slingenberg and de Haan (2011) studied how macroeconomic variables predict financial stress indices for 13 OECD countries using a linear regression model. Like Davig and Hakkio (2010), they were unable to establish a clear relationship between economic variables and the financial stress index. Similarly, Baranauskaité (2013), using a principal component analysis method, found that it is not always clear whether periods of tension in the financial system affect the real economy, or whether events in the real economy are signalled by increased tension in the financial system. In his view, financial stress cannot be considered, in this case, as a product of developments in the real economy.

Despite the apparent risk that financial stress poses to the real economy, as most studies show, the relationship between financial stress and economic activity is complex and poorly understood.

In the case of the WAEMU, Doucouré and Sène (2014) base the stress index on macroeconomic variables such as the current account balance relative to GDP, inflation rate volatility, money supply relative to GDP, the primary budget balance relative to GDP, and the ratio of credit to the economy relative to nominal GDP. Using the Mean Group method, they conclude that macroeconomic shocks have a negative impact on the stress index in the countries of the Union. This result confirms that of Rouabah (2007). Gbenou and Gero (2017) used the VAR model in their study. The simulations show that an increase in liquidity and real GDP growth is followed by an improvement in the health of credit institutions. However, increased lending to the economy and rising credit risks cause it to deteriorate. Thus, a decrease in the financial stress of credit institutions is accompanied by an improvement in asset quality and an increase in the supply of credit to the economy, liquidity and economic growth. Ultimately, the composite index of financial stress in the banking system can therefore predict changes in financial intermediation activity and GDP growth. Indeed, the effect of financial stress remains an existing source of information that has been little explored in theoretical and empirical terms in the EU. It is important to take these relationships into account in development policies.

The development of the literature on the construction of financial stress indices and the effect of financial stress on economic growth allows us to choose the most appropriate model for our study.

3. METHODOLOGY: MODEL SPECIFICATION

In order to analyse the effect of financial stress on economic growth, we consider the panel data VAR model (PVAR). Unlike Malega and Horvåth (2017), who analysed the effects of financial stress on the real economy using the VAR model with four variables (Table 1) (unemployment rate, inflation rate, interest rate and gross fixed capital formation), in this study, real GDP will be used to take into account the level of economic growth in WAEMU countries. In addition to this indicator, GFCF will be used to take into account total investment expenditure, i.e.:

$$Y_{it} = C_i + \sum_{j=1}^{J} \varphi_i Y_{i,t-j} + \varepsilon_{it} \quad (1)$$

Y_{it} is the endogenous variable such as the financial stress index (FSI), real gross domestic product (GDP), inflation rate (TINF), unemployment rate (U) and gross fixed capital formation (GFCF). C_i is the constant. ε_{it} represents the error terms. These are uncorrelated white noise.

$$E(\varepsilon_t) = 0$$
$$E(\varepsilon_t \varepsilon_{t'}) = 0$$

Thus, the model contains five variables and five shocks. Specifically, we seek to highlight the influence of financial stress on economic growth. The vector Y_{it} is represented as follows

$$Y_{it} = \begin{bmatrix} FSI_t \\ PIB_t \\ TINF_t \\ U_t \\ FBCF_t \end{bmatrix} \quad (2)$$

The model can be rewritten as follows:

$$Y_{it} = C_i + \varphi_i FSI_{it} + \varphi_i PIB_{it} + \varphi_i TINF_{it} + \varphi_i U_{it} + \varphi_i FBCF_{it} + \varepsilon_{it} \quad (3)$$

In addition to analysing the interrelationships between financial stress and economic activity, the PVAR allows for the endogeneity and heterogeneity of EU countries in terms of their specific characteristics and interdependence. Before using the model, it is necessary to perform stationarity and cointegration tests to determine the appropriate specification.

3.1 Econometric tests

3.1.1. Stationarity test

This test minimises the risk of spurious regression. When variables are not stationary, shocks may be permanent, rendering the VAR model meaningless as it no longer provides information on shock absorption times. It is therefore important to test the stationarity of the variables used. Analysis of our results shows that only the GDP and TINF variables are stationary at the 1% threshold. On the other hand, the FSI, U and FBCF variables are stationary in first difference at the 1% threshold. In addition, the VAR model can only be used when the variables are not cointegrated, so we perform a cointegration test.

Cointegration test

In our work, we use the cointegration tests developed by Pédroni (1995) and Kao (1999) (Table 2). The test results are detailed in Table 2. According to the test results, there is a short-term relationship between the financial stress index and the economic activity variables considered across all countries in the panel. In Table 2, the first four tests are essentially based on an intergroup dimension aggregation, while the last three tests are based on an intragroup dimension aggregation. The result of the Pedroni test indicates that the variables are not cointegrated because all p-values are greater than 1%. The result of the Pedroni test is confirmed by that of Kao. Consequently, the short-term dynamics are sufficient to model the interaction between the variables considered.

Model specification test

The Hausman test allows a choice to be made between a fixed-effects model and a random-effects model. However, both fixed-effects and random-effects models allow for data heterogeneity to be taken into account. If the probability associated with this test is lower than the chosen threshold, the test is significant and this leads to the fixed-effects model being preferred.

For the sample considered, the value of the Hausman test statistic is 7.65. The critical probability (0.1053) is greater than the 1% threshold, so the null hypothesis of no correlation between the individual effects and the explanatory variables is not rejected. Therefore, we retain the random effects model.

3.1.4. Validation test of the estimated model

3.1.4.1. Test for heteroscedasticity of errors

The Breusch-Pagan test allows us to empirically validate the choice of model structure. The probability of the test is 0.1006, which is greater than 1%, so we do not reject the null hypothesis of homoscedasticity of errors.

3.1.4.2. Error autocorrelation test

The aim is to verify whether the errors can be considered autocorrelated. The probability of the test is less than 5%, which indicates that the errors are not autocorrelated.

Estimation results and discussion

This section presents the results obtained from the PVAR model. The results are presented in Table 3. In this study, we focus on the different signs between the financial stress index and the economic activity variables. Specifically, we focus on the different coefficients between financial stress and economic activity. However, from a theoretical standpoint, interpreting the model's coefficients is difficult, so we focus on the different signs. The use of impulse response functions allows us to interpret the results of the PVAR model.

The estimation results show that prices fall during periods of high financial stress. This implies that the TINF is negatively related to FSI lagged by one period. In addition, GFCF is negatively related to FSI lagged by one period. With regard to U, we find that an unexpected increase in financial stress is associated with a rise in unemployment. This result reveals that unemployment is positively related to FSI. With regard to GDP, it is negatively related to FSI lagged by one period.

The variance decomposition of the financial stress forecast error is explained by 98.20% of its own innovations, compared with 0.48% of GDP, 1.10% of the inflation rate, 0.05% of the unemployment rate and 0.15% of gross fixed capital formation.

In terms of the impulse response function, a shock to financial tensions leads to a decline in real GDP. The effect of the shock on GDP lasts for about four years before fading. More specifically, we see an increase in unemployment following a shock to financial tensions, with the effect lasting four years after the shock. We also see a decline in prices, but the effect of the shock on this variable lasts for around six years before fading. This effect is the most significant. We also observe a decline in investment, with the effect of the shock on investment lasting for around five years after the shock.

The objective of the first method, namely principal component analysis, was to construct a financial stress index for the WAEMU zone in order to measure the level of instability in the WAEMU financial system. The index identifies episodes of instability experienced by the Union's financial system after the 2007-2008 global financial crisis, as well as the sovereign debt crisis and political crises. This result confirms the presence of financial stress in the financial system, which reduces economic growth. The result corroborates those of Monin (2017, 2019) and Malega and Horváth (2017), who found that the index successfully identifies financial stress events and that the most intense period of stress occurred in

2008 and also in late 2011 and early 2012. However, the various indices constructed for EU countries reveal that countries do not react at the same time to financial stress.

The VAR model was used to show the channels through which financial stress affects economic growth. The results show that financial tensions have negative effects on economic activity. Indeed, while the quantitative approach to money is based on the dichotomy between the real and monetary spheres, John Maynard Keynes's 'The General Theory of Employment, Interest and Money', published in 1936, develops a close relationship between the real economy and the monetary economy through the interest rate. In this case, we could expect to see a greater improvement in economic growth following a reduction in financial tensions. Thus, when financial tensions escalate, policymakers should take measures to alleviate them. During less stressful periods, policymakers must closely monitor financial tensions. Raffinot and Venet (1998) argue that growth would be positively influenced by the development of the financial sphere. Therefore, financial deepening stimulates growth, but a crisis in the financial sector can hamper growth. Recently, Monin (2019) showed that financial tensions lead to a decline in economic growth in the United States of America. Our results corroborate those of Gbenou and Gero (2017) in the case of the WAEMU and Monin (2019) in the United States of America.

Specifically, in analysing the impulse response function, we find that financial stress leads to a decrease in overall investment. This result can be explained by the fact that, in periods of financial instability, companies are unable to obtain financing and seek to reduce their debt. They therefore reduce their investments and, according to the real options theory developed by Merton (1973), in times of financial instability, it is optimal to wait rather than make a new investment. This result is consistent with those of Cevik et al. (2013), who showed that financial stress negatively affects overall investment in Turkey.

The results also suggest that financial tensions are associated with falling prices. Financial instability is accompanied by price instability. This result explains the interaction between price levels and financial stability. Indeed, the central bank's main objective is price stability. Thus, when the risk of inflation decreases, monetary policy can be assigned a secondary objective: growth and employment. The impact of interest rates on inflation and, more generally, on economic activity operates through monetary policy transmission channels. The traditional monetary channel acts through the price effect. The credit channel acts through a volume effect. Our findings corroborate those of Malega and Horváth (2017), who found that an increase in financial stress is accompanied by a fall in prices in the case of the Czech Republic. However, our results contradict those of Monin (2019) regarding the effect of financial stress on price levels.

Finally, an increase in financial stress is accompanied by an increase in unemployment. The Phillips curve shows the trade-off between inflation and unemployment. According to this curve, a low inflation rate is associated with an increase in the unemployment rate. This result can be explained by the fact that financial stress leads to a reduction in investment by companies. This decline leads to a contraction in production, income, consumption and employment. This result corroborates that of Malega and Horváth (2017) for the Czech Republic.

Robustness test

According to the causality test (Table 4) by Toda and Yamamoto (1995), financial stress affects and cause economic growth. This allows us to conclude that financial stress negatively affects economic growth, but not vice versa. Our results are robust.

4. CONCLUSION AND ECONOMIC POLICY IMPLICATIONS

This article examines the effect of financial stress on economic growth in the WAEMU during the period 2000–2024. To this end, the panel VAR estimation method proposed by Sims (1980) was used. The various indices constructed identify episodes of financial stress in the WAEMU financial system. Analysis of various developments in the financial stress index leads to the conclusion that stress in the financial system contributes to reducing economic growth in the WAEMU.

In addition, we analysed the effect of financial stress on economic growth. The results of the econometric estimation reveal that financial stress negatively affects economic growth. This validates our first research hypothesis that financial stress negatively affects economic growth. Financial stress generates imbalances in the financial system that have vast economic and social costs, despite the fact that, a priori, financial development can have a positive effect on growth.

Indeed, the results also show that an increase in financial stress is associated with high unemployment, lower investment and falling prices, which contribute to reducing economic growth.

These results have implications for economic policy. From this perspective, we suggest: Closely monitoring financial stress even when the economy appears to be functioning normally. To do this, a financial stress index should be used to monitor the financial system, as the index helps to quickly identify the level of stress in the financial system and apply regulatory measures as needed. Strengthening the financial stability of the WAEMU, which will enable sustainable investment.

REFERENCE

1. Angora, A., & Tarazi, A. (2011). Crise bancaire dans les pays de l'UEMOA: un système d'alerte avancée fonde sur une approche Logit Multinomiale. Brussels economic review- cahiers de economiques de bruxelles, 54(1), 21- 50.
2. Apostolakis, G., & Papadopoulos, A. P. (2019). Financial Stability , Monetary Stability and Growth: A PVAR Analysis. Open Economies Review, 157-178.
3. Ary Tanimoune, N. (2011). Description et analyse de l'action des banques centrales dans le cadre de la crise financière

internationale de 2007. Quels enseignements pour la banque centrale des Etats de l'Afrique de l'Ouest? Document du travail n°DT/11/01/ -Mars.

4. Balakrishnan, R., Danninger, S., Elekdag, S., & Tytell, I. (2011). The transmission of financial stress from avanced and emerging economies. Emerging market finance and trade 47, 40-68.
5. Bananauskaité, R. (2013). Construire un système d'échelle indice de stress financier pour le système financier lituanien. Master Thèse: l'économie. Vilnius, Université ISM de gestion et d'économie., 1-67.
6. Bassaninni, A., & Scarpetta, S. (2001). les moteurs de la croissance dans les pays de l'OCDE: une analyse empirique sur données de panel. revue économique de l'OCDE(33), 7-58.
7. BCEAO. (2017). Bulletin mensuel de statistiques économiques de l'UEMOA.
8. BCEAO. (2018). Note d'information et statistique.
9. BCEAO. (2019). Note d'information et statistique.
10. Bedeke, S. B. (2023). Climate change vulnerability and adaptation of crop producers in sub-Saharan Africa: A review on concepts, approaches and methods, Environment, Development and Sustainability, 25(2), 1017–1051. Available at: https://doi.org/10.1007/s10668-022-02118-8.
11. Berjaoui, L. (2012). Construction d'un indice de fragilité du secteur bancaire Marocain. International journal of Innovation and applied studies, 105- 117.
12. BM. (2018). The turning of the tide.
13. Borio, C. (2003). Towards a macroprudentiel framework for financial supervision and regulation. working paper(128).
14. Brave, S., & Butters, A. R. (2011). Monitoring financial stability: A financial condition index approach. Economic perspectives. federal reserve bank of Chicago, 22- 43.
15. Cardarelli, R., Elekdag, S., & Lalli, S. (2011). Financial stress and economic contraction. Journal of Financial Stability, 7, 78-97.
16. Cartapanis, A. (2011). Les crises financières et les politiques macroprudentielles: inflexion réglementaire ou nouveau paradigme? Revue économique, 62(3), 349-382.
17. Cevik, E. I., Dibooglu, S., & Kene, T. (2013). Maesuring financial stress in TURKEY. REVIEW OF FIANCNAIL STABILITY, 1-24.
18. Chang, R., & Velasco, A. (2002). The 1997-98: Liquidity crisis: Asia versus Latin American, Banking, Financial Integration and International crises. Edited by Leonard H and Klauss, S., Santiago, central Bank of Chile.
19. Creel, J., Hubert, P., & Labondance, F. (2014). Financial stability and economoic performance. Journal of Economic Modelling, 48, 25- 40.
20. Davig, T., & Hakkio, C. S. (2010). What is the effect of financial stress on econmic activity. Kansas city fed economic rewiev second quarter, 35-62.
21. Doucouré, F. B. (2008). Méthodes économétriques plus programmes, cours-Application-corrigés, Logicel: EViews, STATA et SPSS. Dakar: Faculté de Sciences Economiques et de Gestion.
22. Doucouré, F. B., & Sène, B. (2014, Décembre). Les determinants macroéconomiques de l'indice du stress banciare dans les pays de l'UEMOA. Revue économique et monétaire de la BCEAO(16), 1-23.
23. Dumičić, M. (2014). Financial stress indicator for small, open highly euroised countries: the case of Croatia. Croatie national bank, working paper, 1- 31.
24. Fagbemi, F., Oke, D. F. and Fajingbesi, A. (2023). Climate-resilient development: An approach to sustainable food production in sub-Saharan Africa, Future Foods, 7, 100–216. Available at:
25. https://doi.org/10.1016/j.fufo.2023.100216.
26. Fama, E. F., Fisher, L., Jensen, M., & Roll, R. (1969, Février (1)). The adjustment of stock prices to new information . International Economic Reveiw, 10 , 1-21.
27. Gavin, M., & Hausman, F. (1996). Les racines des crises bancaires: le contexte macro-économique", dans: Ricardo Hausman et Rojas-Suarez Liliana, crises bancaires, en Amériquelatine (Eds.). Banque interaméricaine de développement et de l'Université Johns HopkinsPresse. Baltimore., 27-63.
28. Gbenou, K. D. (2015). Mise en place d'un système d'alertes précoce de crise bancaire dans les pays de l'UEMOA. Document d'étude et de recherche DER/15/01 BCEAO.
29. Gbenou, K. D., & Gero, F. A. (2017). Mesure et prévision du stress financier du système bancaire dans les pays de l'UEMOA. Finance et Finance internationale, 1- 23.
30. Goldsmith, R. (1969). Financial structure and Development. New Haven, Yale University Press.
31. Gorton, G. (1988). Banking panics and Business cycles. OXford Economic papers, 55- 221.
32. Granger, C. W. (1980). Testing for causality a personal Viewpoint. In journal of economic Dynamics of control, 329-352.
33. Granger, C. W. (1988). Causality, cointegration and control. In Journal of Economic Dynamics and Control, 551-559.
34. Hakkio, C. S., & Keeton, W. R. (2009). Financial stress:what is it how can it be measured and why does it matter? Federal reserve bank of kansas city, 5-50.
35. Hanscel, E., & Monnin, P. (2005). Measuring and forcasting stress in the banking sector: evidence from Switzerland.

Bis working paper(22), 1- 509.

36. Hata, R. et al. (2023). Terrorist attacks in Sub-Saharan Africa from 1970 through 2020: analysis and impact from a counter-terrorism medicine perspective, Prehospital and disaster medicine, 38(2), 216–222. Available at: https://doi.org/10.1017/S1049023X23000080.

37. Hatzius, J., Hooper, P., Mishkin, F., Schoenholtz, K. L., & Watson, M. W. (2010). Financial conditions indexes: A fresh look after the fiancial crisis. NBER working paper (16150).

38. Holló, D., Kremer, M., & Lo Duca, M. (2012). CISS: A composite indicator of systemic stress in the financial system. ECB working paper(1426), 1- 49.

39. Illing, M., & Liu, Y. (2003). Mesure de stress financier. Revue du système financier, Banque du canada,, 45-50.

40. Illing, M., & Liu, Y. (2006). Measuring fiancial stress in a developed country: An application to Canada. Journal of Financial Stability, 2(4), 243-265.

41. Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots and heterogeneous panel. Journal of Econometrics, 1(115), 53-74.

42. Jacklin, C., & Bhattacharya, S. (1988). Distinguishing panic and information based Bank run: Xelfare and implications. Journal of Political Economic, 569 - 592.

43. Jakubik, P., & Slacik, T. (2013). How to measure financial (in) stability in ermerging Europe. Institute of Econmic Studie (IES) Working paper(13), 1-21.

44. Kaiser, H. F. (1960). The application of electronic computer to factor analysis. Educational and Psychological Measuremnt, 20, 141-151.

45. Kaminsky, G., & Reinhart, C. (1996). The Twin Crise: the cause of banking and balance of payments problems. Board of governor of the federal reserve system, intertional finance discussion paper(544), 473-500.

46. Kao, C. (1999). Spurious regression and residual-based test for cointegration in panel data. Journal of econometrics(90), 1- 44.

47. Kleisen, K. L., & Smith, D. C. (2010). Measuring financial market stress. Economic synopses(2).

48. Kose, A. M., Prasaad, E., Rogoff, K., & Wei, S. (2006). Financial globalization : An reappraisal. IMF working paper.

49. Labye, A. (2011). la crise financière actuelle : une application du modèle de Minsky. Revue d'économie financière, 2(102), 263-284.

50. Levin, A., Lin, C. F., & Chu, C. (2002). Unit Root test in panel Data: Asymtotic and Finite Sample propertic. Journal of Econometrics(108), 1-24.

51. Levine, R. (1997). Financial development and economic growth: views and agenda. Journal of Economic literature, 688-726.

52. Li, F., & St-Amant, P. (2008). Financial stress, monetary policy and activity economic. Bank of Canada Working paper .

53. Malega, J., & Horváth, R. (2017). Financial stress in CZECH Republic: Measurement and effects on the Real economic. Prague economic paper, 257- 268.

54. Melvin, M., & Taylor, M. (2011). The crisis in the foreign exchange market. CSIFO working paper(2707), 1- 40.

55. Merton, R. C. (1973). Theory og rational option pricing. The Bell journal of Economic and Management Science, 141-183.

56. Mishkin, F. (2013). Monnaie, banque et marchés financiers. (éd10).

57. Modigliani, F., & Miller, M. (1958). the cost of capital, corporation finance , and the theory of investment. in American Econmic Review, 48(3).

58. Monin, P. J. (2017). The OFR financial stress index. office of financial research Working paper, 1- 40.

59. Monin, P. J. (2019). The OFR Financial Stress Index. WWW. mdpi. com /journal/ risks, 1-21.

60. Moshirian, F. (2008). Globalization ,Growth and institutions. journal of banking and finance, 472-479.

61. Pédroni, P. (1995). Fully modified OLS for heterogeneous cointegrated panel and the case of purchasing power parity. Working paper in economics, Indiana University.

62. Popovska, J. (2014). Modelling financial stability: the case of the banking sector in Macedoine. Journal of Applied Economics and bussiness, 68-91.

63. Raffinot, M., & Venet, B. (1998). Approffondissement financier et croissance: Analyses empiriques en Afrique Subsaharienne, technique financière et développement.

64. Raleigh, P. (2014). L'Afrique notée: le rôle de la notation dans le développement des marchés financiers Africain. Revue d'économie financière, 229- 242.

65. Rouabah, A. (2007). Mesure de la vulnérabilité du secteur bancaire Luxembourgeois. Cahier d'étude de la banque centrale du Luxembourg(24), 1-6.

66. Sims, C. A. (1980). Macroeconomic and reality. Econometrica, 48(1), 1- 48.

67. Sims, C. A. (1996). Macroeconomics and Methodology. Journal of Economic Perspectives, 105 - 120.

68. Sinenko, N., Titarenko, D., & Arins, M. (2012). Latvian Financial Stress Index. Discussion paper Latvijas Bakan, Access online(1).

69. Slingenberg, J. W., & de Haan, J. (2011). Forcaseting financial stress. DNB working paper , April(292).

70. Stock, J. H., & Watson, M. W. (1989). New Indexes of Coincident and Leading Economic Indicators. in O.J. Blanchard and S. Fischer (eds.), NBER Macroeconomics Annual 1989, 352 –394.

71. Toda, H. Y., & Yamamoto, T. (1995). Statistical inference in Vector Autoregressions With possibly integrated proscesses. In Journal of Econometrics, 225-250.

72. Trichet, J. C. (2011). Intellectual chanllenges to financial stability analysis in the Era of Macroprudential oversight. Banque de France Financial Stability Reveiw(15), 139-149.

73. Vinals, J. (2011). Macroprudentiel policy: An organizing framework. the monetory and capital markets department, 3- 59.