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THEMATIC STUDY AND NOTES N°01

ANALYSIS OF THE FINANCIAL CYCLES (OF CREDIT) IN WAEMU

Par Yao Dossa TADENYO

September 2021

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Direction de la Recherche et des Partenariats

Thematic Study and Notes

ANALYSIS OF THE FINANCIAL CYCLES (OF CREDIT) IN WAEMU

By Yao Dossa TADENYO *

September 2021

* I would like to thank all my colleagues at the DRP and other Central Services Departments for their valuable contributions, which have improved the quality of this work. The shortcomings and limitations inherent in this study are not the responsibility of the Central Bank, but of the author alone.

PREAMBLE

The West African Center for Banking Studies and Training (COFEB) is the Central Bank of West African States (BCEAO) entity in charge of capacity-building activities and economic and financial research. Since November 2019, this Regional Center has three (3) Directorates, namely the Directorate in charge of Teaching and Training Programs, the Directorate in charge of Research and Partnerships and the Directorate in charge of Administrative Affairs and Communication, under the responsibility of a General Manager. Through this institutional transformation, the vision of the BCEAO authorities is to make COFEB a renowned center of excellence in training and research at the international level.

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Like the Working Paper Series produced at the BCEAO, "Thematic Study and Notes" present research findings and the lessons to be drawn from them, with a view to enlightening policymakers on subjects pertaining to current economic and financial affairs or relating to a Central Bank business process.

Ousmane SAMBA MAMADOU,
Directeur Général du COFEB

A word from the Director

The financial crises of the last three decades have revived interest in the study of financial cycles, both in the world of research and in the bodies responsible for implementing macroprudential policy. In particular, the financial crisis of 2007 gave a large empirical literature on the understanding of the factors determining the financial cycle and how it interacts with the real economy. This renewed interest is related to the policy implications of these interactions. The importance of financial cycles in economic fluctuations reinforces the role of macroprudential policies, which have emerged as a third pillar of the economic policy framework, alongside monetary and fiscal policies.

Historically, at least since the time of the Great Depression of 1929, successive financial crises have highlighted the fundamental role played by financial conditions and disturbances in the fluctuations of real economic activity, and have given renewed relevance to developments in economic theory. At the same time, these contemporary facts have led to a growing interest in research on financial cycles. Empirical investigations are leading to a growing consensus on the role of financial cycles in generating or amplifying shocks that could significantly disrupt the real economic cycle.

It would therefore appear to be useful to improve understanding of the financial cycle in WAEMU countries, the better to anticipate its trends. To do so, it is particularly important to identify the main features of the financial cycle and grasp their implications for economic policy.

The present Note and Thematic Study is part of this approach. It provides an empirical overview of the behavior of financial cycles in WAEMU member countries and concludes that they are synchronous. On this basis, policy implications are drawn in terms of the implementation of macroprudential policies in the Union and the role of the Central Bank.

Enjoy your reading !

Ndèye Amy NGOM SECK
Director, Research and Partnerships

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Abstract

This thematic study note aims to improve understanding of the financial cycle in WAEMU countries. This understanding will be useful for better anticipating trends in the financial cycle and pinpointing their implications for economic policy implementation.

From this perspective, the paper presents an overview of the main transmission mechanisms and potential consequences of financial cycles. It also describes the main characteristics of financial cycles in WAEMU countries, using claims on the economy as an indicator. Estimates based on quarterly data from 2004 to 2020 suggest that, with the exception of magnitudes, the overall dispersion of the main characteristics of financial cycles between Union countries is low. In addition, domestic financial cycles display a high degree of synchronicity, reflecting the financial integration of Union economies, purportedly related to the context of monetary and banking unions.

Based on these results, the study posits that there is a Union-wide financial cycle that is conducive to the implementation of common macroprudential policies. The concordance of the phases of these financial cycles could therefore promote a complementary role for monetary policy in mitigating the adverse macroeconomic effects associated with financial instability.

Mots clés : *cycles de crédit, fluctuations économiques, synchronisation des cycles, indice de concordance.*

Classification JEL : C32; E32 ; E44 ; F36.

Résumé

La présente note d'étude thématique vise à améliorer la compréhension du cycle financier dans les pays de l'UEMOA. Cette compréhension serait utile pour mieux anticiper les évolutions du cycle financier et pour cerner leurs implications pour les politiques économiques à mettre en œuvre.

Dans cette perspective, la note présente les mécanismes principaux de transmission et les enjeux des cycles financiers, de façon générale. En outre, elle décrit les principales caractéristiques des cycles financiers des pays de l'UEMOA, en utilisant les créances à l'économie comme indicateur. Les estimations basées sur les données trimestrielles de 2004 à 2020 permettent de conclure qu'excepté les amplitudes, la dispersion des caractéristiques principales des cycles financiers entre les pays de l'Union est globalement faible. Par ailleurs, les cycles financiers nationaux affichent un degré élevé de synchronicité, qui témoigne d'une intégration financière des économies de l'Union et serait lié au contexte d'unions monétaire et bancaire.

Sur la base de ces résultats, l'étude émet l'hypothèse d'un cycle financier à l'échelle de l'Union qui serait favorable à la mise en œuvre des politiques macroprudentielles communes. Aussi, la concordance des phases des cycles financiers pourrait-elle encourager un rôle complémentaire de la politique monétaire destiné à atténuer les effets macroéconomiques néfastes associés aux instabilités financières.

Key Words: *credit cycles, economic fluctuations, synchronization of cycles, concordance index.*

JEL Classification: *C32; E32 ; E44 ; F36.*

I. INTRODUCTION

The financial crises that have emerged over the past three decades have led to high economic costs and increased the focus on interactions between financial¹ and real cycles in economic trends (Monteiro and Vasicek, 2018). In particular, the 2007 financial crisis and subsequent major recession led to renewed interest in the role played by the financial markets and financial frictions in the generation, amplification and spread of shocks (Annicchiarico et al., 2019 ; Schularick and Taylor, 2012). The crisis therefore placed understanding the determining factors of the financial cycle and its interactions with the macroeconomy at the top of the agenda in academic and political circles (Mian et al., 2018 ; Gourinchas and Obstfeld, 2012; Reinhart and Rogoff, 2011). These interactions have policy implications for central banks, in their capacity as bodies responsible for implementing macroprudential policy (Claessens et al., 2011.a). Given the importance of financial cycles in today's macroeconomy, prudential policies can be seen as a third pillar of the economic policy framework, complementing monetary and fiscal policies (Monteiro and Vasicek, 2018).

From a theoretical point of view, the admission of the existence of a financial cycle represents a break with the theoretical framework of efficient markets inherited from Modigliani-Miller (1958), in particular the assumptions of perfect information, pure and perfect competition, and complete markets operating without friction. According to Modigliani and Miller (1958), financial structure has no influence on the value of a company, i.e., its share price and the cost of capital. In other words, corporate financial policy is neutral. In this way, the real economy is isolated from changes in external financing conditions via bank credit or securities issues.

This theoretical construction by Modigliani-Miller (1958) ignores the important role played by shocks affecting the balance sheets of companies and financial intermediaries in fluctuations in economic activity, and does not stand up to the test of recent economic facts. Indeed, successive financial crises in history and developments in economic theory show that financial conditions and turmoil play a major role in economic fluctuations. At least since the Great Depression of 1929, the dynamics of the economic cycle have been driven more by financial factors. The financial crises of recent decades, including the massive collapse of the Japanese asset market in the early 1990s, the crisis in emerging countries in Asia and the Americas in the 1990s, the stock market crises in certain developed countries at the end of the 1990s, and the subprime crisis of 2007 highlight the role played by financial factors. These crises give renewed relevance to the pioneering analyses of Gurley and Shaw (1955) and Minsky (1964), according to which financial factors influence the real business cycle.

These contemporary facts have led to a growing interest in research on financial cycles. The role of credit or asset prices in business cycles has been the subject of numerous investigations². There is a growing consensus that the financial system may play a role in generating or amplifying shocks that could significantly disrupt the real business cycle. In this respect, it would be useful to improve our understanding of the financial cycle in order

¹ The financial cycle is a manifestation of the instability of trends in the financial system over time (Aglietta, 2017). There is no unanimous definition. The term is explored in the next section.

² See, for example, Clerc (2001), Bernanke, Gertler and Gilchrist (1996), Gilchrist and Zakrajsek (2008), Ivashina and Scharfstein (2010), Mian and Sufi (2010), etc.

to better anticipate its trends. This understanding would have implications in terms *i) identifying the behavior of the financial cycle and the position of the economy ; ii) understanding the implications of financial cycle behavior for economic policies ; iii) improving the orientation of counter-cyclical macro-prudential policies and limiting the effects of financial crises ; and iv) improving the effectiveness of macro-prudential policies in the monetary union.*

This paper is intended to promote a better understanding of the financial cycle. It provides an empirical overview of how the financial cycle operates in WAEMU member countries. It is organized as follows : after this introduction, the second section focuses on the definition of financial cycles, their transmission mechanisms and their potential consequences. The third section highlights the stylized characteristics of financial cycles. The fourth identifies the main characteristics of financial cycles in WAEMU countries and the fifth examines the role monetary policy could play in mitigating the amplitude of financial cycles. The final section concludes.

II. DEFINITION, TRANSMISSION MECHANISMS AND POTENTIAL CONSEQUENCIES OF FINANCIAL CYCLES

2.1. Defining the financial cycle

The financial cycle is inspired by the economic cycle and refers to the dynamics of the financial system. As in the case of the economic cycle, there is no consensus on the definition of the financial cycle. Borio (2014) defines it analytically as *“self-reinforcing interactions between perceptions of value and risk, attitudes towards risk and financing constraints, which translate into booms followed by busts”*. These interactions play a crucial role in amplifying economic fluctuations and causing serious dysfunctions in financial systems. In the words of Praet (2016) *“financial asset prices and credit creation in the global economy are characterized by pronounced and recurrent ebbs and flows — a pattern we have come to refer to as the financial cycle”*. Praet's definition is close to that of Aglietta (2017), who views the financial cycle in terms of *“the joint dynamics of private credit and asset prices, in which real estate plays a predominant role”*.

Due to the crucial role played by credit conditions in the dynamics of financial cycles, some analysts have reduced the *“financial cycle”* to the *“credit cycle”*. In other empirical studies, depending on the financial structures in place, this reduction is justified by the relative importance of credit creation compared to asset prices in determining financial dynamics.

The *“credit cycle”* refers to phases of credit expansion and contraction. In general, credit cycles are distinct from business cycles in their frequency and amplitude (Aikman et al. 2015). According to Mercer (2019), *“the credit cycle—the expansion and contraction of the supply of credit to borrowers—usually evolves in three distinct phases, each with its own characteristics. These are the beginning, middle and end of the credit cycle”*. For his part, Aglietta (2017) distinguishes five sequential phases : *i) boom, ii) euphoria, iii) climax and crisis, iv) ebb and the onset of pessimism, and v) debt deflation and restructuring of balance sheets.*

Regardless of the number of phases that can be identified within a financial cycle, the essence of a financial cycle is that it is a manifestation of the changes characterizing the interactions between the real and the financial spheres of an economy. These interactions take place through specific channels identified in the economic literature.

2.2. Transmission channels from the financial cycle to the real economy

Recent work on the financial cycle has focused on the mechanisms by which the credit cycle is transmitted to the economic cycle. This work is inspired by Minsky's (1964) theory of the credit cycle and by Keynesian theory, particularly with regard to expectations and market fluctuations. They make it possible to identify two distinct quantitative channels through which the financial cycle influences real economic activity. The first (the "*bank credit channel*"), is based on "*microfinancial mechanisms*" while the second (the "*bank balance sheet channel*") results from "macro-financial factors" associated with the credit cycle.

2.2.1. The "bank credit channel": theoretical framework and underlying assumptions

The channel for the transmission of the financial cycle through bank credit is based on three assumptions. *i) The first presumes that the central bank has the capacity to influence the supply of intermediated loans, by changing the quantity of reserves available to the banking system (Peek and Rosengren, 1995). ii) The second presumes that intermediated loans and securities presented in the "open market" are not perfect substitutes for some companies in the liabilities side of their balance sheet. iii) The third postulates the existence of an imperfect price adjustment mechanism preventing any monetary policy shock from being neutral.*

Based on these assumptions, the bank credit channel implies that following monetary tightening (expansion) resulting in a decrease (increase) in bank reserves and deposits, bank credit supply forecasts decrease (increase). Thus, the shock of restrictive (expansionary) monetary policy leads to a contraction (rise) in the credit supply, complementing the separate effect of rising (falling) interest rates on aggregate demand (see Gertler and Gilchrist, 1993 ; Bernanke and Blinder, 1988, 1992 ; Oliner and Rudebusch, 1996 ; or Ashcraft, 2006).

2.2.2. The "balance sheet channel"

The mechanism of the "*balance sheet channel*" or "*financial accelerator*" highlights the link between asymmetric information in credit markets and the external financing premium. According to Mishkin (1996), the level of adverse selection and moral hazard of companies on credit markets is positively correlated with their net financial position. Thus, when their net worth deteriorates in the wake of a negative financial shock, adverse selection problems are exacerbated, leading to a contraction in lending to the economy and investment spending. Conversely, an expansion in credit and investment spending is noted.

The "*balance sheet channel*" mechanism works as follows. A drop in interest rates following a policy of monetary expansion improves businesses' balance sheets due to the increase in operating income (via lower interest charges) for borrowers. The resulting increase in the businesses' net worth reduces issues of adverse selection and corporate moral hazard (Mishkin, 1996). This, in turn, reduces the external financing premium. In addition, lower key interest rates reduce the user cost of capital. The combined effect of the drop in the external financing premium (due to improved balance sheets) and the reduction in the user cost of capital (linked to the drop in interest rates) amplifies the real impact of the initial monetary expansion policy beyond the traditional effects associated with the interest rate channel.

In short, according to the "*balance sheet channel*" hypothesis, variations in the monetary policy position not only affect interest rates per se, but also have a direct and indirect influence on the financial situation of borrowers via the prices of their collateral assets. The improvement (deterioration) in the financial situation of borrowers and in the value of collateral is favorable (unfavorable) to credit growth. Shocks that affect the balance sheet

are then propagated and magnified in the real economy (Bernanke and Gertler, 1989 ; Bernanke, et al. 1996). Thus, the financial cycle has a powerful macroeconomic impact on output and effective demand, via the financial accelerator mechanism. In addition, the intensity of this mechanism depends on *“the amplitude of indebtedness and then deleveraging within the cycle”* (Aglietta, 2017).

This impact may be negative, leading to very high economic costs when financial cycles lead to financial crises. Because of the way financial cycles interact with real economic activity, understanding them is a major challenge for those in charge of financial stability.

2.3. The challenges related to understanding the financial cycle

The financial cycle is a major determinant of the macroeconomy, due to the central role financial factors play in it. For policymakers, understanding the financial cycle has major implications.

2.3.1. Identifying the main features of the financial cycle and knowing how to pinpoint the economy's position in the cycle

Mitigating financial cycles is one of the fundamental objectives of macroprudential policies, in addition to strengthening the resilience of the financial system, i.e., its capacity to absorb economic and financial shocks and the propagation of their effects to the rest of the real economy (Group of Thirty, 2010 ; Bennani et al., 2013). In the pursuit of these two objectives, understanding the phases of the financial cycle and their fundamental determinants would provide essential insights for the authorities in charge of conducting macroprudential policy (Borio, 2013). Indeed, the facts show that cyclical phases in the financial markets comprise risks and are liable to lead to serious financial tensions. Moreover, the interaction of the financial cycle with the real cycle can amplify economic fluctuations and cause damage to macroeconomic and/or financial stability.

The framework for activating macroprudential measures illustrates the scope of this challenge. Indeed, the recommendations for the use of countercyclical variable capital buffers against the amplification of shocks from the banking system and financial markets to real activity refer to the stages of the financial cycle (Detken et al. 2014). They emphasize the need for banks to increase their equity capital during periods of high risk of systemic crisis to strengthen their capacity to absorb unexpected losses. At the very least, activating this mechanism requires knowledge of the characteristics of the financial cycle and the ability to identify the economy's position within it. Thus, for the authorities in charge of financial stability, intervention in the financial cycle raises the question of identifying the opportune moment (Praet, 2016). An understanding of financial cycles will provide some answers to this question.

2.3.2. Understanding the implications of the financial cycle for economic policy

The behavior of the financial cycle has implications for the economic policies designed to stabilize erratic economic trends. Macroprudential policy honors this vocation by aiming to ease financial cycles. The 2007 financial crisis, however, through a combination of the accumulation of financial sector disruptions and the relative severity of the subsequent recession compared to usual recessions, shows that much remains to be done to improve the effectiveness of the macroprudential framework.

The lessons learned from this crisis have led to the enhancement of macroprudential supervision and monitoring mechanisms, notably through the enactment of new standards to reinforce the financial system. However, the dynamic behavior of the financial cycle means that the authorities in charge of economic policies, particularly macroprudential policies, need to have a clear and precise view of financial cycles, with regard to their various properties (including their amplitude and persistence) to ensure the effectiveness of the framework (ECB, 2014). In this respect, knowledge of the main characteristics of financial cycles is as essential as attenuating them and strengthening the resilience of the financial system.

2.3.3. Improving the orientation of countercyclical macroprudential policies and limiting the effects of crises

A deeper understanding of the financial cycle and how it interacts with the business cycles would enable us to better guide macroprudential policies and limit the amplifying effects of financial cycles on business cycles. The history of financial crises shows that they are not all followed by economic crises. However, when this does happen, the recessions are deeper. These more or less dramatic fluctuations in business caused by the financial cycle leave room for regulatory or monetary policies to play their role in moderating the economic cycle. To achieve this effectively, an understanding of financial cycles is an important prerequisite. The challenge is to identify policies that could prove useful in moderating economic fluctuations (Stein, 2021) and to have a precise idea of the appropriate times to activate these policies. This challenge also implies a necessary trade-off between the objective of financial stability and that of vigorous growth, particularly in a context of the end of the financial expansion phase and sluggish real growth (BIS, 2015).

2.3.4. Enhancing the effectiveness of macroprudential policies in the monetary union

Improving the effectiveness of macroprudential policies in the monetary union is another issue at stake in the analysis of financial cycles. Examining financial cycles is vital in a monetary union context, where an identical measure of macroprudential policies is applied to all member countries. This issue is linked to the need for synchronicity in the economic and financial cycles of member states to facilitate the implementation of common policies (Harding and Pagan, 2006). This would increase their efficiency.

In the event of weak cycle synchronicity, there could be high costs associated with the implementation of common monetary or macroprudential policies. While the hypothesis of a significant financial cycle is relevant, the divergences between national financial cycles could also amplify the divergences between the economic cycles of the member countries of the union. As a result, common monetary policy could lose its power to stabilize fluctuations in national economic and financial cycles, leading to their amplification (Haug et al., 2005). This could be detrimental to real and nominal convergence, and thus to the effectiveness of the common monetary policy. Furthermore, the conflict between macroeconomic stabilization and financial stability objectives could be exacerbated (Oman, 2019).

These major challenges make it essential to understand financial cycles and identify their main characteristic features at the heart of macroprudential policy implementation.

III. STYLIZED FEATURES OF FINANCIAL CYCLES

The literature on the features of financial cycles is largely based on the definition of the cycle devised by Burns and Mitchell (1946)³. This definition provides a methodological reference and a simple, effective procedure for identifying cyclical turning points (Claessens, 2012). This approach to the definition of the cycle was also used by Abou (2010) with reference to the WAEMU countries. Based on this definition, a financial cycle can be characterized by, *i) its peaks, ii) its troughs, iii) the duration, iv) its amplitude, and v) the violence (speed) of its expansion and contraction phases*. In reality, these cycle phase characteristics are not symmetrical. The cycle may reflect asymmetries of duration, amplitude or violence in its phases.

A number of stylized characteristics of financial cycles can be identified using a historical perspective and empirical research. Claessens et al. (2011) explored 500 financial cycles from 1960 to 2007 in 23 countries, and Aikman et al. (2015) explored the credit cycles of 13 developed countries provide valuable information. These regularities concern, inter alia :

- the precursor role of booms in financial crises and downturns,
- the fact that the duration and amplitude of financial cycles are relatively higher than those of business cycles,
- asymmetry in the duration of financial cycle phases and components,
- mutual reinforcement between credit and asset price cycles, and
- a high degree of synchronization of national financial cycles.

3.1. The boom as a precursor to the end of the cycle and a slowdown

Theories based on financial frictions⁴ and behavioral finance⁵ teach us that credit booms are likely to lead to recessions or financial crises. They have contributed to the consensus that the causes of financial crises are to be found in booms where the “*risk appetite*” and “*animal spirits*” of financial market players generate vulnerabilities in the financial system. The role of booms in the financial cycle is expressed satisfactorily in the following statement : “*Credit booms sow the seeds of subsequent credit crunches*” (Aikman et al., 2015 ; Cuciniello and Di Iasio, 2020). They are apparently a key precursor to the financial crises noted in the twentieth century in both emerging and advanced economies (Gourinchas and Obstfeld, 2012).

The facts show that rapid credit growth tends to presage a financial crisis or a more moderate slowdown in activity. Indeed, a strong rise in the credit market tends to convey a greater magnitude of negative information about future economic growth than that contained in credit quantity variables. This is why credit booms, particularly those associated with rapid increases in credit volume, and feelings of exuberance—i.e., aggressive pricing of credit risk—tend to end badly (Stein, 2021).

³ Cycle characteristics are by Burns and Mitchell (1946). Bry and Boschan (1971) and Pagan and Harding (2002 and 2006) complement this definition in their work on dating business cycles.

⁴ Fisher (1933), Bernanke and Gertler (1989), Kiyotaki and Moore (1997), and Geanakoplos (2009) provide the basic foundations for these theories. Empirical research was conducted by Brunnermeier and Sannikov (2014), Hall (2011) and Eggertsson and Krugman (2012).

⁵ Behavioral finance theory, developed by Minsky (1977, 1986) and Kindleberger (1978), emphasizes the independent role played by the imperfectly rational beliefs or feelings of investors. The empirical study was conducted by Bordalo et al. (2018), and Greenwood et al. (2020).

Other empirical studies on financial market trends indicate that in the aftermath of a peak in the financial cycle, a serious weakening in business activity appears more likely. This leads to credit contractions and drops in financial asset prices. As a result, economic activity registers major economic slowdowns (see Monteiro and Vasicek, 2018 ; Gourinchas and Obstfeld, 2012 ; Drehmann et al., 2012 ; Claessens et al., 2011).

The sequence of events that led to the global financial crisis of 2007 clearly illustrates the precursory role of the financial boom, in credit in particular. The confidence effects that prevailed in the first half of 2007 (expectations on asset returns and increased international capital flows) pushed credit supply sharply upwards in several developed and emerging countries (Lane, 2013). This period of euphoria preceded the crisis and the sudden downturn marked by falling confidence, drying up of liquidity, and the installation of a climate of strong risk aversion.

In short, there is a strong empirical correlation between peaks in the financial cycle and unfavorable macroeconomic outlooks, particularly for growth in the subsequent period. This regularity points to the need to attenuate financial cycles, with a view to increasing financial and macroeconomic stability. To design appropriate macroprudential policy, it would therefore be necessary to monitor the peaks of financial cycles because they are more closely associated with the onset of financial crises than with economic cycles (Stremmel, 2015).

3.2. Duration and amplitude of financial cycles relatively greater than those of economic cycles

Another regularity in the manifestations of financial cycles lies in their frequency. This value is much lower than that noted for business cycles (Borio, 2012). Empirical evidence provided by the ECB (2014) using data from ten euro zone countries supports this conclusion. Business cycles traditionally last between one and eight years. In the euro zone, for example, they last five years, with disparities between countries. Exploring a broader spectrum of countries, Claessens et al. (2012) found that recessions average around four quarters, compared with five for economic recoveries. Recessions appear to last the same amount of time in advanced and emerging countries. However, recoveries in emerging economies take two quarters longer than those in advanced economies.

Financial cycles appear to be longer and of much greater amplitude. The average duration of financial cycles in seven industrialized countries over the 1960-2011 period was estimated at sixteen years (Drehmann et al., 2012). In some euro zone countries, the duration was around thirteen years, far longer than economic cycles. In general, the duration of downturns (or recoveries) in financial cycles is relatively longer than that of economic recessions (or recoveries, respectively). Bearish episodes last between six and eight quarters. Expansion phases often last longer than downturns : around four quarters for credit and real estate price cycles, and around twelve quarters for stock prices (Claessens et al., 2012). Similar differences are noted by the ECB study (2014) in the case of credit cycles, residential housing prices and equity.

Financial cycles are often more pronounced than economic cycles, with downturns particularly deeper and more intense than recessions. As with duration, the amplitude of phases in financial cycles is often greater, especially when it comes to downturns. On average, credit crunches account for 6% of real credit, compared with 7% for real estate price drops and 30% for share price drops. The intensity of cyclical phases in different financial markets is asymmetrical, with the highest amplitudes of bullish episodes observed

in stock prices, at around 26% (Campbell, 2003). These features of financial cycles are far removed from those of business cycles.

3.3. Asymmetry in the duration of phases and components of the financial cycle

The features of cyclic phases are not symmetrical. There is noticeable asymmetry in the duration of cyclical phases and in the manifestations of the components of the financial cycle, i.e., the credit cycle, the equity price cycle and the residential property price cycle. In general, a boom phase is shorter than a slump. The latter lasts much longer than a normal downturn, ranging from 10 to 18 quarters, but the timeframe is longer for episodes of real estate price collapse. In contrast, boom periods are of shorter duration (4.5 quarters) than ordinary upward trends (9 quarters). In comparative terms, property price booms are generally longer in duration, whereas the usual phases of price rises cover 13 quarters.

In addition, real estate and stock market asset cycles can be deep and long-lasting, whereas credit cycles appear relatively shorter and less pronounced. On the other hand, stock market cycles are relatively more frequent, due to their intrinsic volatility.

3.4. Mutual reinforcement between credit and asset price cycles

Another important regularity is the strong mutual reinforcement that takes place between credit and real estate price cycles. The strong interactions between the credit and housing markets generate significant co-movements. As a result, episodes of credit tightening coincide with downturns in property prices. Credit contractions are apparently affected more severely than other financial variables. A similar co-movement is noted between credit recoveries and real estate booms.

This mutual influence can lead to an amplification of financial cycles, resulting in more intense cyclical episodes and major downturns. The intensity of these interactions peaks when the credit and housing markets deteriorate at the same time. However, when credit cycles coincide with equity cycles the results produced are different. Credit downturns are longer lasting and more intense.

3.5. Strong synchronization of national financial cycles

Synchronicity is also a key feature of financial cycles. It reflects the simultaneity of the cyclical phases experienced by several markets or countries over a given period. An analysis of the facts shows national financial cycles as being highly synchronized between countries, and the degree of synchronicity increases over time. This co-movement is related to the growing globalization of the economy, favoring market integration.

Credit and equity market cycles appear relatively more synchronized between countries which have a concordance index close to 75%, while national housing market cycles appear synchronized at 60%. Due to this international synchronization of financial cycles, they are increasingly accentuated. Thus, cyclical downturns have relatively more damaging effects, particularly regarding credit and equity markets. In addition, the international synchronicity of cyclical phases in credit and equity markets leads to longer and deeper downturns (Claessens et al. 2011.a and b).

In the specific case of the European Union, credit, business and real estate cycles are the most highly correlated among within countries, while equity price cycles are much less synchronized with the other cycles (ECB, 2014). This situation partially reflects the close

relationship between the business cycle and lending to the non-financial private sector. In addition, as seen on a broader country scale by Claessens et al. (2011.a and b), credit and equity price cycles are relatively more strongly correlated between countries than housing price cycles. The relatively low degree of synchronization between housing market cycles is linked to the diversified structure of markets across the countries of the EU. These conclusions are shared by Stremmel (2015), but there are some major nuances worth noting. Financial cycles in Europe are highly correlated during periods of stress, and diverge during periods of expansion. In other words, financial cycles are somewhat less synchronized in good times, i.e., in expansion phases.

Furthermore, analysis of the features of financial cycles also reveals a fairly high degree of synchronization of financial variables in the euro zone (Monteiro and Vasicek, 2018).

Moreover, the integration of financial markets and the resulting massive cross-border flows seem to have favored the synchronization of national financial cycles. Interactions between the national financial cycles and the business cycle take place through two main channels, as identified in the literature. Due to differences in economic and financial structures, these interactions may lend different features to financial cycles, depending on the economy. In this respect, it would be useful to explore the main features of financial cycles in WAEMU and examine their comparability.

IV. IDENTIFICATION AND ANALYSIS OF THE SYNCHRONICITY OF FINANCIAL CYCLES IN WAEMU

In this Note, financial cycles are identified in terms of credit cycles. Their main characteristics in the WAEMU countries, as revealed by the estimates⁶ based on quarterly data from 2004 to 2020 include the :

- number of expansions and contractions,
- duration of phases of the cycles,
- amplitude of cyclic phases,
- speed of expansions and contractions, and
- synchronicity of cyclic phases.

4.1. Relatively higher number of expansion phases

The profile of financial cycles in WAEMU is broadly in line with the regularities observed internationally. The number of expansion phases is effectively greater than the number of contraction phases. In addition, the number of expansion phases varies from country to country. Nine expansion phases were counted in the cycle at WAEMU level, while at country level, Burkina Faso and Senegal had six. In Benin, Guinea-Bissau and Niger, seven expansion phases were identified. Côte d'Ivoire, Mali and Togo had eight. Moreover, in each country and at Union level, the number of expansions exceeds the number of recessions by one (see Graph 1.a).

⁶ Details of the approaches used to identify, extract and measure the synchronicity of financial cycles, as well as the choice of analysis indicator, are presented in the appendix.

This observation was also made by Abou (2010) in his study based on annual data from 1970 to 2009. He noted that in Benin, Mali, Senegal, Togo, and the Union, the number of expansion phases was higher than the number of contraction phases.

Theoretical and empirical research points to a mutual influence between the credit cycle and the real economy. However, the credit cycle has its own dynamics. The cyclical phases identified in WAEMU could therefore be explained by factors specific to the banking sector and factors related to the macroeconomic environment. With regard to banking-related factors, Tadenyo (2021) emphasizes the significant role of bank liquidity, portfolio quality and the perception of risks associated with bank lending. Factors linked to the macroeconomic environment are mainly due to shocks affecting actual business. The structure of the Union's economies provides channels through which actual business exerts an impact on the bank credit cycle. In a context of small, open economies largely dependent on commodity exports, the international context—and in particular price trends for these products—has an influence on the credit cycle. Favorable international prices for products exported by the Union's countries will lead to credit expansions, while falling prices will be associated with downturns in the credit cycle. Among the macroeconomic factors affecting actual business, we should also mention the significant role played by monetary and fiscal policies. Furthermore, actual business within the Union is still affected by weather events and socio-political unrest.

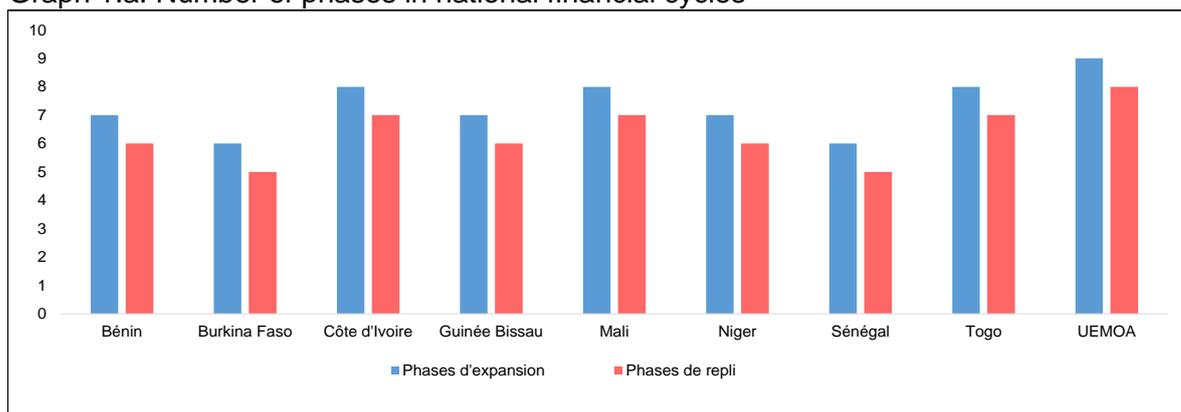
4.2. Relatively longer duration of recession phases

There is a slight difference in duration between expansionary and recessionary phases in the same country, except in the case of Burkina Faso, where they are identical, at just over six quarters. For most countries in the Union, the average duration of expansions is between 4.43 and 6.20 quarters. Burkina Faso and Senegal stand out somewhat for the length of their expansion phases (6.2 and 6 quarters, respectively).

The same observations can be made regarding recession phases. The longest are in Burkina Faso and Senegal (6.2 and 6.6 quarters, respectively). In addition, recessions last slightly longer than expansions in Benin, Côte d'Ivoire and Senegal (see Figure 1.b).

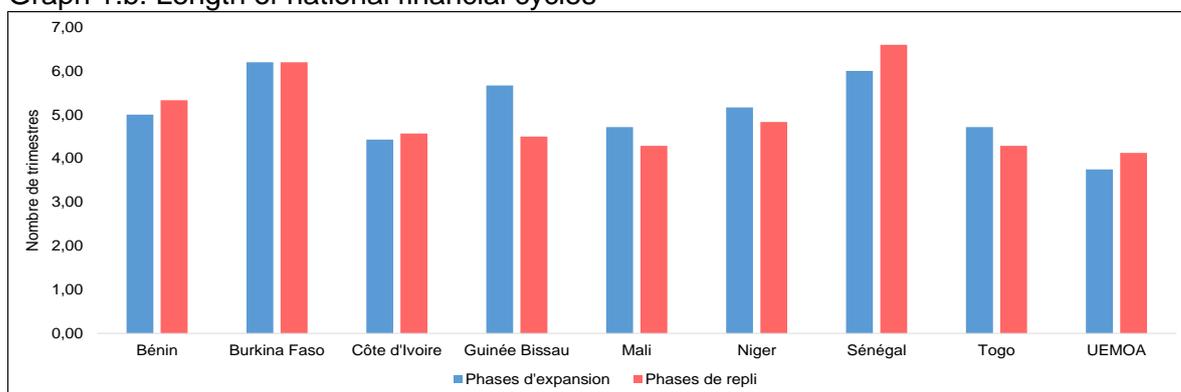
These characteristics of the financial cycle in WAEMU countries appear to be broadly similar to those in emerging countries. Indeed, Claessens et al. (2012) find an average duration of four and five quarters for expansions and recessions respectively. However, these durations contrast with those reported in Abou's study, which averaged 11 years, or 44 quarters. This seems excessive given the results available in the empirical literature.

Graph 1.a: Number of phases in national financial cycles



Source : The graphs were drawn up by the author based on cycle dating results.

Graph 1.b: Length of national financial cycles



Source : The graphs were drawn up by the author based on cycle dating results.

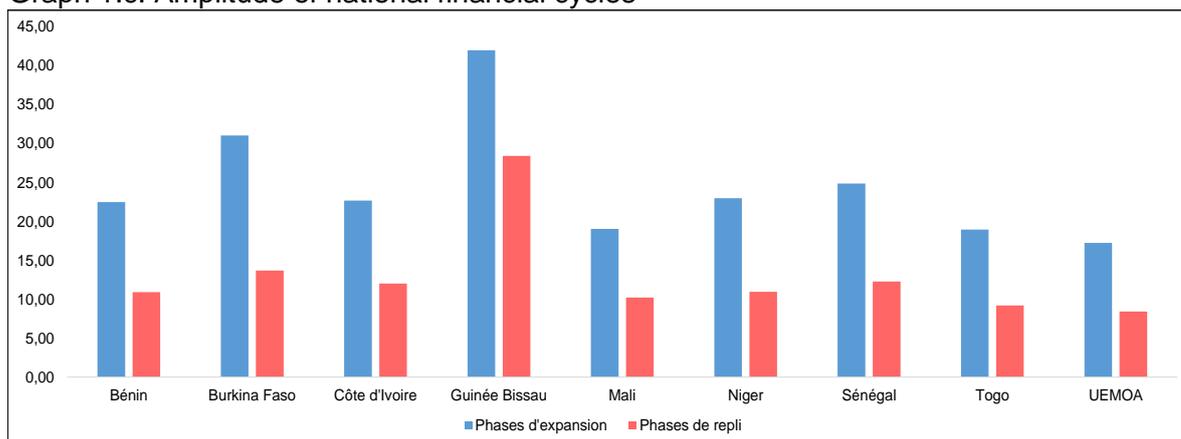
4.3. Relatively greater amplitude of expansion phases

The amplitudes of the cycle phases are not symmetrical. Expansion phases seem to show higher amplitudes than recession phases. In some Union countries, the amplitudes of expansions are double those of recessions. It is also worth noting the varying amplitudes of cyclical phases from one country to another, in relation to the level of claims on the economy. The amplitudes appear more pronounced in countries where credit activity is relatively higher, and therefore proportional to the economic weight of Union member countries.

Given that the level of claims on the economy is taken as an indicator, a comparison of the amplitude of cycles in different countries would be of little relevance. A weighting is then applied by expressing the amplitudes of the cyclical phases as a relative share of the indicator averages, thus measuring the proportion in which peaks and troughs deviate from average values. Analysis of the amplitudes thus expressed reveals differences within the Union. Expansions are relatively more pronounced in Guinea Bissau (42%) and Burkina Faso (31.04%), and lower in Togo (18.96%), Mali (19.04%), Côte d'Ivoire (19.64%), Benin (22.49%) and Niger (23%) (see Graph 1.c).

However, this dispersion seems less marked in the amplitudes of contraction phases. Only the average amplitude of Guinea Bissau's recession phases (-28.21%) stands out from those of other Union countries. This means that, in terms of the extent of downturns, national values are less dispersed (see Graph 1.c). With the exception of Guinea Bissau, they range from 9.21% (Togo) to 13.69% (Burkina Faso).

Graph 1.c: Amplitude of national financial cycles

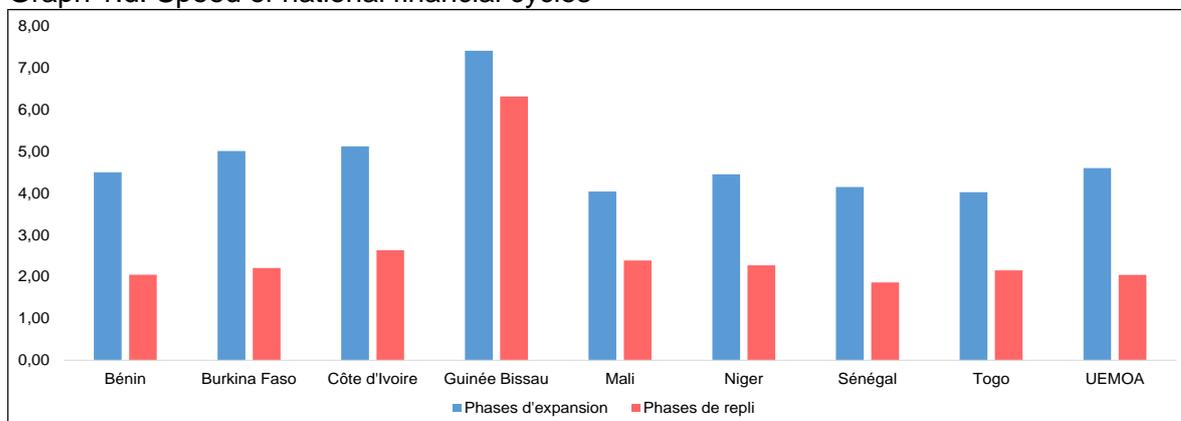


Source : The graphs were drawn up by the author based on cycle dating results.

4.4. Relatively greater speed of expansion phases

Speed or violence is another feature that can be used to describe financial cycles. The absolute value of the gradient is used to compare expansion and contraction phases. Estimates show that the speed of cyclical phases varies very little from one country to another, except in the case of Guinea-Bissau. Excluding this country, the speed lies between 4.2 and 5.12 for expansions and between 1.86 and 2.63 for contractions. Moreover, the speed of expansion phases is greater than that of recessions (see Graph 1.d). As a result, credit markets in WAEMU countries adjust more rapidly in their expansion phases.

Graph 1.d: Speed of national financial cycles



Source : Les graphiques sont élaborés par l'auteur à partir de résultats de la datation des cycles.

4.5. Synchronicity of national cycles

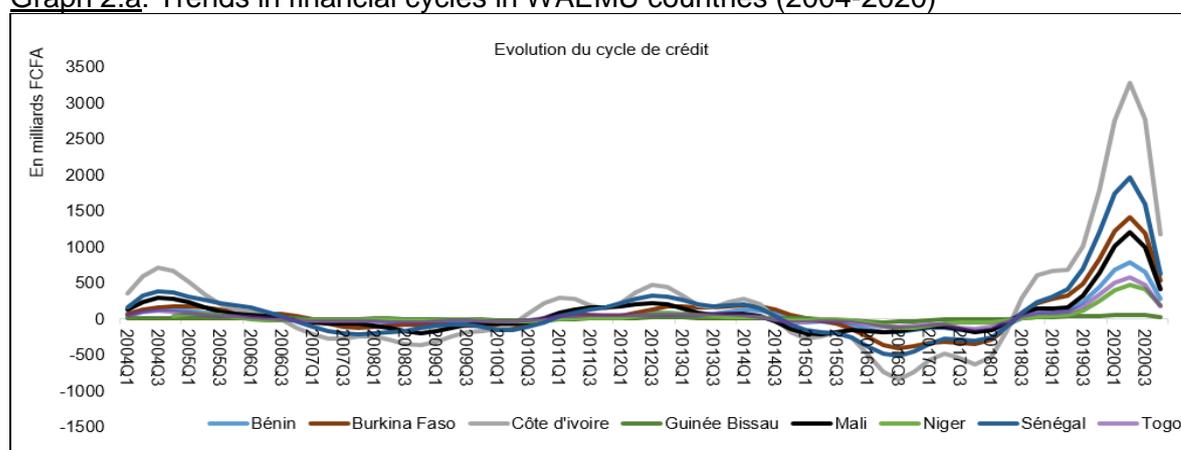
There seems to be a co-movement between national financial cycles. This is reflected in Graphs 2.a and 2.b, which trace the trends of the cycles over the 2004-2020 period. National financial cycles show a similarity of phases, suggesting a high degree of synchronicity between them. As a result, the Union's economies are likely to experience similar financial cycles, albeit of varying depths. This synchronicity is likely to increase over time, given the downward trend in dispersion between national credit cycles (see Graph 3).

This synchronicity is also confirmed by the degree of correlation between the cycles. The two-way Pearson correlation coefficients calculated range from 83.61% to 99.68%, suggesting the existence of a strong co-movement between national cycles (see Table 1).

These results are also confirmed by an examination of the degree of concordance between the expansion and recession phases of financial cycles. The indices calculated are also high, suggesting that cyclical phases largely coincide between the Union's countries. They range from 73.53% to 88.24%.

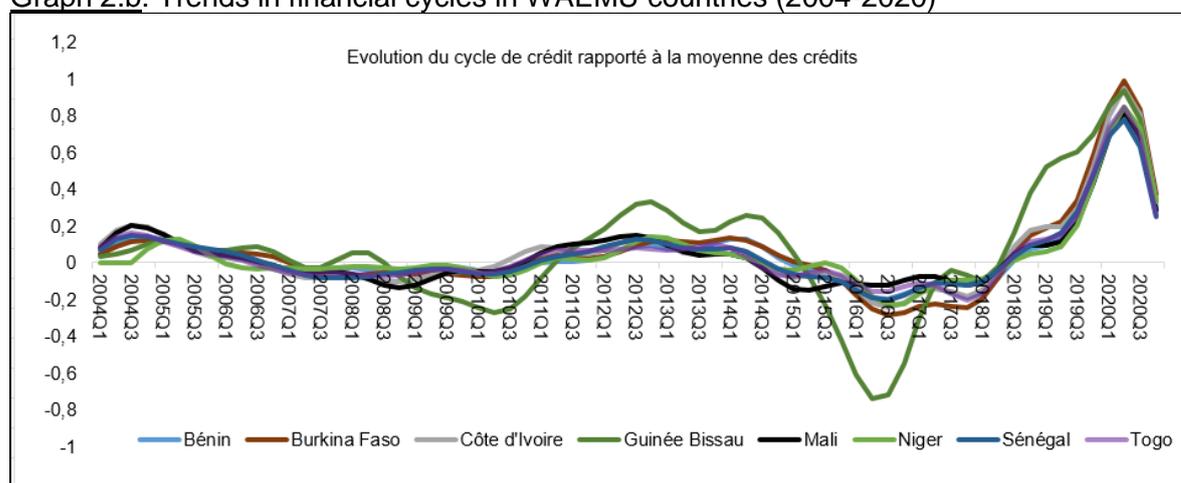
The robustness of these non-parametric results is confirmed by the estimation of the concordance test equations. The correlation coefficients all appear significant at a 1% error threshold, in line with the high degree of concordance of the cyclical phases (see Graph 4).

Graph 2.a: Trends in financial cycles in WAEMU countries (2004-2020)



Source : Compiled by the author from estimates based on BCEAO data

Graph 2.b: Trends in financial cycles in WAEMU countries (2004-2020)



Source : Compiled by the author from estimates based on BCEAO data.

Graph 3: Dispersion of financial cycles

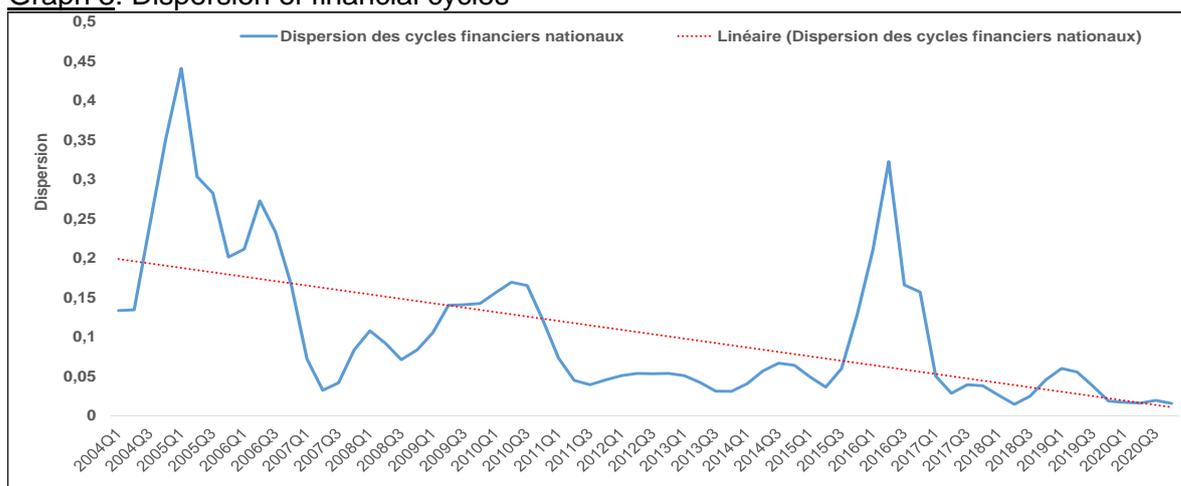
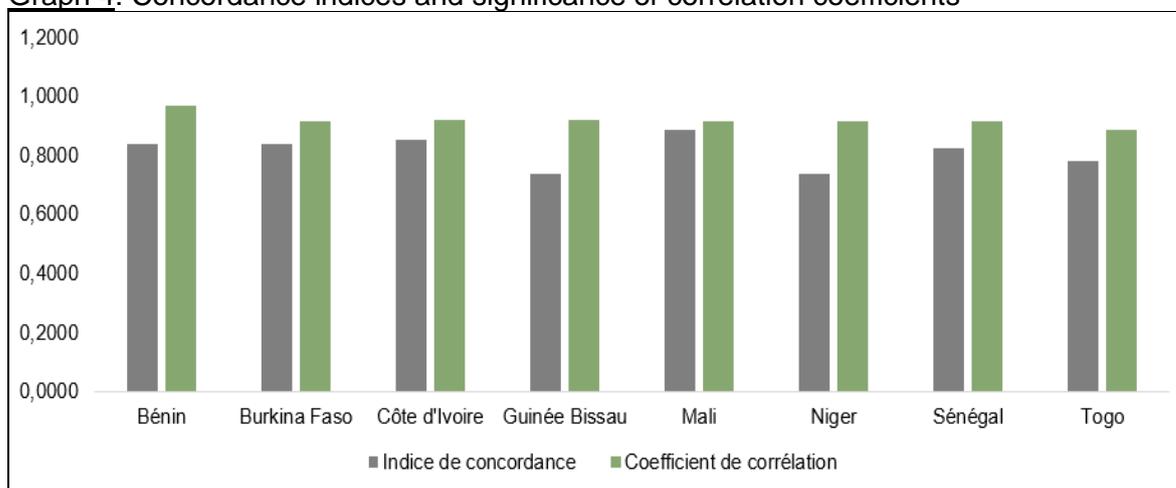


Table 1: Correlation and similarity coefficients for financial cycle amplitudes

Pays	Bénin	Burkina Faso	Côte d'Ivoire	Guinée Bissau	Mali	Niger	Sénégal	Togo	UEMOA
Bénin	1,0000	----							
Burkina Faso	0,9909	----							
Côte d'Ivoire	0,9815	0,9815	1,0000						
Guinée Bissau	0,8441	0,8673	0,8361	1,0000					
Mali	0,9580	0,9444	0,9781	0,7968	1,0000				
Niger	0,9780	0,9721	0,9720	0,8207	0,9532	1,0000			
Sénégal	0,9854	0,9836	0,9883	0,8643	0,9773	0,9758	1,0000		
Togo	0,9844	0,9804	0,9912	0,8099	0,9782	0,9718	0,9882	1,0000	
UEMOA	0,9881	0,9883	0,9968	0,8414	0,9786	0,9766	0,9941	0,9950	1,0000
UEMOA - pays i	0,9862	0,9843	0,9932	0,8391	0,9729	0,9736	0,9910	0,9944	----
	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	----

Source : Author's calculation based on BCEAO data.

Graph 4: Concordance indices and significance of correlation coefficients



Source : Based on the author's estimates.

* The correlation coefficients (ρ_s) taken from the significance test equation are estimated using the generalized method of moments. The values in brackets are the probabilities associated with ρ_s .

In short, over the 2004-2020 period, credit cycles evidenced a high degree of synchronicity. This synchronicity could be related to the monetary and banking union context and suggests the existence of common factors determining national financial cycles within WAEMU. Banks, the main component of the Union's financial system, are subject to the same regulations and monetary conditions. Banking activity within the Union is governed by a single banking law, and the same monetary policy measure is applied without discrimination to all eight WAEMU member states. And so there is an underlying unified regulatory framework and a priori symmetry of monetary policy shocks affecting bank balance sheets, although the responses of individual banks may prove heterogeneous. Furthermore, the high degree of synchronization of financial cycles could be explained by the existence of sub-regional money and interbank markets. Banks access liquidity or trade on identical terms, regardless of the country they are located in. Liquidity tensions on these sub-regional markets are therefore transmitted in a similar way to all banks in the Union, and therefore to their loan portfolios.

The resulting effects on the synchronicity of financial cycles in WAEMU are similar to those of other empirical studies. Empirical research by Claessens et al. (2011, 2012) on 21 developed countries shows that financial cycles are highly synchronized. Stremmel (2015) explores the synchronicity of financial cycles in eleven European countries⁷ over the 1980-2012 period. The results suggest that financial cycles are highly correlated during periods of stress, and diverge during periods of expansion. In contrast, Samarina et al. (2017) find that the credit cycles of 16 euro zone countries, particularly those for mortgage loans and private non-financial loans, diverged over the 1990-2013 period.

These results have implications in terms of financial integration. The fact that the financial cycles in WAMU countries are synchronous means that national financial markets (particularly banking) are closely linked. The banking union context contributes to this through the importance of cross-border capital flows. According to Carstens (2019), for instance, financial markets help expand the range of opportunities for lenders and borrowers. This concordance of cyclical phases is therefore proof of the financial integration of WAMU economies, the positive effects of which can be expressed in terms of capital allocation efficiency and risk diversification (Ho, 2009). Moreover, the synchronicity of national financial cycles augurs well for the existence of a common financial cycle at the Union level, and is conducive to the implementation of common economic policies, particularly in the monetary and macroprudential areas. It is possible to have a single macroprudential policy at the WAEMU level due to the fact that financial cycles are synchronized. This facilitates and improves the effectiveness of the implementation of monetary and macroprudential policy measures. For instance, the economic costs associated with the introduction of macroprudential measures can be minimized in a monetary union. Such synchronicity also provides support for the Union-wide orientation of macroprudential measures, particularly with regard to the introduction of the countercyclical capital buffer.

These results also imply a role for the BCEAO. Given the concordance of the phases of financial cycles as shown by the estimates, common macroprudential policies could turn out to be appropriate for preventing financial instability through the implementation of a certain number of prudential instruments. The fact remains, given the potential negative macroeconomic effects of financial instability, that monetary policy could still play a

⁷ These were Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Spain and the United Kingdom

complementary role to macroprudential policy (Richter et al., 2019). In a context of monetary union, the synchronicity of financial cycles makes the task less arduous. While it may be impossible to eliminate the cyclical ups and downs of the financial cycle, monetary policy could be used to offset the limitations of the macroprudential system in terms of preventing financial instability. This would help moderate the adverse effects of the financial cycle on real economic activity. The role of monetary policy is not yet clearly defined in the literature. The debate surrounding “*Leaning against the wind*” or “*Cleaning up afterwards*” is still ongoing (see Carré, 2015, or Coussin and Delatte, 2019). In the former case, the monetary authorities would intervene against the financial cycle. The BCEAO, through the common monetary policy, could limit its scope. More specifically, the Central Bank could play a role in moderating or supporting financial cycles and even real cycles. As a result, financial stability would become a monetary policy objective. This implies incorporating a financial stability indicator into the Taylor rule. In the latter case, the Central Bank would undertake an ex-post intervention via its monetary policy instruments solely to “clean up” the effects of reversals in the expansion phases of the financial cycle.

It should also be noted that greater synchronization of national financial cycles is essential and desirable for the implementation of a common monetary policy within a banking or monetary union. This would, however, increase the likelihood of systemic risk (European Banking Federation, 2011) and limit the scope of the private cross-border risk-sharing mechanism⁸ particularly via the financing channel. Risk-sharing is purported to compensate for national income losses due to divergent responses to common or asymmetric shocks, or to shocks specific to a member country, in a context where there is no autonomous monetary policy. The private risk-sharing mechanism⁹ via the financing channel assumes the existence of gaps or heterogeneity that act as justification for opportunities for international risk diversification, notably through international investments. These are enhanced when economies go through divergent conditions or are structurally different (De Vijlder, 2018). So, the channel of cross-border credit (issued by banks and capital markets) provides a member country with guaranteed access to international financing, and works best when it is possible for that country to diversify its international sources of funding. However, due to the synchronicity of financial cycles, risk-sharing via the cross-border bank credit channel finds itself de facto weakened due to the similarity of the cyclical phases experienced by all Union countries, and the limited opportunities for international risk diversification. Under these conditions, risk-sharing via cross-border credit remains limited to situations where idiosyncratic shocks are likely to dry up national sources of financing in a member country of the Union. In other words, the mechanism would no longer work in the event of divergent responses to common shocks, or in the event of asymmetric shocks. Adverse common shocks would thus increase the probability of systemic risk.

Moreover, as Carstens (2019) points out, the financial integration highlighted by the concordance of the phases of the financial cycle in WAEMU would also come with costs in

⁸ Cross-border risk sharing refers to mechanisms for smoothing out a country's consumption over time. The European Commission (2007) defines it as mechanisms by which “*an entity acquires a claim on the future income streams of other entities, which are not correlated with its own main source of income, enabling it to smooth fluctuations in the sum of goods and services it consumes over time*”.

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terms of the transmission of shocks and volatility. Indeed, the benefits associated with financial integration can only be reaped if the potential costs involved are minimized.

So, given the importance of financial stability, it is important to gain a deeper understanding of national financial cycles, their determining factors and their interactions with business cycles, to better tailor policy measures. The importance of financial cycles in macroeconomic fluctuations raises the question of the role monetary policy can play in moderating them.

V. THE ROLE OF MONETARY POLICY IN FINANCIAL CYCLES

Past experiences of financial turbulence have shown that the tools available to the monetary authorities are not sufficient to keep a crisis in check. The measures implemented on these occasions have been much more focused on limiting the spread of damage to the rest of the economy. In addition, the application of regulatory measures suffers from inadequacies related to gaps in the coverage of the different types of institutions and markets, and from the inexorable forces of regulatory trade-offs that do not promote the achievement of an optimal level of financial stability compatible with macroeconomic performance. Indeed, from the perspective of stabilizing financial cycles, the role of the authorities in charge of macroprudential policy is likely to become more preventive in nature.

Given that financial regulation may do little to address the booms and busts of financial cycles, some see a role for monetary policy in containing the fluctuations of the financial cycle, or at least of the credit cycle (Stein, 2021). This role, which is expected of the central banks, finds justification in the inevitable interaction of monetary policy with the financial cycle. This interaction stems from the powerful impact of monetary policy on yields and asset prices, as well as on risk-taking incentives, in particular for financial intermediaries. Through these channels, monetary policy can thus exert amplifying or moderating effects on the cyclical phases of financial markets. In so doing, it can have a significant impact on financial stability (Praet, 2016 ; Koepke, 2016).

This mechanism underpins the intuition of those who believe that monetary policy should also play a role in the pursuit of financial stability, in addition to price stability goal. Based on this rationale, the monetary authorities are urged to take account of the state of financial market cycles, in the same way as with business cycles, in their analysis of inflation forecasts. In other words, trends in financial cycles are expected to have implications for monetary policy.

This vision is not unanimously accepted, however, and the debate on the role of monetary policy in the quest for greater financial stability has yet to be settled. Corbo (2010), to take one example, emphasizes the fact that central banks have a major role to play in preventing financial crises. However, he proposes a broadening of the monetary policy framework to take account of asset prices (or even the growth of monetary aggregates and credit). In this way, monetary policy would change its position from *“cleaning up afterwards”* to a more active stance of *“Leaning against the wind”* to discourage the formation of asset price bubbles.

The need to review central banks' stance on financial stability is highlighted by Criste and Lupu (2014). In their view, central banks could adopt a more proactive approach to financial stability, going beyond the traditional framework of regulation and supervision. However,

pursuing a financial stability objective in addition to price stability could lead to a conflict between objectives.

This twofold objective could be achieved if economic and financial cycles are closely synchronized. Under these conditions, a monetary policy aimed at stabilizing inflation and the economic cycle would make it possible to influence the trends in credit, and therefore in the financial cycle. From this perspective, monetary policy would be “*Leaning against the wind*¹⁰”. In phases of financial expansion, monetary policy is more restrictive to curb excessive accumulation and the formation of asset price bubbles, both of which are catalysts for financial crisis and recession.

However, using monetary policy to compensate for failures in other policy areas would overburden it and lead to suboptimal results with regard to both financial stability and the broader goals of macroeconomic stabilization (Praet, 2016). In addition, the perspective of “*Leaning against the wind*” would come with macroeconomic costs. In most cases, the costs would outweigh the benefits (IMF, 2015 ; Svensson, 2017). In addition, the prospect of a “*second best role for monetary policy*” in the management of the financial (credit) cycle runs counter to the conventional view of central banking, as expressed by Yellen (2011) and Bernanke (2015), for example. This view maintains that monetary policy should not be diverted from its traditional macroeconomic objectives. While there are obvious interactions with macroprudential policy, financial stability issues should be addressed by prudential tools that offer relative flexibility. In short, macroprudential policy should remain the first solid line of defense (Praet, 2016).

VI. CONCLUSION

This Note has provided an overview of the financial cycle and how it interacts with the business cycle. This interaction is of interest to economic research and central banking. Analysis of the financial cycle, in particular, is a key issue for the implementation of macroprudential policies.

In a monetary union context, this interest is accentuated by the need to synchronize business and financial cycles between Member States to ensure the effectiveness of monetary or macroprudential policy measures. There was no research on financial cycles in WAEMU among the literature consulted. This note provides an overview of the behavior of financial (credit) cycles in WAEMU countries. It specifically describes national credit cycles in the Union and explores their degree of synchronization.

The empirical analysis makes use of quarterly data from 2004 to 2020, using claims on the economy as an indicator. This choice is in line with much of the literature on financial cycles, and is justified by the predominant role of banks in the WAEMU financial system, as well as the limited availability of data on financial asset prices.

Estimates show that, on the scale of the Union, credit cycle expansion phases last an average of 3.75 quarters, compared with 4.13 quarters for recessions. With a few

¹⁰ This proposal refers to the mobilization of monetary policy to promote financial stability, with a stricter position (i.e., setting a higher key interest rate) than would be justified by standard flexible inflation targeting, unless policymakers did not take the possibility of a financial crisis into account. It was promoted by the Bank for International Settlements (BIS).

exceptions, there are slight differences in both the number and duration of phases in national cycles. The most marked differences concern the amplitudes of the phases and can be explained by the unequal volume of claims on the economy in the different countries of the Union. These differences do not significantly influence on the synchronicity of national financial cycles. The values of the correlation coefficients and those of the concordance indices for cyclical phases are high (close to one). This suggests a synchronization of national financial cycles. Furthermore, Harding and Pagan's significance test supports this conclusion.

The high degree of synchronicity is related to the monetary and banking union context, which means that banks are subject to the same regulations and monetary conditions. In addition, banks access liquidity on the same sub-regional money market and exchange their liquidity on the same sub-regional interbank market, under identical terms. This situation promotes symmetry in the transmission of tensions linked to banks' liquidity and their loan portfolios.

In this banking and monetary union context, the existence of synchronous national financial cycles is proof of the financial integration of the member economies, and allows us to posit the existence of a financial cycle on a Union-wide scale. Such synchronicity suggests the existence of a Union-wide financial cycle, which would be conducive to the implementation of common macroprudential policies across all eight-member countries, proving relevant in preventing financial instability. The concordance of the phases of national financial cycles also implies a role for the BCEAO. Monetary policy could indeed help moderate the adverse effects of the financial cycle on real activity by offsetting the limitations of macroprudential policies. This role for monetary policy could be lean against the financial cycle (following a "*Leaning against the wind*" strategy) or consist of an ex-post intervention aimed at "*cleaning up*" the effects of reversals in the expansion phases of the financial cycle (following a "*Cleaning up afterwards*" strategy).

However, synchronicity between financial cycles within a banking and monetary union could weaken the cross-border risk-sharing mechanism in the event of shocks common to the Union's economies, and increase the likelihood of systemic risk. To guard against this, domestic macroprudential policies should be integrated into an international framework to take account of the international dimension of credit.

Incidentally, information on the development of financial cycles provides the Authorities in charge of financial stability with an important insight for risk assessment (Deutsche Bundesbank, 2019). The importance of understanding financial cycles requires the BCEAO to develop a reliable approach to measuring financial cycles in WAEMU. It is therefore important to conduct in-depth research to better formulate policy recommendations on financial cycles in the Union. This research will contribute to the debate on the role of monetary policy in moderating financial cycles. Research avenues in this direction could involve exploring the determining factors of financial cycles and their co-movements with business cycles.

Bibliographic references

Abou, N. B. 2010. "Analyse comparée des évolutions du crédit et de l'activité économique dans l'UEMOA", Document d'Etude et de Recherche, DER/10/01, BCEAO, Juin.

Aglietta, M. 2017. "Finance et macroéconomie : la prépondérance du cycle financier", *Revue de l'OFCE, Presses de Sciences-Po*, vol. 153(4): 221-251.

Aikman, D. et al. 2015. "Curbing the credit cycle", *Economic Journal*, 2015, vol. 125(585): 1072-1109.

Annicchiarico, B. et al. 2019. "A behavioral model of the credit cycle", *Journal of Economic Behavior and Organization* vol. 166: 53–83.

Ashcraft, A. B. 2006. "New evidence on the lending channel", *Journal of Money, Credit and Banking*, Vol. 38 (3): 751-775.

Barjou, F. 2001. "La politique monétaire en zone euro : objectifs et contraintes", BNP-Paribas, Conjoncture, Sept.

Baxter, M. and R. G. King. 1999. "Measuring business cycles: Approximate band-pass filters for economic time series", *The Review of Economics and Statistics*, Vol. 81(4): 575-593.

Belke, A. et al. 2016. "Business cycle synchronization in the EMU: Core vs. periphery", CEPS Working Document No. 427 (November).

Bennani, T., et al. 2013. "Macroprudential framework : Key questions applied to the French case", Banque de France Occasional paper No. 9.

Bernanke, B. S. 2015. "*Federal Reserve Policy in an International Context*". Paper presented at the 16th Jacques Polak Annual Research Conference Hosted by the International Monetary Fund. Washington, DC, Nov. 5-6, 2015.

Bernanke, B. S., et al. 1996. "The financial accelerator and the flight to quality", *Review of Economics and Statistics*, Vol. 78 : 1-15.

Bernanke, B. and A. Blinder. 1992. "The federal funds rate and the channels of monetary transmission", *American Economic Review*, Vol. 82 (4): 901-921.

Bernanke, B. S. and A. S. Blinder. 1988. "Is it money or credit or both or neither?", *The American Economic Review*, Vol. 78 (2): 435-439.

Bernanke, B. S. and M. Gertler. 1989. "Agency costs, net worth, and business fluctuations", *The American Economic Review*, Vol. 79(1): 14 - 31.

Bordo, M. D. and T. F. Helbling. 2005. "International business cycle synchronisation in historical perspective" *European Economy - Economic Paper 227* (Vol. 1 and 2): Proceedings of the 2004 first annual DG ECFIN research conference on "Business Cycles and Growth in Europe".

Borio C. 2014. "The financial cycle and macroeconomics: what have we learnt?", *Journal of Banking and Finance* Vol. 45 : 182-198.

- Borio, C. 2013.a. "Macroeconomics and the financial cycle: Hamlet without the prince?", VoxEU.org, Feb.
- Borio, C. 2013.b. "Macroprudential policy and the financial cycle: Some stylized facts and policy suggestions", Speech given at the "Rethinking Macro Policy II : First Steps and Early Lessons" hosted by the IMF in Washington, DC.
- Bry, G. and C. Boschan. 1971. "Cyclical analysis of time series: Selected procedures and computer programs". New York, NBER, ISBN 0-87014-223-2.
- Burns, A. F. and W. C. Mitchell. "Measuring business cycles" (New York, New York : National Bureau of Economic Research, 1946).
- Campbell, John. 2003. "Consumption-based asset pricing". Chapter 13 In : Constantinides, G.M., Harris, M., Stulz, R. (Eds.), Handbook of the Economics of Finance.
- Canova, F., M. Ciccarelli, M. and E. Ortega. 2003. "Similarities and convergence in G-7 cycles", European Economy – *Economic Paper* 227 (Vol. 1 and 2): Proceedings of the 2004 first annual DG ECFIN research conference on "Business Cycles and Growth in Europe".
- Carré, E. 2015. "La crise financière a-t-elle affecté le débat « lean » versus « clean » chez les banquiers centraux? ", *Revue d'économie financière* No 117 : 251-276.
- Carstens, A. 2019. "The quest for financial integration in Europe and globally", Speech by General Manager of the BIS, at the Eurofi Financial Forum, Helsinki, 12 September.
- <https://www.bis.org/speeches/sp190912.htm>
- Christiano, L. J. and T. J. Fitzgerald. 1999. "The Band pass filter", Working Papers (Old Series) 9906, Federal Reserve Bank of Cleveland.
- Claessens, S. et al. 2012. "How do business and financial cycles interact", *Journal of International Economics* Vol. 87: 178-190.
- Claessens, S. et al. 2011.a. "Financial cycles: what? How? When?", IMF WP 11/76.
- Claessens, S. et al. 2011.b. "Le tourbillon des marchés financiers", Finances & Développement, Mars.
- Clerc, L. 2001. "Le cycle du crédit, une revue de la littérature : intermédiation, prime de financement externe et politique monétaire », *Bulletin de la Banque de France* No. 94, oct.
- Cogley, T., and J. M. Nason. 1995. "Effects of the Hodrick-Prescott filter on trend and difference stationary time series: Implications for business cycle research," *Journal of Economic Dynamics and Control* Vol. 19: 253-278.
- Commission Européenne. 2007. "Cross-border risk sharing : has it increased in the euro area?", Rapport trimestriel sur la zone euro.
- Corbo, V. 2010. "Financial stability in a crisis: What is the role of the central bank?", BIS Papers chapters, in: BIS (ed.), Perspectives on inflation targeting, financial stability and the global crisis, Vol. 51: 27-30, Bank for International Settlements.

Coussin, M. et A.-L. Delatte. 2019. "Les cycles financiers convergent-ils en zone euro ? En phase oui, en amplitude non", *La Lettre du CEPII* No 403, octobre.

Criste, A. and I. Lupu. 2014. "The central bank policy between the price stability objective and promoting financial stability", *Procedia Economics and Finance* vol. 8: 219-225.

Cuciniello, V. et N. Di Iasio. 2020. "Determinants of the credit cycle: a flow analysis of the extensive margin", ECB Working Paper No. 2445 European Central Bank.

De Vijlder, W. 2018. "Partage des risques dans la zone euro: quelles perspectives," *Conjoncture* No. 7, BNP PARIBAS.

Dell'Ariccia, G. et al. 2012. "Policies for macrofinancial stability: How to deal with credit booms", IMF Staff Discussion Notes 12/06, International Monetary Fund.

Detken, C. et al. 2014. "Operationalizing the countercyclical capital buffer : Indicator selection, threshold identification and calibration options", ESRB Occasional Paper, 5.

Deutsche Bundesbank. 2019. "Financial cycles in the euro area", Deutsche Bundesbank Monthly Report January 2019, Deutsche Bundesbank.

Diamond, D. and P. Dybvig. 1983. "Bank runs, deposit insurance and liquidity", *Journal of Political Economy*, 91(3): 401-19.

Drehmann, M. et al. 2012. "Characterising the financial cycle : Don't lose sight of the medium term!" BIS Working Papers 380, Bank for International Settlements.

Eggoh, J. and A. Belhadj. 2015. "Business cycles in the Maghreb: Does trade matter?" *Journal of Economic Integration*, Center for Economic Integration, Sejong University, vol. 30(3): 553-76.

English, W. et al. 2005. "Assessing the Predictive Power of Measures of Financial Conditions for Macroeconomic Variables", BIS Papers chapters, in: Bank for International Settlements (ed.), Investigating the relationship between the financial and real economy, vol. 22: 228-52.

European Central Bank. 2014. "Financial stability review: Capturing the financial cycle in Euro area countries", *Financial Stability Review*, European Central Bank, vol. 2.

European Banking Federation. 2011. "Credit cycles and their role for macro-prudential policy", November 2011, European Banking Federation.

Gertler, M. and Gilchrist, S. 1993. "The role of credit market imperfections in the monetary transmission mechanism : Arguments and evidence", *Scandinavian Journal of Economics*, vol. 95(1): 43-64.

Gilchrist, S. and E. Zakrajšek. 2012. "Credit Spreads and Business Cycle Fluctuations", *American Economic Review* vol. 102(4): 1692-1720.

Gilson, N. et Labondance, F. 2013. "Synchronisation des chocs d'offre et de demande en Europe – Un après-euro ou une après-crise des *subprimes*? ", *L'Actualité économique*, 89 (3): 155-89.

- Gourinchas, P-O and M. Obstfeld. 2012. "Stories of the Twentieth Century for the Twenty-First", *American Economic Journal: Macroeconomics*, Vol. 4: 226-265.
- Gouveia, S. and L. Correia. 2013. "Trade Integration and Business Cycle Synchronization in the Euro Area: The Case of Southern European Countries", *Journal of Economic Integration* vol. 28(1): 85-107.
- Group of Thirty. 2010. "Enhancing financial stability and resilience : Macroprudential policy, tools, and systems for the future". Group of Thirty, Oct. 2010. ISBN I-56708-150-9.
- Gurley, J. G. and Shaw, E.S. 1955. "Financial aspects of economic development" *The American Economic Review*, vol. 45(4): 515-38.
- Hamilton, J. D. 2017. "Why you should never use the Hodrick-Prescott filter", NBER Working Paper No. 23429, National Bureau of Economic Research.
- Harding, D. and A. Pagan. 2006. "Synchronization of cycles," *Journal of Econometrics*, 2006, vol. 132(1): 59-79.
- Harding, D. and A. Pagan. 2002. "Dissecting the cycle : A methodological investigation", *Journal of Monetary Economics* Vol. 49(2): 365-81.
- Haug, A. A. et al. 2005. "Monetary policy transmission mechanisms and currency unions : A vector error correction approach to Trans-Tasman currency union", *Journal of Policy Modeling*, vol. 27(1) : 55-74.
- Haug, A. A. and W. G. Dewald. 2004. "Longer-term effects of monetary growth on real and nominal variables, major industrial countries, 1880-2001", ECB Working Papers No. 382, European Central Bank.
- Himmelberg, C. P. and D. P. Morgan. 1995. "Is bank lending special?" in J. Peek and E.S. Rosengren (eds.) *Is bank lending important for the transmission of monetary policy?* ", FRB Boston Conference Series No.39: 15-36.
- Hodrick, R. J., and E. C. Prescott. 1997. "Postwar US business cycles : An empirical investigation" *Journal of Money, Credit, and Banking* vol. 29(1): 1-16.
- Hulsewig, O. et al. 2006. "Bank Loan Supply and Monetary Policy Transmission in Germany: An Assessment Based on Matching Impulse Responses", *Journal of Banking and Finance*, vol. 30(10): 2893-2910.
- Igan, D. et al. 2011. "Housing, Credit, and Real Activity Cycles : Characteristics and Co-movement". *Journal of Housing Economics* vol. 20(3): 210–231.
- IMF. 2015. "Monetary Policy and Financial Stability", Staff Report, International Monetary Fund, www.imf.org.
- Ivashina, V. and D. Scharfstein. 2010. "Loan Syndication and Credit Cycles" *American Economic Review : Papers & Proceedings* Vol. 100(2): 57–61.
- Jensen, M. C. and W. H. Meckling. 1976. "Theory of the Firm : Managerial Behavior, Agency Costs and Ownership Structure", *Journal of Financial Economics* Vol. 3(4): 305-360.

- Jorda, O. et al. 2012. "When Credit Bites Back: Leverage, Business Cycles and Crises", Working Papers 172, University of California, Davis, Department of Economics.
- Koepke, R. 2016. "Determinants of of Emerging Market Crises : The Role of U.S. Monetary Policy", IIF Working Paper disponible à <https://ssrn.com/abstract=2814544>
- Lane, P. R. 2013. "Capital flows in the Eurozone", *European Economy Economic Paper*, No. 497.
- Male, R. 2010. "Developing Country Business Cycles: Characterising the Cycle", Working Papers 663, Queen Mary University of London, School of Economics and Finance.
- Mercer Canada. 2019. "Dynamique de fin de cycle", *Inventer l'avenir, aujourd'hui*, février.
- Mian, A. and A. Sufi. 2018. "Finance and Business Cycles: The Credit-Driven Household Demand Channel", *The Journal of Economic Perspectives*, vol. 32(3): 31-58.
- Mink, M., J. P. A. M. Jacobs, and J. de Haan. 2012. "Measuring Coherence of Output Gaps with an Application to the Euro Area," *Oxford Economic Papers*, vol. 64(2): 217–36.
- Minsky, H. P. 1964. "Financial Crisis, Financial Systems and the Performance of the Economy", in Commission on Money and Credit, Private Capital Markets, Englewood Cliffs, New jersey, Prentice-Hall.
- Mishkin, F. 1996. "Les canaux de transmission monétaire : leçons pour la politique monétaire", *Bulletin de la Banque de France*, Vol. 27: 91-105.
- Modigliani, F. and M. H. Miller. 1958. "The Cost of Capital, Corporation Finance and the Theory of Investment", *The American economic review*, vol. 48(3): 261-97.
- Mohanty, M. S. and P. Turner. 2008. "Monetary Policy Transmission in Emerging Market Economies: What Is New?", Bank of International Settlements Papers No. 35.
- Monteiro, D. and B. Vasicek. 2018. "Financial cycle in euro area", Quarterly Report on the Euro Area (QREA), Directorate General Economic and Financial Affairs (DG ECFIN), European Commission, Vol. 17(2) : 17-30, July.
- Ng, T. 2011. "The Predictive Content of Financial Cycle Measures for Output Fluctuations", *BIS Quarterly Review*, Bank for International Settlements, June.
- Oliner, S. D. and D. G. Rudebusch. 1996. "Is There a Broad Credit Channel for Monetary Policy?", *FRB of San Francisco Economic Review*, vol. 1: 3-14.
- Oman, W. 2019. "The Synchronization of Business Cycles and Financial Cycles in the Euro Area", *International Journal of Central Banking* vol. 15(1): 327-62.
- Peek, J. and E.S. Rosengren. 1995. "Is bank lending important for the transmission of monetary policy? An overview", *FRB of New England Economic Review* Nov.: 3-11.
- Praet, P. 2016. "Financial cycles and monetary policy", Speech by Peter Praet, Member of the Executive Board of the ECB, in the context of a panel on "International Monetary Policy", Beijing, 31 August. <https://www.ecb.europa.eu/press/key/date/2016/html/sp160831.en.html>

- Reinhart, C. M. and K.S. Rogoff. 2011. "From Financial Crash to Debt Crisis", *American Economic Review* vol. 101 (5): 1676-1706.
- Richter, B., M. Schularick and I. Shim. 2019. "The Costs of Macroprudential Policy », *Journal of International Economics*, vol. 118: 263-282.
- Samarina, A. et al. 2017. "Credit Cycle Coherence in the Eurozone : Was There A Euro Effect?", *Journal of International Money and Finance* Vol. 77(C): 77-98.
- Schularick, M. and A.M. Taylor. 2012. "Credit Booms Gone Bust : Monetary Policy, Leverage Cycles, and Financial Crises", 1870-2008", *AER* vol. 102(2): 1029-61.
- Stein, J.C. 2021. "Can Policy Tame the Credit Cycle?", *IMF Economic Review* vol. 69: 5-22.
- Stiglitz, J. and A. Weiss. 1981. "Credit Rationing in Markets with Imperfect Information", *American Economic Review*, vol. 71 (3): 393-410.
- Straetmans, S. 2014. "Financial Crisis, Crisis Spillovers and the Business Cycle", Manuscript.
- Stremmel, H. 2015. "Capturing the Financial Cycle in Europe", ECB Working Paper Series No 1811, European Central Bank.
- Stremmel, H., and B. Zsomboki. 2015. "The Relationship between Structural and Cyclical Features of the EU Financial Sector", ECB WP. No. 1812, European Central Bank.
- Svensson, L. E.O. 2017. "Re-evaluating the result that the costs of 'leaning against the wind' exceed the benefits", Voxeu, 24 January.
- Tadenyo, Y. D. 2021. "Liquidité bancaire et financement de l'économie dans l'UEMOA", Documents d'Etude et de Recherche de la BCEAO No. 2021/01, BCEAO.
- Tapsoba, S. J-A. 2008. "Trade Intensity and Business Cycle Synchronicity in Africa", *Journal of African Economies*, vol. 18(2): 287–318.
- Townsend, R. M. 1979. "Optimal Contracts and Competitive Markets with Costly State Verification", *Journal of Economic Theory*, vol. 21(2): 265-93.
- Yellen, J. L. 2011. *Pursuing Financial Stability at the Federal Reserve*. Speech at the Fourteenth Annual International Banking Conference, Federal Reserve Bank of Chicago, Chicago IL, Nov.

Appendix 1

Box 1 : Methodology for extracting, identifying and examining the synchronicity of credit cycles

The financial cycle identification approach used in this note is based on Harding and Pagan's (2002) extension of the algorithm developed by Bry and Boschan (1971) to identify turning points in a series. In addition, financial cycles are extracted using the filtering technique developed by Christiano and Fitzgerald (2003). Cycle synchronicity was measured using Pearson's correlation coefficient and Harding and Pagan's (2006) concordance index. To this end, the credit cycle of each country j is compared with the credit cycle of the rest of the seven member countries of the Union (WAEMU- j). To do this, the aggregate claims on the economy of WAEMU- j are calculated by subtracting the amount of claims on the economy of country j from the WAEMU total. In addition, a correlation relevance test between cycles was carried out following the approach of Harding and Pagan (2006). Then, following Stremmel (2015), the robustness of the synchronicity test was checked by defining national cycle dispersion as the one-year standard deviation across countries of cycle ratios relative to claims on the economy¹¹.

With particular regard to the choice of indicator(s) to be used to measure the financial cycle, the note draws on the empirical literature, focusing exclusively on credit. The low level of financial assets in WAEMU compared with bank credit justifies this choice. The credit indicator used for the purpose is the aggregate of claims on the economy. Quarterly data from 2004 to 2020 was used. To this end the Census X-13 method was used to seasonally adjust the series. Details of the methodological approaches are provided below.

1.1 Identifying financial cycles

Identifying a cycle involves highlighting its main features. This is done by dating the cycle through the identification of its phase turning points (peaks and troughs), the determination and exploration of similarity of the duration and amplitude of expansion and contraction phases as well as the violence of cyclical phases. The approach used in this note is based on Harding and Pagan's (2002) extension of the algorithm developed by Bry and Boschan (1971) to identify turning points in a series.

1.2. Identifying cyclical peaks and troughs

Harding and Pagan (2002) define a binary variable S_t that takes the value 1 in the expansion phase of the cycle and 0 in the event of a recession. Based on this binary variable and the original series, peaks, troughs and average cycle lengths are identified. The specifications of peaks and troughs are as follows for a quarterly series f_t .

A cyclic peak is detected at time t if :

$$\{(f_t - f_{t-2}) > 0; (f_t - f_{t-1}) > 0\} \text{ et } \{(f_{t+2} - f_t) < 0; (f_{t+1} - f_t) < 0\}$$

A cyclic trough is signaled at time t if:

$$\{(f_t - f_{t-2}) < 0; (f_t - f_{t-1}) < 0\} \text{ et } \{(f_{t+2} - f_t) > 0; (f_{t+1} - f_t) > 0\}$$

¹¹ Details on the techniques for extracting, identifying and measuring cycle synchronicity are provided in Box 1 in the appendix.

1.3. Average duration of expansion and contraction phases

Drawing on Harding and Pagan (2002, 2006), the average duration (\hat{d}) of a cycle phase is calculated as follows :

$$\hat{d} = \frac{\sum_{t=1}^T S_t}{\sum_{t=1}^{T-1} (1 - S_{t+1}) S_t}$$

- S_t is a binary variable that takes the value 1 during expansion phases and 0 otherwise ;
- $\sum_{t=1}^T S_t$ represents the total duration of expansion phases in the series ;
- $\sum_{t=1}^{T-1} (1 - S_{t+1}) S_t$ indicates the total number of peaks in the series.

1.4. Average amplitude of expansion phases

The average amplitude of the expansion phases of a series is obtained using the Harding and Pagan (2002, 2006) method according to the following formula :

$$\hat{\alpha} = \frac{\sum_{t=1}^T S_t \Delta f_t}{\sum_{t=1}^{T-1} (1 - S_{t+1}) S_t}$$

- $\sum_{t=1}^T S_t \Delta f_t$ represents the total variation in activity during expansion phases.

1.5. The speed or violence of a cyclical phase

Speed or violence is another characteristic of a cycle. It is obtained from the gradient, i.e., the ratio between the amplitude of a given cyclical phase (expansion or contraction) and its duration. In the present study, velocity is calculated by considering the average of the expansion and recession phases.

2. Techniques for the extraction of financial cycles

The economic literature is full of cycle extraction procedures ; this profusion is a reflection of dissatisfaction with their use. The best-known in macroeconomics is the Hodrick-Prescott filter (1997). This procedure has nonetheless been the subject of much criticism, highlighting its limitations that could induce bias in the analysis (Cogley and Nason, 1995 ; Haug and Dewald, 2004; Hamilton, 2017). In view of the shortcomings of the Hodrick-Prescott filter (1997), recent research relies much more heavily on bandpass filters, an approach that is gaining in popularity [see Oman (2019); Samarina et al. (2017); Tapsoba (2008); Haug and Dewald (2004), etc.]. In this note, estimates are made by extracting credit cycles using the filtering technique of Christiano and Fitzgerald (2003). This technique produces stationary series for the cyclic component.

3. Examining the synchronicity of financial cycles

Several approaches are used to assess the synchronization of economic and financial cycles. Some works are based on the standard correlation coefficient (Aikman et al., 2015; Gouveia and Correia, 2013; Gilson and Labondance, 2013; Igan et al., 2011; etc.) or the degree of dispersion between cycles (Stremmel, 2015).

Oman (2019), Male (2010), and Claessens et al. (2012) take a different approach. They measure co-movement using the concordance index developed by Harding and Pagan

(2002). This index captures the degree of synchronicity between financial cycles, i.e., it measures the fraction of time during which cycles are in the same phase.

3.1. The concordance index

This index captures the degree of synchronicity between financial cycles, i.e. it measures the fraction of time during which cycles are in the same phase. Harding and Pagan (2002, 2006) refer to this fraction as the “concordance index” and define it (for two series x_t et y_t and a sample size of T) in the following form :

$$IC_{xy} = \frac{1}{T} \left\{ \sum_{t=1}^T [S_t^x \cdot S_t^y + (1 - S_t^x) \cdot (1 - S_t^y)] \right\}$$

– S_t^x takes the values 0 and 1 at time t , respectively, during the recession and expansion phases of x ;

– S_t^y takes the values 0 and 1 at time t , respectively, during the recession and expansion phases of y .

As specified above, the "concordance index" will take on the unit value ($IC_{xy} = 1$) when series x and y are in the same phase of their respective cycles. This means that both series will be fully procyclical. The value of the “concordance index” will be zero ($IC_{xy} = 0$) when the series are in phase opposition of their respective cycles. In this case, both will be fully counter- Harding and Pagan (2006) propose a statistical significance test for the degree of synchronicity of two cycles based on an estimation of the correlation coefficient between the two series S_t^x et S_t^y . The following linear relationship is then estimated :

$$\frac{S_t^y}{\hat{\sigma}_{S^y}} = \theta + \rho \cdot \frac{S_t^x}{\hat{\sigma}_{S^x}} + \varepsilon_t$$

- $\hat{\sigma}_{S^x}$ and $\hat{\sigma}_{S^y}$ are respective standard deviations of S_t^x et S_t^y ;

- θ is a constant ;

- ε_t is the error term; it is assumed to be independent and identically distributed, and ;

- ρ is the correlation coefficient.

The synchronicity test is focused on the value of ρ . Due to the risk of serial correlation of the S_t^x and S_t^y series, the Student statistic is not suitable for testing the null hypothesis of non-synchronicity. Instead of the ordinary least squares method, it would be more appropriate to use a method that takes autocorrelation and heteroscedasticity into account. According to Harding and Pagan (2006), the Generalized Method of Moments (GMM) is better suited to this exercise. The present study also follows this estimation approach. Values delayed by a period of s_x and s_y are used as instruments.



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