

The effect of shocks in the relationship between financial integration and financial development

L'effet des chocs dans la relation entre l'intégration financière et le développement financier

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ABSTRACT

The aim of this study is to analyze the impact of internal and external shocks on the relationship between financial integration and financial development over the period 2000-2020. The sample used is countries of ECOWAS. Based on a Pool Mean Group estimation and a non-linear Ordinary Least Square estimation, the results reveal that shocks are unfavourable to financial integration, and reduce the positive effect of financial integration on financial development.

Keywords: Financial integration, Financial development, Stock market, Shocks.

JEL Classification : F21, F36, G15.

RESUME

L'objectif de cette étude est d'analyser l'impact des chocs internes et externes sur la relation entre l'intégration financière et le développement financier sur la période 2000-2020. Notre échantillon est constitué des pays de la CEDEAO. Après estimation d'un modèle par la méthode Pool Mean Group et d'un modèle non linéaire par les Moindres Carrés Ordinaires, les révèlent que les chocs sont défavorables à l'intégration financière et réduisent l'effet positif de l'intégration financière sur le développement financier.

Mots-clés : Intégration financière, Développement financier, Marché financier, chocs.

1. INTRODUCTION

Financial integration refers to individual country's linkages to international capital markets. It designates a process involving a set of measures used with the aim of eliminating restrictions imposed on the financial sector such as the liberalization of the interest rate, the elimination of restrictions imposed on the capital account or the reform of the external sector, McKinnon (1973) and Shaw (1973). The elimination of controls on the movement of capital allows companies and individuals to access foreign capital markets and increase the resources available for investment.

In developing countries, stock markets are in the early stages of growth and are still little known to populations. These countries are considering the liberalization of capital movements, but they are concerned about the effect of increased capital flows on their economic growth and in particular on their competitive positions on an international scale, their economic stability as well as their financial systems. In the case of the West African Economic and Monetary Union (WAEMU) area, the financial system is essentially bank-based. The rate of utilization of financial services is 63.8% because of mobile banking (BCEAO, 2021). Despite this, the banking rate of the population is still very low, 19.3% in 2020, (BCEAO, 2021).

In this area, the Regional Stock Exchange has only forty-six listed companies, with thirty-five from Côte d'Ivoire and two listed companies in average from the seven other countries (BRVM, 2022). However, government and public companies of the union, finance themselves on this market using bond loans. Therefore, in recent years, there have been major developments in this market and other African financial markets, namely the development of technologies to make this market more efficient and transparent.

Furthermore, Konan (2017) shows that financial integration enhances the financial development. Financial openness has a positive effect on financial development through the deepening of domestic banking sectors and stock markets (Mishkin, 2009). These financial markets can therefore integrate in order to increase their financing capacity and facilitate access to several other firms. However, the recurrence of internal and external shocks, such as the covid 19 crisis and the crisis in Ukraine, could hinder financial integration and could reduce its effect on financial development, despite the resilience of these financial markets to these shocks.

Thus, what is the impact of shocks on financial integration? what is the impact of financial integration on financial development? Do shocks improve or deteriorate the impact of financial integration on financial development? The general objective of this study is to analyze the impact of internal and external shocks on the relationship between financial integration and financial development. First, we evaluate the effect of shocks on financial integration. Then secondly, we examine the effect of financial integration on financial development and whether shocks enhance or deteriorate this effect. The sample used is countries of Economic Community of West African States (ECOWAS) over the period 2000-2020. This article is subdivided into six sections. In section 1, we have the introduction. In section 2 we have the literature review. We present the methodology in section 3. Descriptive statistics are discussed in section 4. Section 5 presents the results and discussions, then section 6, the conclusion and economic policy implications.

2. LITERATURE REVIEW

This section revisits the theoretical and empirical literature on the link between financial integration, shocks and financial development. In a first subsection, we examine the link between financial integration and financial development. In a second subsection, we discuss how shocks can affect financial integration.

2.1. Financial integration and financial development

The question of the relationship between financial integration and financial development has received a great deal of attention since the advent of globalization and financial globalization. Some theoretical works argue that financial integration promotes financial sector development. Among others, Beck et al (2000), Klein and Olivei (2008), Honig (2008), Kose et al (2009a and b) argue that capital account liberalization helps to stimulate the development of the financial system and thus accelerate economic growth. Similarly, according to Blancheton and Maveyraud-Tricoire (2006), international financial integration, by allowing international diversification of capital, offers important benefits by reducing risks and/or increasing returns to investors' portfolios. Consequently, financial integration is accompanied by an increase in capital flows.

Other studies, however, question the positive contribution of financial integration to the development of the financial system. According to Eichengreen (2001), Kaminsky and Schmuckler (2002), financial integration can lead to financial system dysfunction, i.e., financial instability, when countries do not have a sound financial system and when the conditions for each level of the integration process have not been fully met.

Empirically, several studies have highlighted the relationship between financial integration and economic growth. However, very little work has been done on the relationship between financial integration and financial development. The few studies that do address the issue examine the relationship between financial integration and economic growth with financial development as a transmission channel. These studies show that financial integration promotes financial development and economic growth, particularly in countries with a high level of financial development. This is the case of the study by Bailliu (2000), which shows that, over the period 1975-1995, capital account liberalization improves financial development and economic growth in 40 developing countries whose banking sector has reached a certain level of development. Similarly, Klein and Olivei (2008) show that capital account liberalization positively affects financial development and economic growth in industrialized countries over the period 1976-1995.

Other empirical studies, on the other hand, show that financial integration negatively affects the financial sector in countries with a very low level of financial development. This is the case of Klein and Olivei (2008) who show that capital account liberalization negatively affects financial development and economic growth in developing countries over the period 1976-1995. Similarly, Allegret and Azzabi (2014) empirically study the relationship between financial openness, financial development and economic growth using a simultaneous equation model estimated by the Generalized Moment Method (GMM) on dynamic panel for 112 emerging and developing countries over the period 1975-2007. Their results show that international financial integration is responsible for a decline in the activity of financial intermediaries. Moreover, financial deregulation seems to have an adverse impact on the development of local stock markets in emerging and developing economies. The particularity of this study is that it takes into account emerging and developing countries simultaneously. Thus, this result obtained could be explained by the fact that the majority of these countries have very low levels of financial development.

Furthermore, some studies establish that financial integration is a source of contagion in the event of asymmetric shocks in countries with developed financial systems. To this end, Daguzan (2011) establishes that global financial integration can be a source of contagion when a country suffers a crisis. Similarly, using a Dynamic Stochastic General Equilibrium (DSGE) model, Poutineau and Vermandel (2014) show that, between the first quarter of 2003 and the fourth quarter of 2012, cross-border capital flows between Germany and France significantly affect the international transmission of asymmetric shocks. This cross-border channel enhanced the diffusion of financial shocks between the two countries.

It therefore emerges from this theoretical and empirical literature review that financial integration promotes financial development through increased capital flows, portfolio diversification, and higher asset returns, especially in countries with a high level of financial development; but contributes to the diffusion of financial shocks. However, financial integration is not conducive to financial development in countries with a very low level of financial development.

2.2. Shocks's effect on financial integration and financial development

A large literature has emerged on the influence of internal and external shocks on financial development. Most of this work attests to the negative impact of shocks on financial development. To this effect, Ben Slimane et al (2013) argue that political and financial shocks in one country negatively influence the financial system of other countries through the occurrence of crisis. Similarly, Ferreira's (2014) study argues that financial shocks represented by financial volatility lead to a decrease in the financing capacity of the financial system. Kennedy and Nourizad (2016) point out that shocks represented by exchange rate volatility negatively impact the financial market through increased financial volatility. According to Caldara et al. (2016), periods of high financial volatility tend to lower financial market revenues.

Empirically, Bekaert, Harvey and Ng (2003) show in their study that the United States and Europe have a high conditional correlation in their financial markets. Thus, European markets are integrated with those of the United States and are affected by shocks in the latter. In the same line of thought, Danielsson et al (2016) show that over the period 1985-2006, the financial and banking crises suffered by Asian and South American countries were a source of volatility in international financial markets. In contrast, with respect to African countries, Allen et al (2011), find that the limited depth and weak integration of African financial systems with the US and European capital markets seem to shelter them from direct transmission of the 2008 financial crisis. However, Kenkouo (2020) shows that African countries, especially those in East Africa, given their weakly integrated and mainly bank-based financial systems, may also be negatively impacted by other types of shocks. Indeed, having constructed an index of banking system soundness, the author estimates a vector autoregression model on panel data (PSVAR) with data from 1993 to 2017. It is found that a negative shock to the USD/XAF exchange rate or high oil price volatility contributes to a lasting deterioration of banking stability. This result is justified by the fact that international trade in these countries is conducted in dollars and these countries are oil producers. The study shows, however, that a positive shock on the growth rate of some trading partners (China, USA, Nigeria) contributes to the strengthening of the resilience of the banking system.

These studies are based primarily on external crises and supply shocks that affect the financial system of the country in question and the financial system of the countries to which it is financially connected. In addition to these supply shocks, there are also demand shocks. To this end, Poutineau and Vermandel (2014), using a DSGE model, show that, between the first quarter of 2003 and the fourth quarter of 2012, demand shocks (government spending and preferences) have a negligible role on the indicators of financial development, namely the supply of credit and the BCE interest rate.

Apart from studies that have analyzed the impact of shocks on financial development, very few works have focused on the effect of shocks in the relationship between financial integration and financial development. To our knowledge, only Belouanas and Brahim (2011), Ghazouani et al. (2014) have addressed this issue in their studies. Indeed, according to Belouanas and Brahim (2011), in case of financial crisis, financial integration generates volatility in capital flows. Also, Ghazouani et al. (2014) indicate that the occurrence of shocks can influence the relationship between financial integration and financial development. Indeed, they suggest that following a monetary shock, financial integration increases the nominal exchange rate and reduces the real interest rate. In contrast, in the case of a fiscal shock, financial integration stabilizes changes in the nominal exchange rate and

the real interest rate. In the event of a shock such as a financial crisis, financial integration leads to volatility in capital flows.

This literature review shows that negative supply shocks negatively influence the financial system of the country concerned and, through the contagion effect, negatively affect the financial systems of the countries to which it is financially integrated. Thus, these shocks reduce the benefits of financial integration on the financial system. However, the effect of demand shocks is negligible.

3. METHODOLOGY

We first present the specification of the models as well as the data that will allow us to carry out our analysis. Second, we describe the estimation method used to estimate the specified models.

3.1. Model specification and data

This study captures the effect macroeconomic shocks in the relation between financial integration and financial market index. Our sample is comprised of ECOWAS countries except Bissau Guinea, Gambia and Guinea. Drawing inspiration from the equation of Allegret and Azzabi (2014) which establishes a relationship between financial integration and financial development, our model is specified as follows:

$$FM_{i,t} = \alpha_0 + \mu_i + \alpha_1 I_{i,t} + \alpha_2 SH_{i,t} * I_{i,t} + \alpha_3 X_{i,t} + \varepsilon_t \quad (1)$$

$i = 1, \dots, 12$ and $t = 2000, \dots, 2020$; i represents countries and t the year

where μ_i is the effect specific to country i . These fixed effects reflect the characteristics of the production function specific to each country. ε_t is the error term with null mean and finite variance.

FM designates the financial market index calculated by Svirydzenka (2016) from International Monetary Fund (IMF). It considers financial access, depth, and efficiency on the stock market. I represents the financial integration, the first variable of interest. According to Konan (2017), who presented the different indicator of financial integration in the literature, we measure it by Foreign Direct Investment (FDI) added to portfolio investment in percentage of GDP. FDI and portfolio investment reflect the possibility and willingness of foreign investors to invest in a given market. Openness to international capital improves the efficiency of the financial system through the arrival of foreign investors. Therefore, we hypothesize that financial integration promotes financial market, Konan (2017). SH is the world uncertainty index which measured macroeconomic shocks. It constructed by Ahir and al. (2022) from comes from IMF. It constructed from the texts of country reports produced quarterly by the Economist Intelligence Unit (EIU). Then, $SH * I$ is an interaction variable.

X is the vector of control variables identified in the literature. It is composed of real GDP per capita growth rate, real effective exchange rate index, trade openness, consumer price inflation rate, and the investment.

The growth rate of real GDP per capita reflects the effect of the macroeconomic environment on financial development with in reference to the work of Chinn and Ito (2002, 2005). We expect this variable is profitable to financial development. The sign of the real effective exchange rate index can be positive or negative depending on the stability of the real exchange rate. Regarding trade openness, its expected sign is positive if exports exceed imports. The sign of the inflation rate depends on the level of inflation because according to Lewis (1999), investors invest where there is less inflation. If the inflation rate is too high, investors don't invest on the financial market. Concerning the investment, we expect a positive effect on financial market.

The real GDP per capita growth rate, real effective exchange rate index, trade openness, consumer price inflation rate come from the World Bank database, the World Development Indicator (WDI).

Investment is represented by the share of gross capital formation at current purchasing power parity, from Penn World Table (PWT) database, (Feenstra, Inklaar et Timmer, 2015).

As we have an interaction variable between shocks and the financial integration variable, it would be wise to first analyze the effect of shocks on financial integration. Following the literature, we specify the model in the following form:

$$I_{i,t} = \beta_0 + \omega_i + \gamma I_{i,t-1} + \beta_1 SH_{i,t} + \beta_2 Y_{i,t} + \mu_t \quad (2)$$

where ω_i is the effect specific to country i . These fixed effects reflect the characteristics of the production function specific to each country. μ_t is the error term. SH is the world uncertainty index. We assume that shocks, measured by uncertainty index, impede financial integration, Belouanas and Brahim (2011). is the vector of control variables identified in the literature. It is composed of financial market (FM), real GDP per capita growth rate, real effective exchange rate index and the investment. We assume that financial market, real GDP per capita growth rate and the investment are favorable to financial integration. For the real effective exchange rate index, given that the different countries do not have the same currency, we hypothesize that it has a negative effect on financial integration.

3.2. Econometric Estimation methods

The purpose of this analysis is to estimate long run effects of financial integration on financial market; and the effect of shocks in this relation (equation 1). But first, we estimate the relationship between shocks and financial integration (equation 2). Thus, we estimate equation (2) before equation (1). For equation (2), given that we have a panel of twelve countries, we could have used the estimation method with fixed effects, or the one with random effects or the Generalized Moment Method (GMM), which are the most commonly used econometric methods. However, these methods have certain constraints that do not fit our model. Indeed, these methods give homogeneous coefficients, except for the constant that captures the specific effects; this could bias the results insofar as there are heterogeneities in the ECOWAS area (Pesaran and Smith, 1995). The GMM method is only valid if there are at least as many instruments as there are variables assumed to be endogenous. When the number of instruments is greater than the individual dimension (the number of countries, for example), the estimates are biased (Tauchen, 1986; Ziliak, 1997).

To do this, because of the small size of our individual dimension and the presence of temporal dynamics, we use the Pooled Mean Group (PMG) and Mean Group (MG) estimators proposed by Pesaran et al. (1999) and Pesaran and Smith (1995) respectively. These estimates have the advantage of estimating the short- and long-term effects jointly, and also have the advantage of allowing the presence of variables that can be integrated of different orders, i.e. $I(0)$ and $I(1)$, or cointegrated, (Pesaran and Shin, 1999). The PMG estimator allows the short-run coefficients and the adjustment coefficient to vary across countries, but the long-run coefficients are identical for all countries, i.e. homogeneous. The MG estimator allows heterogeneity in both the short-term parameters and the long-term coefficients.

Following Pesaran et al. (1999), model (2) can be understood as a staggered delay autoregressive model (ARDL) of the form:

$$I_{it} = \sum_{j=1}^m \gamma_{ij} I_{it-j} + \sum_{j=0}^n \delta'_{ij} y_{it-j} + \omega_i + \mu_{it} \quad (3)$$

Where y_{it} is the vector of explanatory variables and ω_i represents the fixed (country) effect. If the variables are cointegrated, then the error term μ_{it} is a stationary process. In this case, the model can be re-specified as an error correction model in which the short-run dynamics are influenced by the deviation from the long-run relationship:

$$\Delta I_{it} = \alpha_i (I_{it-1} - \theta_i y_{it}) + \sum_{j=1}^{m-1} \gamma^*_{ij} \Delta I_{it-j} + \sum_{j=0}^{n-1} \delta^{*'}_{ij} \Delta y_{it-j} + \omega_i + \mu_{it} \quad (4)$$

Where θ_i is the vector of long-run coefficients. Δ is the operator of variation between two successive dates. The adjustment coefficient α_i as well as the long-run coefficients θ_i constitute the parameters of interest. We expect $\alpha_i < 0$. The PMG estimator uses the maximum likelihood method. The MG estimator is obtained by an arithmetic mean of the separate individual estimates. The assumption of homogeneity of the long-run coefficients must be tested empirically by the Hausman test applied to the difference between the MG and PMG estimators. Under the null hypothesis, this difference is not significant and the PMG estimator is then preferred. Once the long-run coefficients are estimated, we examine the effect of shocks on financial integration. From equation (2), we calculate the marginal effect of shocks as follows:

$$\frac{\partial I}{\partial SH} = \beta_1 \quad (5)$$

Shocks are expected to slow down the marginal financial integration, which should be reflected in a coefficient $\beta_1 < 0$.

For equation (1), we use Ordinary Least Squares (OLS) because the model is non-dynamic.

After estimation, we examine how shocks affect the relationship between financial integration and financial development. From equation (1), we calculate the marginal effect of financial integration as follows:

$$\frac{\partial FM}{\partial I} = \alpha_1 + \alpha_2 SH \quad (6)$$

This equation shows that the marginal effect of financial integration on financial market development depends on shocks. Shocks are expected to reduce the marginal effect of financial integration, which should be reflected in a coefficient $\alpha_2 < 0$. The standard approach in empirical studies to test for a nonlinear effect is to examine the sign and statistical significance of the interaction coefficient. Thus:

If α_1 and α_2 are all positive (negative), then financial integration has a positive (negative) effect on financial market development, and shocks favorably affect (worsen) this impact.

If $\alpha_1 > 0$ and $\alpha_2 < 0$, then financial integration has a positive effect on financial market development, and shocks reduce this impact.

If $\alpha_1 < 0$ and $\alpha_2 > 0$, then financial integration has a negative effect on financial market development, and shocks mitigate this impact.

4. DESCRIPTIVE STATISTICS

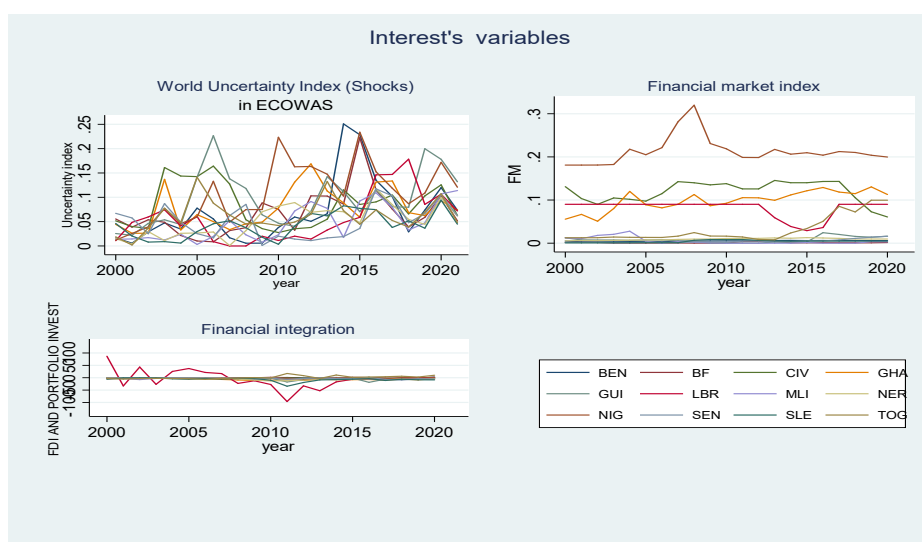
In this section, we present the statistics and the different evolutions of the interest's variables.

Table 1 : Descriptive statistics

Countries		Benin	Burkina Faso	Côte d'Ivoire	Ghana	Guinea	Liberia	Mali
Variables								
FM	Moyenne	0.005	0.001	0.119	0.099	0.008	0.081	0.005
	Minimum	0.003	0.000	0.061	0.051	0.000	0.029	0.000
	Maximum	0.006	0.004	0.145	0.130	0.024	0.090	0.028

UN (Shocks)								
Moyenne	0.069	0.066	0.085	0.778	0.098	0.057	0.048	
Minimum	0.006	0.009	0.028	0.026	0.022	0	0.003	
Maximum	0.251	0.223	0.164	0.169	0.227	0.178	0.114	
FDI&portfolio								
Moyenne	-1.058	-0.747	-1.731	-6.027	-3.870	-5.104	-2.920	
Minimum	-3.428	-4.969	-3.578	-10.970	-18.596	-96.217	-7.576	
Maximum	2.290	2.184	-0.669	-0.989	1.065	86.853	0.534	

Variables \ Countries		Niger	Nigeria	Senegal	Sierra Leona	Togo	ECOWAS	
		FM Moyenne	0.009	0.213	0.005	0.004	0.032	0.048
Minimum	0.005	0.181	0.001	0.001	0.008	0.000		
Maximum	0.013	0.320	0.016	0.008	0.1	0.320		
UN (Shocks)								
Moyenne	0.052	0.108	0.05	0.043	0.062	0.068		
Minimum	0.001	0.012	0.001	0.004	0.002	0		
Maximum	0.118	0.234	0.117	0.094	0.141	0.251		
FDI&portfolio								
Moyenne	-4.625	-1.893	-2.577	-7.438	1.317	-3.056		
Minimum	-13.043	-4.508	-9.344	-34.338	-6.572	-96.217		
Maximum	-0.162	0.203	1.548	-0.622	17.182	86.853		



Graph: Evolution of interest's variables

The first graph shows the occurrence of various internal and external shocks over two decades in the different ECOWAS countries from 2000 to 2020. During this period, these countries experienced coups, political crisis, terrorist attacks, and also suffered some indirect consequences of the 2008 financial crisis through the decline in export demand. In 2020, the Covid 19 health crisis has strongly affected these countries through the closure of borders and trade.

Among the ECOWAS countries, Nigeria has the highest level of financial market development, followed by Côte d'Ivoire, then Ghana and Liberia. These four countries have the highest levels of financial development in ECOWAS. The other countries have very low levels. Benin, Burkina Faso, Côte d'Ivoire, Niger, Mali, Senegal, and Togo belong to the WAEMU area. Thus, they share a common financial market, the regional stock exchange (BRVM). As shown in the second graph, Côte d'Ivoire has the highest level of financial market development in WAEMU while the other countries have low levels. Indeed, among forty-six companies listed on the BRVM, thirty-five come from Côte d'Ivoire, while the other countries each have an average of one or two companies listed (BRVM, 2022). However, between 2018 and 2020, the figure shows a drop in the financial development index in Côte d'Ivoire. This drop is due to the equity market whose market capitalization has suffered a decline from 4682.53 billion FCFA in 2018 to 4367.70 billion FCFA in 2020, (BRVM, 2018, 2020). Furthermore, in recent years, several regional bonds at the BRVM have come from Togo, (BRVM, 2022). Hence the increase in Togo's financial market development index between 2013 and 2020.

The third graph shows us a very low level of FDI and portfolio investment of all ECOWAS countries. Average values are less than 20% of GDP. This transcribes a weak financial integration of these different countries.

5. RESULTS AND DISCUSSIONS

For the empirical analysis, we first performed unit root tests to determine the order of integration of the variables. Then, we performed cointegration tests to examine the existence of long-term relationships between the variables. Finally, following the Hausman test, we chose the most efficient estimator between the PMG and MG estimators.

5.1. Unit root test

For the unit root test, we use the Augmented Dickey-Fuller (ADF) test of Dickey and Fuller (1981) and the Im-Pesaran-Shin (2003), (IPS). The results of the tests are summarized in Table 2. According to these results, variables are stationary in level at the 5% threshold except financial market index and trade openness which are stationary in first difference.

Table 2: Unit root tests in panel of Augmented Dickey-Fuller (ADF) and Im-Pesaran-Shin (IPS)

Variables	IPS Test		ADF Test	
	Level	First difference	Level	First difference
Foreign Direct Investment (FDI) and portfolio investment	-3.0140*** (0.000)	-5.8332*** (0.000)	93.2058*** (0.000)	355.7297*** (0.000)
Shocks	-2.5409*** (0.000)	-5.2564*** (0.000)	57.4001*** (0.000)	291.2437*** (0.000)
Financial market	-1.1466 (0.929)	-4.2508*** (0.000)	19.4476 (0.727)	192.6354*** (0.000)
GDP growth rate per capita	-3.8599*** (0.000)	-6.9584*** (0.000)	171.6811*** (0.000)	462.4274*** (0.000)

Investment	-2.0262** (0.036)	-4.9233*** (0.000)	41.3696** (0.015)	264.8795*** (0.000)
Real effective exchange rate index	-2.4258*** (0.001)	-4.4490*** (0.000)	45.4179*** (0.001)	169.8983*** (0.000)
Inflation	-3.6602*** (0.000)	-5.9666*** (0.000)	146.4421*** (0.000)	388.4744*** (0.000)
Trade openness	-1.7271 (0.251)	-4.3887*** (0.000)	30.1211 (0.115)	194.6843*** (0.000)

Notes : ADF et IPS indicate respectively Fisher-ADF test, Dickey & Fuller (1981) and Im, Pesaran & Shin (2003). a) denotes model with deterministic trend. (*), (**) and (***) denote rejection of the null hypothesis of the presence of unit root in serie at the significance level at 10%, 5% et 1%, respectively. Values of probability are in brackets

5.2. Cointegration test

Following the unit root tests, we perform cointegration test to test for the existence of a long-run relationship between financial market index, uncertainty index and financial integration (FDI and portfolio investment). To do this, we use the Pedroni (1999) cointegration test. The results of this test are presented in Table 3.

Table 3: Cointegration test

Phillips-Perron statistic	-3.2029*** (0.000)
Augmented Dickey-Fuller statistic	-3.4875*** (0.000)

Notes: values of probability are in brackets. (***) denote rejection of the null hypothesis of non-cointegration at 1%.

Statistics reject the null hypothesis of non-integration. We can therefore conclude that there is a long-run relationship between financial market index, uncertainty index and financial integration (foreign direct investment and portfolio investment). We therefore turn to the estimates.

5.3. Estimations of long run relation

For the first estimation, we use the PMG estimator to estimate long-run relationships within an error correction model. The Hausman test shows that the hypothesis of homogeneity of the long-run coefficients cannot be rejected for the different equations. The interpretation of the results will therefore focus on the PMG method. We estimate the relationship between shocks and financial integration. The results are confined in Table 4.

Table 4: Equation of financial integration

FDI and portfolio investment	
Long-run	
Shocks	-6.0472*** (2.1153)
Financial market	-16.1121** (7.4931)
GDP growth rate per capita	0.0336 (0.0495)

Investment	-8.1498** (3.4010)
Real effective exchange rate index	0.0358* (0.0182)
<i>Adjustment coefficient</i>	-0.6711*** (0.1158)
Number of observations	190
Hausman test (Prob>chi2)	0.9902

Notes : (*), (**) et (***) denote significance respectively at 10%, 5% et 1% . Values in brackets are standard errors.

The long-run relationship between shocks and financial integration is confirmed. The adjustment coefficients are negative and significant. The results show a negative and significant coefficient for shocks. This means when shocks, measured by the world uncertainty index, increase by one-unit, financial integration, measured by the sum of FDI and portfolio investment, decreases by 6.0472 units, ceteris paribus. This result is similar to that of Belouanas and Brahim (2011), and consistent with our expected results. This result reflects the harmful effect of shocks in the financial integration process of ECOWAS countries. Indeed, these countries have faced different types of shocks such as coup, political crisis, terrorist attacks, and the Covid 19 health crisis that caused the closure of borders and businesses, and therefore limited FDI and portfolio investments.

The 2008 financial crisis did not have a direct effect on the financial markets of ECOWAS countries, due to the lack of integration of their financial markets with international financial markets, Allen et al. (2011). However, the losses suffered by foreign investors, led to a decline in their investments in ECOWAS through a decline in FDI and portfolio investments, Golou (2009).

An unexpected result is the negative and significant sign of the development of the financial market. Following an increase in the financial market index by one unit, FDI and portfolio investment, a proxy for financial integration, declined more than proportionally by 16.1121 units, ceteris paribus. This can be explained by the fact that the financial markets in ECOWAS are not perfectly integrated regionally and internationally; and the different countries do not share the same currency, except for the countries of the West African Economic and Monetary Union (WAEMU).

The negative and significant sign of investment, i.e. gross capital formation, could be explained by changes in the interest rate. Indeed, according to the IS/LM model, following a fall in the interest rate, there is an increase in investment and a fall in FDI and portfolio investment. Consequently, an increase in investment is followed by a decrease in FDI and portfolio investment.

Against all expectations, the effective exchange rate index has a positive and significant impact on financial integration. This is due to the fact that out of the twelve ECOWAS countries in our sample, seven of them, i.e., the majority, have a common currency, i.e., the CFA Franc XOF. This reduces exchange rate risks in financial integration.

Second, by the OLS, we estimate the relationship between financial integration and financial market; and the effect of shocks on this relation. The results are confined in Table 5.

Table 5: Equation of Financial Market

Variables	Coefficients
FDI and portfolio investment	0.0068*** (0.0017)

Interact	-0.0959*** (0.0208)
GDP growth rate per capita	0.0020** (0.0010)
Investment	-0.1040 (0.0733)
Real effective exchange rate index	-0.0006 (0.0004)
Openness trade	-0.0010*** (0.0002)
Inflation	0.0053*** (0.0008)
Constant	0.1586*** (0.0465)
Number of observations	193
R ²	0.3468

Notes: (*), (**) et (***) denote significance respectively at 10%, 5% et 1%. Values in brackets are standard errors.

These results show that FDI and portfolio investment, i.e. financial integration, have a positive and significant impact on the development of ECOWAS financial markets. An increase in FDI and portfolio investment of one unit is followed by a rise, but less than proportional, in the financial market development index of 0.0068 units, *ceteris paribus*. This result is in line with our expectations and is similar to those of Mishkin (2009), Konan (2017). However, the interaction variable between shocks and financial integration has a negative and significant coefficient. This means that shocks reduce the benefits brought by financial integration to financial markets. However, the first estimation showed that shocks hamper financial integration. Thus, shocks are not only detrimental to financial integration, but they also reduce the positive effects of financial integration on financial markets. Indeed, in the event of internal or external shocks, uncertainty sets in on financial markets and foreign capital will flee to other, safer markets. These results are similar to the idea of Ghazouani et al (2014). Thus, in the process of regional financial integration put in place by ECOWAS countries, financial authorities need to take this into account by putting in place financial standards and rules in order to cushion possible shocks internal and external to the zone.

The growth rate of GDP per capita has a positive and significant effect on financial market development. As Robinson (1952) states, economic growth stimulates the demand for financial services which results into increased financial development. The macroeconomic environment is therefore conducive to financial market development in ECOWAS, Chinn and Ito (2002, 2005). It facilitates the access, depth and efficiency of these markets.

Trade openness has a negative and significant coefficient in accordance with the results of Rajan and Zingales (2003) who state that trade openness without financial openness is unlikely to promote financial development. Indeed, according to these authors, financial development creates opportunities for new firms and drives competition, which reduces the profits of old firms in the market, hence their opposition to financial development. Whereas, if trade and financial openness occur together, it limits the ability of old firms in the market to block financial development. Therefore, for ECOWAS financial markets to benefit from the fruits of trade liberalization, they should be progressively opened up regionally and then internationally.

Inflation has a positive and significant effect on the development of financial markets. According to Lewis (1999), this means that inflation is not excessive. In ECOWAS countries that are not part of WAEMU, the inflation rate exceeds 4%. However, in WAEMU countries, which also belong to ECOWAS, the inflation rate does not exceed 4%. In our sample, these WAEMU countries are more numerous than non-WAEMU countries. This explains the favorable effect of inflation on financial market development. With less inflation, economic agents easily acquire financial securities and the degree of financial depth is high.

6. CONCLUSION AND ECONOMIC POLICY IMPLICATIONS

The aim of this study is to analyze the impact of internal and external shocks on the relationship between financial integration and financial development. First, we evaluate the effect of shocks on financial integration by PMG estimation. Then secondly, we examine the effect of financial integration on financial development and whether shocks enhance or deteriorate this effect. To do this, we construct an interaction variable between shocks and financial integration, then we estimate this non-linear model by OLS. Our sample used is countries of ECOWAS over the period 2000-2020. The estimation results show that shocks are unfavorable to financial integration, and reduce the positive effect of financial integration on financial development.

Other important findings emerge from this study. These are the development of financial markets that hinders financial integration; and trade openness that slows down the development of financial markets. This is due to the lack of full financial integration of these financial markets at the regional and international levels; and also, to the lack of a common currency among ECOWAS countries. However, a stable macroeconomic environment is conducive to the development of financial markets.

A number of economic policy implications emerge from these results. First, these results indicate that in the process of economic and financial integration of ECOWAS countries, they should establish convergence criteria for their economies, as is the case in the WAEMU area, and ensure that these criteria are respected. These convergence criteria will have to take into account tax rules, budget rules, inflation rules and judicial standards. Uniform judicial and fiscal standards for regional trade will facilitate trade and the resolution of regional trade conflicts. With regard to inflation, an average rate for the various countries could be established to allow countries outside the WAEMU to lower their rate by a few points and WAEMU countries to increase their rate by a few points. These various measures will help improve the integration of financial markets, but the banking sector will also benefit in terms of financial depth and stability.

Having established convergence criteria, the countries that have already reached these criteria will have to help the others reach them as well. Once the convergence criteria have been met, these countries will have to set up their common currency, a project that is already under way. Some empirical studies, such as Diaw and Ka (2012), have already advocated an intermediate exchange rate, i.e., a peg to a basket of currencies determined by the geographical orientation of external trade for ECOWAS countries. Thus, moving to a regional integration of their financial markets will allow their markets to have new sources of foreign capital. These markets will be more capital-intensive and will have a greater number of listed companies. Finally, to better cope with internal and external shocks, it is wise to establish financial regulations, as is the case in the banking sector with the Bâles rules, clean up their political governance, and set up a monitoring unit to prevent and cushion shocks.

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