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Regional financial integration and inclusive growth in African franc zone countries

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Abstract

The objective of this paper is to empirically determine the impact of regional financial integration on inclusive growth for the 15 African countries of the franc zone. To achieve this, we first proceed methodologically to construct the inclusive growth index that takes into account the informal sector by adopting the principal component analysis and the composite index calculation technique. Then, through recent econometric developments such as: ordinary least squares (OLS), double least squares (DLS), we establish the impact of RFI on this inclusive growth index between 1995 and 2015. The main results show that the low level of regional financial integration has a negative effect on the inclusive growth of the LICs despite the inclusion of the informal sector. However, although the capital account is liberated, negative inclusive growth is still observed. These results therefore provide a major basis for governments to ensure not only the improvement of the quality of institutions, particularly government efficiency and regulation, but also the implementation of policies aimed more at fostering regional financial integration in order to achieve more inclusive growth.

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1- Introduction

Regional financial integration (RFI) is a concept that has a wide range of definitions in the economic literature. However, according to the Banque de France report (2014), RFI can be defined as: "a process of strengthening the interactions between national financial systems (banks / financial markets) operating at the regional level. By creating larger financial spaces, it improves the regional and global allocation of savings and credit in favour of the most productive investments. by contributing to a reduction in the cost of financial transactions and by increasing the supply of available financing, it is a factor of economic development. it can also be associated, in Africa as in developed countries, with increasing risks of contagion, as demonstrated in particular by the 2008-2009 financial crisis"[1]. Thus, the African countries of the franc zone (ACFZ)[2] which include two sub-regions, have decided since 1994 to adopt monetary-type financial integration as a development strategy aimed at inclusive growth. to our knowledge, there is no work that has established the link between IFR and inclusive growth. most studies have established a link between regional financial integration and economic growth(Chen and Quang, 2014; Seo and Shin, 2016). However, in view of the limitations of economic growth as a wealth indicator, the particularity of this article will be to focus on the relationship between regional financial integration and inclusive growth. in fact, inclusive growth emerged from the debate on sustainable poverty reduction in the early 2000s. according to Klasen (2010), inclusive growth is broad-based income growth that is shared by all members of society (i.e. growth that benefits everyone in the economy). for Elena and Susana (2010), inclusive growth is growth that not only contributes to poverty reduction, but also allows agents.

However, despite the fact that the banking sector in the ACFZ has a high level of liquidity, it should be noted that the financial markets remain less dynamic (Bobbo, 2018). This is certainly the reason why, given the level of regional financial integration in the franc zone, inclusive growth remains mixed and very low. in fact, according to the various reports on the franc zone published by the Banque de France in collaboration with The Bank of Central African States, between 1995 and 2017 the average growth rate of the franc zone countries was 4.2% in relation to GDP. The average inflation rate was 3.8% (which is higher than 3%, which represents the convergence threshold). in addition, between 2000 and 2006, there was a high rate of investment of 22,9%[3]. Between 1990-1994, then 1995-1999 and 2000-2004, the average budget deficit in the franc zone countries reached 6.1%, 2.3% and 0.1% of GDP respectively. there has been an increase in the unemployment rate and poverty in the ECMAC zone. in other words, between 2012 and 2017, the unemployment rate in the ECMAC zone is 15% and 40% of the zone's population lives below the poverty line[4]. according to the first report on the state of poverty in UEMOA drawn up by the UEMOA commission in 2015, the poverty level is 43%, while the unemployment rate is 5.5%, which is practically equal to the world unemployment rate (5.6%). in addition, in recent years there has been a decline in local and foreign investment in the ACFZ, and this is due not only to credit

[1] This is a definition taken from the summary of the conference entitled "Making Financial Integration Work in Africa" organised by the Banque de France and Ferdi on 27 May 2014: P2.

[2] In this zone we have 15 member countries: the CEMAC countries, of which there are 6, the UEMOA countries, of which there are 8, and the COMOROS. We also note the existence of two financial markets: the Côte d'Ivoire stock exchange, since 2018 CEMAC has had the douala stock exchange replacing the douala stock exchange and the Libreville stock exchange.

[3] According to the IMF (2013).

[4] 2012 report on the situation of the economic and social integration of young people in the CEMAC region

rationing, but also to a poor business climate (security crises...). These figures clearly show that despite the existence of regional financial integration in the franc zone, the indicators of inclusive growth mentioned above are low or even negative. This observation leads us to ask the following question: what is the impact of regional financial integration on inclusive growth in the ACFZ? Thus, the remainder of this article is presented as follows: the second section will be devoted to the literature review, the third section will focus on the empirical strategy, the fourth section will look at the results, and the last section will be devoted to the conclusion and recommendations.

2- Literature review

In the economic literature, some theoretical and empirical studies have argued that regional financial integration is conducive to inclusive growth because through financial inclusion[5], the poorest contribute not only to the continued increase in wealth, but also to the reduction of inequality and poverty (Nguekeng and Tchitchoua, 2020). Other studies on the other hand have diametrically opposite results. Moreover, according to the African Development Bank's Scoreboard Theory (2013), inclusive growth is full of several indicators such as: sustainable economic growth, reduction of inequality, productive employment, poverty reduction, human development, gender equality, socio-economic infrastructure and good governance. However, since there are no studies that have directly established the link between regional financial integration and inclusive growth, we will focus on highlighting, both theoretically and empirically, the impact of regional financial integration on some key indicators of inclusive growth such as: rapid and sustainable economic growth, inequality reduction and poverty.

It is McKinnon and Shaw (1973) who first highlighted the benefits of finance on economic growth. For them, by promoting financial deregulation, RFI can be a vector of rapid and sustainable economic growth. For through the liberalisation of the capital account (lower interest rates), it contributes to the increase in domestic investment, which will encourage the birth of several enterprises and consequently a massive recruitment of individuals. Thanks to the income generated by their jobs, individuals will be called upon to consume in accordance with the fundamental psychological rule of J. Kenynes [6]. This consumption will therefore contribute to the improvement of company production and therefore economic growth (Avom and Mekongo, 2020; Ekpo and Chuku, 2017). Moreover, in the sense of the Bretton Woods institutions, individual consumption is a major determinant of production, because if households do not consume, firms cannot produce and develop. In the same logic, Gelos and Werner (2012) suggest that, by favouring the access of the private sector to credit, financial deregulation[7] is a guarantee of high and sustainable economic growth. In a study in Nigeria, Sulaiman et al (2012) attempted to show the effect of financial deregulation policies on economic growth in Nigeria. Using Johansen's co-integration test and the error correction mechanism (ECM), the results show that there is a positive effect between financial deregulation policies and economic growth in Nigeria. In other words, the more deregulated

[5] According to the World Bank, financial inclusion is the set of means put in place to fight against banking and financial exclusion. It encompasses a whole range of financial and non-financial products and services made accessible to poor populations.

[6] J. Keynes' law states that: "on average and most of the time, men tend to increase their consumption to the extent that their income increases, but not as much as the increase in income".

[7] It should be recalled that following the severe global economic and financial crisis of the 1980s, several countries were forced by the IMF and the World Bank to deregulate their financial systems in order to revive economic activity.

the financial systems are, the more this promotes high and sustainable economic growth. In other words, by promoting rapid and sustainable growth, RFI is a source of inclusive growth. In addition, some authors believe that regional financial integration, through the channels of financial development and financial inclusion, contributes to reducing poverty and inequality and therefore is a source of inclusive growth. In fact, data from Beck et al (2014), suggest that private credit expansion can stimulate income growth for the poorest segments of society and reduce income inequality, strongly refuting the position of Greenwood and Jovanovic (1990) who argue that: "the relationship between finance and inequality is non-linear because the effects of finance or financial development are a function of the level of economic development". In other words, according to these authors, in order for financial policies to affect inequality or poverty, the countries implementing them would first need to have a high level of economic development.

In a study of 29 African countries between 1990 and 2017, Avom and Mekongo (2020) analyse the non-linear effects of RFI on sustainable economic growth in Africa in the context of financial globalisation. Using a dynamic panel model by the generalized method of moments, they find two important results in their study. First, RFI can only promote sustainable economic growth if the countries concerned have a high degree of trade and financial openness, high human capital, low inflation, a democratic political system, a high level of government expenditure and alternation at the top of the state. In other words, according to these authors, for RFI to promote inclusive growth, the above conditions must be met. However, Nguekeng and Tchitchoua (2020), conducted a study of 44 sub-Saharan African countries between 1995 and 2017 on the determinants of inclusive growth. By constructing a synthetic index of inclusive growth using the standardized principal component analysis approach, they conclude that the reason why inclusive growth is not a reality in sub-Saharan Africa is because the level of financial integration and infrastructure development is low. Finally, for White (2012), for RFI to promote inclusive growth, it must contribute to: a low level of income inequality, a decrease in absolute poverty, and a reduction in the North-South gap.

The novelty of this article is that, as in the majority of empirical studies, the authors have constructed synthetic indices of inclusive growth without involving the informal sector. The novelty of this study will therefore be the inclusion of the informal sector in the construction of the inclusive growth index.

3- Empirical strategy

The aim here is to first construct the inclusive growth index (loocking the appendice 1) and then show the impact of regional financial integration on this constructed inclusive growth index.

3.1- Assessment of the impact of regional financial integration on the index of inclusive growth in the PAZFs.

We present in turn the model to be estimated, the variables as well as the different source of data used.

3.1.1- The model to be estimated

The analysis covers a sample of 15 countries in the franc zone over the period 1995-2015. We have chosen this period for two main reasons. Firstly, it is from 1990 onwards that a democratic transition can be observed in several African developing countries. Similarly, data

on financial integration are only available from 1995 onwards. The functional form of this model is as follows:

$$\boldsymbol{XSIV = f(INTFIN, X)} \qquad \textit{(1)}$$

Where, X represents the matrix of control variables; XSIV, the inclusive growth index constructed (see appendix 1). We assume that low financial integration negatively affects the inclusive growth of franc zone countries. Therefore, after estimation, we would expect the coefficient of equation 2 to be negative and significant, in panel, this equation is written:

$$\boldsymbol{XSIV_{it} = \alpha_i + \beta INTFIN_{it} + X'_{it}\delta + \mu_{it} + \varepsilon_{it}} \qquad \textbf{(2)}$$

Where, XSIV represents the inclusive growth index, INTFIN is the degree of financial integration, $\boldsymbol{X'_{it}}$is the matrix of control variables, μ_{it} represents the country-specific effect and $\boldsymbol{\varepsilon_{it}}$ is the error term. $\boldsymbol{\alpha_i}$ represents observable individual fixed effects. The indices i and t represent countries and periods respectively. The choice of this model is inspired by the work of Allegret and Azzabi (2014). Indeed, they conducted a study on the impact of financial integration on economic growth in emerging and developing countries over the period 1995-2012.

3.1.2- variables and data sources

The main variable of interest here is the financial integration index (INTFIN). The latter is taken from the database of Chinn and Ito (2017). It is well known that it is ex- extremely difficult to measure the magnitude of the opening of the capital account. Although many measures to describe the extent and intensity of capital account control exist, the consensus is that these measures fail to fully capture the complexity of capital controls in the real world for a number of reasons [8]. In this study, we rely on the capital account opening index, developed by Chinn and Ito (2002) and updated in 2017. One of the merits of this index is that it attempts to measure the intensity of capital controls, insofar as the intensity is correlated with the existence of other restrictions on international transactions.

The control variables included in the X_{it} component are taken from the literature on factors of inclusive growth. They include: investment, GDP per capita, education, fiscal policy, monetary policy, trade policy, financial flows, governance institutions and indicators, information and communication technologies, financial development.

3.2- Descriptive statistics and correlation matrix of variables

We will first present the descriptive statistics, then the correlation matrix of the variables.

3.2.1- Descriptive statistics of variables

The table below gives descriptive statistics for all the variables we have just presented.

[8] Lectures Edison and Warnock (2001), Edwards (2001), and Edison et al, (2002) for discussions and comparisons of different measures of capital account restraint. Dooley (1996), for example, provides an extensive literature and Neely (1999) provides an overall descriptive analysis of capital control.

Table I : Descriptive statistics

Variables	Obs	average	Standard deviation	Minimum	Maximum
Inclusive growth index	279	-0,015	2,013	-3,859	3,873
Financial Integration Index	315	0,179	0,054	0,061	0,473
Governmental Constitutions	315	13,074	4,717	2,651	29,6
Gdp/head	315	6,95	1,073	5,65	10,156
Investment	314	2,973	0,583	1,268	5,389
Education	294	23	10,856	7,107	49,036
Commercial Opening	314	79,007	61,966	30,733	531,737
Credit to the private sector/GDP	315	11,52	6,974	0	37,869
Inflation	300	3,638	5,839	-8,975	50,734
IDE	315	4,628	12,89	-8,589	161,824
Div. exports	315	0,545	0,21	0,2	0,923
Regulation	255	-0,799	0,422	-1,715	0,141
Government Effectiveness	255	-1,013	0,436	-1,867	0,022
Corruption control	255	-0,862	0,386	-1,837	0,31
Rule of law	255	-0,925	0,446	-2,072	0,038
Citizen's voice	238	-0,731	0,59	-2,002	0,375
Political stability	255	-0,564	0,725	-2,687	0,957

Source: Authors

In view of the factors presented above, we find that there is a theoretical vacuum on the role that financial integration could play on inclusive growth. Rather than considering capital account liberalization (financial integration) as a major determinant, the literature has focused much more on financial development as a catalyst for inclusive growth. The present study therefore attempts to fill this gap by assessing the effects of financial integration on inclusive growth in franc zone countries. Table 1 shows that on average inclusive growth is low in the countries in our sample combined with low financial integration as well. As far as inclusive growth is concerned, however, there is a fairly high degree of heterogeneity. with a standard deviation of the order of 2.013, i.e. a deviation of 2.028 from the mean. In terms of financial integration, there is a high degree of homogeneity within the countries of the franc zone. Indeed, the difference between the average and the standard deviation is very small, of the order of -0.125.

3.2.2- Presentation of the correlation matrix of variables

Table II : Matrix of correlations between the inclusive growth index, financial integration and governance variables.

Note: In brackets we have the standard deviations and the stars represent the significance thresholds at 1% (***), 5% (**) and 10% (*). **FIN INT**: Financial Integration Index; **XSIV**: Inclusive Growth; **Reg**: Regulation; **Gov- eff**: Government Effectiveness; **Corr**: Control of corruption; **R. Law** : Rule of Law; **Vx. Cit**. : Citizen Voice; **Pol sta** : Political stability.

	(1) **INT FIN**	**XSIV**	Reg.	Gove-eff	Corr.	R. law	Cit-vox	Pol-stab
FIN INT	**1**							
XSIV	**-0,22*** **	1						
	(0,000)							
Reg.	-0,142*	-0,130	1					
	(0,100)	(0,791)						
Gove-eff	-0,175**	-0,185**	0,836***	1				
	(0,047)	(0,023)	(0,000)					
Corr.	0,0654	-0,109	0,743***	0,689***	1			
	(0,445)	(0,621)	(0,000)	(0,000)				
R. law	0,00245	-0,0909	0,804***	0,766***	0,770***	1		
	(0,575)	(0,586)	(0,000)	(0,000)	(0,000)	(0,000)		
Cit-vox	0,0492	-0,008	0,670***	0,664***	0,755***	0,764***	1	
	(0,232)	(0,192)	(0,000)	(0,000)	(0,000)	(0,000)		
Pol-stab	0,0769	-0,0831	0,355***	0,383***	0,284***	0,605***	0,397***	1
	(0,359)	(0,201)	(0,000)	(0,000)	(0,000)	(0,000)	(0,000)	
N	255							

Source: Authors

we shows the correlations between the inclusive growth index, financial integration and the institutional variables of Kauffman and Kraay (2009). We find that the inclusive growth index and the financial integration index are negatively related at 1%. In other words, low integration of franc zone countries would reduce inclusive growth in these countries. Furthermore, financial integration is negatively and significantly related to government regulation and efficiency, while inclusive growth is significantly and negatively related to government efficiency only. Overall, the low quality of institutions in countries that use the CFA franc as their currency would partly explain the low level of financial integration and inclusive growth observed in these countries. For a better analysis of the relationship between financial integration and inclusive growth, it is important to carry out econometric analyses.

4-Presentation of results

4.1- Basic results

Table 3 below gives the ordinary least squares (OLS) estimation of the effect of financial integration on the inclusive growth of franc zone countries. We note that financial integration negatively affects inclusive growth of franc zone countries. Indeed, an increase in the financial integration index translates into a decrease in the level of inclusive growth. However, how can such a result be understood? According to Boyd and Smith (1992), financial integration can have negative effects on certain performance indicators such as growth and employment because in countries with weak political institutions, there is capital outflow from low capitalization countries to high capitalization countries with better institutions. This situation is therefore detrimental to inclusive growth. In the same vein, Komárek and Komárkova (2008) explain this result by the fact that, when financial integration leads to an expansion of the money supply, inflationary pressures creates macroeconomic instability and volatility of capital flows. This has negative effects on inclusive growth. It is therefore understandable that through weak institutions, monetary expansion and high inflation, financial integration becomes detrimental to inclusive growth. Thus, for financial integration to promote inclusive growth in African franc zone countries, there must be well-functioning political and financial institutions and good control of the quantity of money in circulation.

These results are in line with one part of the literature on the relationship between financial integration and economic growth. Indeed, many studies, studies conclude that the effect of capital account liberalisation on growth is negative (De Nicolo and Juvenal, 2014; Allan, 2011; Aiznman, 2001; Grilli and Milesi-Ferretti, 1995).

Table III : Effect of financial integration on inclusive growth in franc zone countries (estimated by OCMs)

Note: In brackets we have the standard deviations corrected for heteroskedasticity and the stars represent the significance thresholds at 1% (***), 5% (**) and 10% (*).

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	***INCLUSIVE GROWTH INDEX FOR THE FRANC ZONE***					
FIN INT	**-8,350*** **	**-4,649** **	**-4,801** **	**-4,325***	**-4,298***	**-3,689**
	(2,311)	**(2,263)**	**(2,279)**	**(2,333)**	**(2,354)**	**(2,659)**
Gdp/head		2,678***	2,442**	2,046**	2,055*	2,136**
		(0,807)	(0,977)	(1,008)	(1,041)	(1,052)
Education		5,42e-06***	5,21e-06***	5,36e-06***	5,38e-06***	5,25e-06***
		(6,24e-07)	(8,13e-07)	(8,22e-07)	(8,34e-07)	(8,44e-07)
Special works			-0,002	-0,007	-0,007	-0,008
			(0,005)	(0,006)	(0,006)	(0,006)
Credit/pib			0,025	0,011	0,011	0,008
			(0,033)	(0,035)	(0,035)	(0,036)

Government Cons.				-0,061	-0,060	-0,048
				(0,057)	(0,057)	(0,059)
Investment				0,654	0,621	0,761
				(0,469)	(0,500)	(0,529)
IDE					0,0047	0,002
					(0,020)	(0,020)
Diversification					0,145	-0,687
					(1,451)	(1,587)
Inflation						-0,015
						(0,032)
Constant	1,466***	-19,25***	-17,64**	-15,76**	-15,82**	-16,44**
	(0,427)	(5,430)	(6,783)	(7,165)	(7,234)	(7,308)
Comments	279	193	193	193	193	190
R^2	0,047	0,458	0,460	0,470	0,470	0,474
Number payx	15	15	15	15	15	15

Source: Authors

The above basic results obtained from OLS may be subject to criticism. Indeed, the use of the OLS estimator assumes a homogeneity of characteristics between countries on the phenomenon under study. Given the uncertainty surrounding this assumption, this OLS estimator may therefore prove to be inconsistent. The LSDVC (Least Squares Dummy Variable Corrected) estimator is therefore designed to take into account certain limitations of OLS. In contrast to the classical fixed effects method, the fixed effects technique in LSDVC has the advantage of solving possible endogeneity problems due to the presence of foreign direct investment (FDI) as an explanatory variable. The endogeneity here would therefore be caused by a possible multicollinearity between the financial integration indicator and FDI (Chinn and Ito, 2006). To solve this problem, we use the double least squares technique (LSDVC). This method also has the advantage of controlling for country heterogeneity. However, it is based on the assumption of exogeneity of the explanatory variables in the model.

4.2- Correction of endogeneity problems.

The results previously obtained in Table 3 above by OLS can be discussed in terms of not taking into account endogeneity problems. In addition to the reasons mentioned above, the endogeneity bias here could also stem either from the omission of some important explanatory variables or from the two-way causality between financial inclusion and inclusive growth. For this reason, we re-estimate equation (1) using the instrumental variables technique. The results are shown in Table 4 below. Indeed, according to this table, the effect of financial integration on inclusive growth becomes positive and significant at 10%. This econometric result allows us to argue that financial integration promotes inclusive growth if and only if

governments are increasingly efficient but also if regulation in these countries is controlled. A country that improves the efficiency of its government and implements good regulatory policies can therefore expect a positive effect of financial integration on inclusive growth of more than 151% (column 3).

Table IV : The effect of financial integration on inclusive growth: taking into account region-specific effects and correcting for endogeneity bias using instrumental variables.

Note: In brackets we have the standard deviations corrected for heteroscedasticity and the stars represent the significance thresholds at 1% (***), 5% (**) and 10% (*).

	INCLUSIVE GROWTH INDEX		
	(LSO)	**(LSO)**	**(Instrumental Variables)**
VARIABLES	UEMOA(1)	CEMAC(2)	FRANC ZONE (3)
FIN INT	-7,669***	1,716	151,0*
	(2,899)	(2,790)	(86,88)
Pib/head	-9,600***	4,805***	1,772
	(2,214)	(0,987)	(1,859)
Open-trade	-0,040**	0,006	-0,022
	(0,019)	(0,006)	(0,014)
credit/Pib	0,027	0,118	-0,004
	(0,040)	(0,081)	(0,055)
Gouv Cons.	0,044	-0,146*	0,029
	(0,069)	(0,077)	(0,095)
Investissement	1,526**	0,264	2,448**
	(0,636)	(0,744)	(1,198)
IDE	0,103*	-0,003	0,029
	(0,057)	(0,016)	(0,036)
Divesrification	-3,136	-0,660	5,388*
	(1,911)	(2,404)	(3,194)
Education	6,69e-06***	4,21e-06***	4,96e-06***
	(1,18e-06)	(9,84e-07)	(1,32e-06)
Constante	58,58***	-37,05***	-47,43**
	(14,08)	(7,466)	(20,02)
Observations	116	71	151
R^2	0,551	0,745	
Number of countries	8	6	15

Source: Author based on WDI data

In view of these results, it is nevertheless essential to carry out robustness analyses in accordance with the econometric approach.

4.3- Robustness tests with the GETS approach

Table V : Robustness with the GETS approach

Note: In brackets we have the standard deviations corrected for heteroscedasticity and the stars represent the significance thresholds at 1% (***), 5% (**) and 10% (*).

	(1)	(2)	(3)	(4)	(5)	(6)
	INCLUSIVE GROWTH INDEX FOR THE FRANC ZONE					
VARIABLES	Reg.	Gove-eff	Corr.	R. law	Cit-vox	Pol-stab
INT FIN	**-33,84****				**-7,348*****	**-7,348*****
	(15,93)				**(2,636)**	**(2,636)**
Education	2,22e-06***	2,31e-06***	2,23e-06***	2,05e-06***	2,51e-06***	2,51e-06***
	(4,38e-07)	(4,33e-07)	(4,40e-07)	(4,33e-07)	(4,68e-07)	(4,68e-07)
Regulation	-1,319***					
	(0,349)					
Investissement		0,691**		0,712**		
		(0,292)		(0,302)		
Gov eff		-1,248***				
		(0,329)				
R-Law				-0,928***		
				(0,317)		
Export-divers					1,590**	1,590**
					(0,644)	(0,644)
Constante	4,208	-3,728***	-0,777***	-3,312***	-0,406	-0,406
	(2,670)	(1,010)	(0,205)	(1,026)	(0,671)	(0,671)
Observations	151	151	193	151	193	193
R^2	0,214	0,213	0,118	0,183	0,182	0,182

Source: the author

The results confirm the strength of our hypothesis that the low financial integration of the franc zone countries is partly responsible for the low inclusive growth observed within the countries that make up the zone. Our variable of interest (INT FIN) therefore explains the inclusive growth of franc zone countries. We have introduced all the control variables (economic, institutional, socio-cultural and political) likely to explain inclusive growth. Only the significant variables appear in the result reported above

5-Conclusion and recommendations

This work had two objectives, first, we constructed a new index to measure inclusive growth that takes into account the informal sector in franc zone countries. second, to assess the effect of financial integration on the inclusive growth process in these countries. Thus, by constructing the composite index of inclusive growth that takes into account the size of the informal sector in franc zone countries and using the principal component analysis developed by Hotelling (1933) and taken up by Kaiser-meyer-olkin (1974) we arrived at a set of results. These show that inclusive growth experienced a slight upward trend over the study period. we then proceeded to assess the effect of financial integration on inclusive growth. we observed that the low level of financial integration in franc zone countries negatively affects inclusive growth in these countries. These results are in line with a part of the literature on the relationship between financial integration and economic growth. Indeed, many studies conclude that the effect of capital account liberalisation on growth is negative. We have noted that financial integration can foster inclusive growth in franc zone countries if and only if governments are increasingly efficient and if regulation in these countries is controlled. thus, a country that improves the efficiency of its government and implements good regulatory policies can expect a positive effect of financial integration on inclusive growth. These results allow us to make some economic policy recommendations to decision-makers in order to achieve economic growth that integrates all social strata. Firstly, the public authorities should ensure that the quality of institutions, and particularly the efficiency of government and regulation, is improved. finally, the states in the franc zone should implement policies aimed more at encouraging sub-regional financial integration in order to achieve more inclusive growth, provided that the efficiency of the various governments and their regulatory systems are rigorous.

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APPENDICES

Appendice 1: Construction of the inclusive growth index in the franc zone: taking into account the informal sector.

The informal sector is considered as a hidden, undeclared, unofficial and clandestine economic activity (Schneider and Enste 2000). The clandestine nature of this part of the economy is reflected in the non-declaration of workers' wages in the sector, with the result that tax evasion predominates. The choice of The variables to be combined in the construction of our composite indicator are based on economic realities such as: the informal sector, gross domestic product per capita, income inequality, human development index, employment, access to drinking water, access to sanitation facilities and agricultural land. However, other variables such as availability of Arab land, export diversification; access to electricity; carbon dioxide emissions and life expectancy will be included as additional variables. The latter do not participate in the construction of the index. Descriptive statistics for all the variables we have just presented are given in the table below:

Table VI : Descriptive statistics of the variables included in the construction of the composite index of inclusive growth in the franc zone.

VARIABLES	(1) N	(2) Mean	(3) sdt	(4) min	(5) Max
Income inequality	380	0.416	0.0778	0.302	0.609
Gross domestic product per capita	462	1,761	2,007	253.8	9,164
Human development	407	46.20	18.79	14.87	93.57
Access to drinking water	462	68.80	15.78	37.20	99.90
Informal sector	433	41.22	12.13	16.49	81.35
Sanitary facilities	462	33.10	20.56	6.300	93.20
Working population	462	63.85	13.11	33.70	87.70
Agricultural land	462	51.88	17.13	17.62	80.92
CO2 emissions	427	21,571	81,700	146.7	503,263
Access to electricity	457	30.29	22.94	0.0155	99.40
Health expenditure	462	5.939	2.077	2.432	13.63
Life expectancy	462	55.30	7.156	37.81	74.19
Quality of institutions	455	56.58	6.802	23.70	77
Export diversification	450	0.776	0.0720	0.522	0.922

Source: Authors

In the remainder of this sub-section, the methodology for constructing the index and the results found will be presented.

Methodology

For the construction of the inclusive growth index at the base, we adopt the principal component analysis and composite index calculation technique proposed by Hotelling (1933). The objective of this statistical technique is to reduce a multivariate data set to a reduced number of dimensions. The new dimensions each represent a linear combination of the original variables and must be uncorrelated with each other. Obtaining these new statistical dimensions of the variables must respect the constraint of maximizing the variance of the sample while minimizing the loss of information. Sometimes, one of the combinations commonly referred to as the factor axis is responsible for a significant portion of the variation in the entire sample. The condition for the validation of this axis requires that it scores at least 70%. However, the other axes which have a score greater than or equal to **100/P** (here p represents the number of variables), still have a significant influence on the variance of the sample.

Algebraically, for a mass of multivariate data, principal component analysis implies that the real variables K_{1i} , ..., Kni by linear combination become new variables with Z_{1i} values, ..., Z_{pi} (Cezar, 2012). This means that taking into account the order of importance from the smallest to the largest, the Z_{pi} are obtained through the following combinations:

$$Z_{1i} = a_{11}K_{1i} + a_{12}k_{2i} + ... + a_{1n}K_{ni}$$
$$Z_{2i} = a_{21}K_{1i} + a_{22}k_{2i} + ... + a_{2n}K_{ni}$$
$$(\ldots)$$
$$Z_{pi} = a_{p1}K_{1i} + a_{p2}k_{2i} + ... + a_{pn}K_{ni}$$

The weights maximize the respective variances of each of the components so as to minimize the loss of information from each sample. The sum of the squares of the weighting coefficients for each component should be equal to unity and the comparison between the different components should follow an ascending order of classification; i.e. the first component has an important part in explaining the total variance than the second component and so on. The consequence of such a logic justifies the fact that if the first component explains at least 70% of the sample, the latter can be retained as the main representative of the whole sample. The other conditions for validating a principal component analysis are based on Bartlett's tests of sphericity and Kaiser's (1974) sampling precision. To reach our goal we use XLSTAT software that centres the variables before performing the principal component analysis.

Results and interpretation of the construction of the index

The continuation of our analyses under the constraint of the requirements we have just mentioned has enabled us to construct an inclusive growth index that takes account of the informal sector for the 15 countries in the franc zone over the period 1999-2013. The 8 variables previously mentioned, including those considered as additional, constitute the representative elements for each country. The Bartlett tests presented in table 6 allow us to statistically validate our analyses.

Table VII : Results of Bartlett and Meyer-Olkin sphericity tests

	Bartlett and Kaiser-Meyer-Olkin statistics with informal sector		Bartlett and Kaiser-Meyer-Olkin statistics without informal sector	
	Bartlett Sphericity Test	**Kaiser sphericity test**	**Bartlett Sphericity Test**	**Bartlett Spheri city Test**
Congo	P-value < 0,0001	0,712	P-value < 0,0001	0,712
Benin	P-value < 0,0001	0,822	P-value < 0,0001	0,780
Guinea Eq.	P-value < 0,0001	0,673	P-value < 0,0001	0,661
Burkina Faso	P-value < 0,0001	0,692	P-value < 0,0001	0,816
CAR	P-value < 0,0001	0,782	P-value < 0,0001	0,768
Cameroon	P-value < 0,0001	0,851	P-value < 0,0001	0,758
Ivory Coast	P-value < 0,0001	0,658	P-value < 0,0001	0,753
Comores	NA	NA	P-value < 0,0001	0,734
Niger	P-value < 0,0001	0,737	P-value < 0,0001	0,624
Tchad	P-value < 0,0001	0,727	P-value < 0,0001	0,730
Guinée-Bissau	P-value < 0,0001	0,796	P-value < 0,0001	0,804
Gabon	P-value < 0,0001	0,533	P-value < 0,0001	0,560
Sénégal	P-value < 0,0001	0,666	P-value < 0,0001	0,705
Mali	P-value < 0,0001	0,701	P-value < 0,0001	0,712
Togo	P-value < 0,0001	0,695	P-value < 0,0001	0,672

Source: Authors

The resulting index shows that inclusive growth has been on an upward trend over the study period. This trend is characterized in two sub-periods. The first, from 1999 to around 2005, is characterized by an essentially negative inclusive growth. The second sub-period from 2005 to 2014 shows positive inclusive growth in value terms. But overall and on average, these countries have not experienced inclusive growth. Evidence of this is represented by the average inclusive growth over the entire period for each country.

Finally and in relation to this sub-section, we also test the sensitivity of our composite index to the explanatory variables in our sample. Table 3 below shows us that inclusive growth is negatively explained by income inequality and positively explained by the other variables. However, the positive correlation of the informal sector with inclusive growth can be justified by the fact that people working in the informal sector can make

significant profits that enable them to afford goods such as health, education and drinking water.

Table VIII : Correlation matrix between inclusive growth and control variables

Note: In this table **XSIVE** represents inclusive growth; **GINI** represents income inequality; **GDP_**head represents gross domestic product per capita; **EAUPOT** represents access to drinking water; **DHUM** represents human development; **SECTINF** represents the informal sector; **FACISAN** represents sanitation facilities **EMPLOYMENT** represents the active population and **TAGRI** represents agricultural land.

	XSIVE	*GINI*	*PIB_tête*	*Dhum*	*EAUPOT*	*SECTINF*	*FACISAN*	*EMPLOI*	*TAGRI*
XSIVE	1								
GINI	-0.0522	1							
PIB_tête	0.1280	0.5214	1						
Dhum	0.3201	0.3649	0.7788	1					
EAUPOT	0.2711	0.2701	0.6102	0.7413	1				
SECTINF	0.0783	-0.310	-0.5503	-0.371	-0.2608	1			
FACISAN	0.1069	-0.3239	-0.5429	-0.4093	-0.1718	0.3995	1		
EMPLOI	0.0077	0.3163	0.7062	0.6687	0.6186	-0.4276	-0.3107	1	
TAGRI	0.0446	0.2160	0.0875	0.1279	0.0622	-0.0895	-0.0412	-0.0170	1

Source: Authors