Economic integration in WAEMU: Will the Multilateral Monitoring Mechanism lead to growth and welfare convergence?

Abstract

This paper analyzes the implications of the Convergence, Stability, Growth and Solidarity Pact adopted by West African Economic and Monetary Union (WAEMU) governments in nominal and welfare convergence of member states. Firstly, we implement a linear model with variable coefficients depending on times to take into account the dynamic of the nominal performances convergence. Afterward, we test standard convergence hypothesis between WAEMU countries. Then, using panel data, a gap approach model based on neoclassical growth theory enables us to test for the existence of multiple steady state equilibria in WAEMU. We find that out of the criteria of inflation and payment arrears, member states haven't showed any sustainable performances. Likewise, using multilateral surveillance system used in WAEMU hasn't stimulated the rates of beta convergence between member states. On contrary, sigma convergence denotes an upward tendency in the cross sectional dispersion of per capita income over time. Estimating convergence clubs refines these results and reveals that at least two clubs of convergence exist in WAEMU.

Key words: multilateral surveillance, beta convergence, sigma convergence, clubs of convergence.

1. Introduction

The emergence of major regional economic blocs and globalization of the economy have placed Africa at a particularly difficult challenge to overcome. Facing the new international context characterized by a decline in the relevance of physical borders of nation-state, the formation of regional entities is considered as one of the essential ways to respond to the legitimate aspirations of people. In the West African region, WAEMU, despite the many past and current experiences integration (WAEC[1], ECOWAS, ...), is one more demonstration of the interest of West African countries to come together to better integration into the global economy. The integration within WAEMU has a multilateral surveillance mechanism[2] whose ultimate goal is to ensure the convergence of member economies. Convergence, defined as the gradual reduction of disparities of economic indicators between countries, can generally be achieved through two distinct patterns not exclusive: nominal convergence, which focuses on the evolution of nominal variables (costs and prices)[3], and real convergence which requires the approximation of living standards. WAEMU countries, adopting an approach similar to that of the European Union, have opted for a convergence of nominal variables and assuming that nominal convergence will lead to real convergence.

But economic theory and empirical results do not fully support this rationale. Indeed Feldstein (1992)[4] shows that price and exchange rates' stability resulting from the nominal convergence stimulates exchanges and instead favors specialization and makes countries more dissimilar in structure and in their reactions to common shocks. So, even if the trade is favorable to growth and development in the long term, countries starting from less favorable initial conditions and could no longer use monetary policy to respond to asymmetric shocks may be forced to borrow trails of low growth. In addition, theorists of optimum currency areas[5] argue that in a monetary union, the focus should instead be put on real convergence which will lead eventually nominal convergence. Furthermore, looking for a nominal convergence can be very costly, especially for the poorest countries that are often remote from nominal objectives adopted, and could even lead to real divergence raising behavior of "free Ridding" in response to asymmetric shocks. To avoid this, WAEMU countries found it necessary to adopt a Pact of Convergence, Stability, Growth and Solidarity. The implementation of this pact is supposed to stabilize the economic situation and the

---

[1] West African Economic community (CEAO in French).
[2] Directive 01/96/CM on implementation of multilateral surveillance.
[3] Inflation, interest rates, exchange rates, ratios of public finances.
[4] Loufir and al (1993)
[5] Schor (2000)

macroeconomic policies of the Union to ensure the harmonious development of member countries. In practice, originally scheduled for December 31, 2002, the horizon of convergence has been postponed once to December 2005, and again to December 2008 and recently to December 2013 confirming the various reports of the Economic Committee of WAEMU, which reveal that many countries face difficulties in meeting the community standards.

The results of theoretical and empirical work on convergence in WAEMU are also not satisfactory. Bamba et al (2000) studying the nominal, structural and economic convergence in WAEMU over the period 1975-1996 noted that the convergence process has been initiated for nominal variables but economic structures of the countries do not paradoxically tend closer. Bamba (2004) repeated the analysis for the period 1980-2001 through the convergence criteria contained in the Pact of WAEMU and concluded that countries observe only the criteria of inflation rate. Diop (2002), meanwhile, showed the existence of a real sigma- convergence in WAEMU only on the period 1979-1994. Plane et al (2005) examined the macroeconomic performances of countries in terms of the eight WAEMU convergence criteria over the period 1985-2002 and concluded that the adoption of the Pact of convergence has led to improved countries' performance. Finally, Ndiaye (2006), the only recent study that analyses really the real convergence of WAEMU economies in terms of per capita income showed that in WAEMU, the process of convergence over the period 1980-2000 was through clubs which converge at different levels of per capita income. Despite the vast literature on the issue, none of the authors addressed effectively and simultaneously the nominal convergence and the convergence of incomes to make findings on the impact of the implementation of the pact on income convergence.

This work raises the question whether after more than ten years of implementation of the pact, the performance of WAEMU countries give a hope of nominal convergence? Has looking for nominal convergence in WAEMU favored a reduction in disparities in per capita income across countries? Do WAEMU countries converge to the same levels of per capita income? The rest of this paper is organized as follows: The next section will present the methodology of the study. Section 3 provides a framework to discuss the results of our estimation. The final section is devoted to the conclusion and recommendations.

2. Methodology and data source

In practice, the methodology adopted to assess the economic convergence between countries depends on whether the authors consider the nominal convergence or they seek to understand the approximation of living standards between countries. As part of our work, the methodology

contains two parts.

2.1 Method used for analysis of nominal convergence

To reflect the dynamics of convergence, two main methods based on the estimated of variable coefficients have been used in recent literature: the Kalman filter (Louffir et al (1993), Bamba et al (2000), Bamba (2004) and the Recursive Least Squares RLS (Ndiaye (2007). The latter, consists in the application of RLS to a linear model with time-dependent coefficients, was used in this work. We make this choice because the estimate by the RLS is less demanding in data and therefore adapts better to the relatively short time series such as we have here (1997-2008). To this end, let's consider a macroeconomic variable X for country P and two references of countries I and J. We can measure the convergence of P to I or to J relative to X by the equation:

$$X_{I,t} - X_{P,t} = a_{Pt} + b_{Pt}(X_{I,t} - X_{J,t}) + \mu_{P,t} \qquad (1)$$

where $\mu_{P,t}$ is white noise, $X_{K,t}$ is the value of variable X for country K at time t, a_{Pt} and b_{Pt} are coefficients to estimate.

The temporal evolution of parameters a_P and b_p provides information on convergence and enables us to achieve the first objective of this study. We say that the country P began a process of convergence towards the country I if $\mathbb{E}[\lim b_{Pt}] = 0$ and $\mathbb{E}[\lim a_{Pt}] = 0$; the country if $\mathbb{E}[\lim b_{Pt}] = 1$ and $\mathbb{E}[\lim a_{Pt}] = 0$. The reasons for choosing this model are manifold. First, as we noted above, we can take into account the dynamics of the convergence process. Moreover, as we aim to test the existence of convergence clubs, the choice of two references, one of which will be the standard of WAEMU and the other another WAEMU country or the average of the Union may allow us to refine our analysis later. The data used in the analysis of nominal convergence affect all macroeconomic variables which are taking into account in the pact of convergence and cover the period 1997-2008. They come from the annex of the reports of multilateral surveillance mechanism of WAEMU Economic Commission.

2.2 Methodology for the analysis of real convergence

Several assumptions of income convergence have been tested in this study. First starting from the thesis of Solow (1956) that poor countries catch up with rich countries, we tested the hypothesis of beta convergence through the following model which is the adaptation of Barro and al (1991)'s model made by Islam (1995) to panel data:

$$Y_{i,t} - Y_{i,t-1} = a + bY_{i,t-1} + \sum_{j=1}^{m} \rho_{i,t}^{j} K_{i,t}^{j} + \mu_t + \upsilon_i + \varepsilon_{i,t} \qquad (2)$$

where $Y_{i,t}$ the logarithm of per capita GDP of country i at time t, **K** is a set of m explanatory variables to control structural characteristics of countries, μ_t and υ_i represent respectively the unobservable temporal effects and individual. $\varepsilon_{i,t}$ is white noise. We accept the hypothesis of convergence if b is statistically significant and less than zero. The convergence rate is derived from the expression $b = -(1 - e^{-\beta T})$ to return Islam (1995). For technical reasons, we add the condition that the absolute value of b must be less than 1. In fact if this condition is not met, the rate of convergence given by $\beta = -\frac{\ln(b+1)}{T}$ will not be defined. The convergence is conditional or absolute, depending on whether or not the model contains the structural variables.

The hypothesis of reducing disparities in per capita income among member countries of WAEMU, was tested using a graphical analysis of the evolution over time of the deviation between income countries combined with Wilcoxon-Mann-Whitney's no parametric test[6] of comparison of two sample. Finally, we will determine the existence of multiple regimes of convergence in WAEMU by the following adaptation made by Serranito and al (2008) to panel data of the method of polynomial functions of Chatterji (1992)[7]:

$$\mathbf{GAP\_PIB}_{i,t} = \mathbf{b_1 GAP\_PIB}_{i,t-1} + \mathbf{b_2 (GAP\_PIB}_{i,t-1})^2 + \mathbf{b_3 (GAP\_PIB}_{t-1})^3 + \mu_{i,t} \quad (3)$$

This non-linear growth equation involves several cases of figures. If $b_1 < 1$, then the solution of equation (3) leads to three different equilibria which two stables: long-term convergence towards the same level of income as the leading country for countries with an initial income gap with the leading country less than a given threshold and divergence of income levels from the leading country ie convergence to a lower income level for countries whose initial income gap is greater than E. In the case where $b_1 > 1$, there exists a single stable equilibrium of the system: all countries with initial income gap with the leading country less than E will converge towards the same. (See Serranito and al (2008) for further comments).

For the analysis of the convergence of per capita income, we use the data of the Socio Economic Data Base of the African Development Bank. Moreover, the estimation of models (2) as (3) has at least three problems: omission, endogeneity, simultaneity which do not allow us to use standard econometric techniques (Sevestre P. (2002)). So we used the Generalized Method of Moments (GMM), specifically Blundell and Bond (1998)'s GMM system estimator, better than Arellano and Bond (1991)'s first-difference estimator which suffers from a weakness of the instruments in a finite sample.

---

[6] The interested reader can refer to Saporta, (2006) for more details on this test
[7] See Galor (1996) for a review of methods for determination of multiple equilibria

The use of these different statistical techniques has enabled us to achieve the results presented in the next section.

3. Estimation results and comments

3.1 Analysis of the convergence of nominal

Graphs[8] 1-8 in Appendix 1 relate the evolution of the coefficient **"b"** for each variable and allow us to analyze the dynamics of convergence as outlined in our methodology. The coefficients "b" are the results of estimates of Equation 1 presented above. The analysis of the coefficients b is done conditionally to the nullity of the coefficient a. To test this hypothesis, we conducted Fisher's exact test to test the nullity of "**a"** over the period 1999-2008. From the analysis of charts, it is easy to see that performance varies across countries and according to criteria. The inflation criterion was the most impressive over the period and for all countries. So the countries, except Côte d'Ivoire, Togo and Bissau Guinea meet the criteria for several years of non-accumulation of arrears in payment, of outstanding debt and investment rates. Convergence, when it exists, is often made reference to the less efficient and rarely to the community standard. Moreover, it does not appear simultaneously in all countries. Great efforts have been made in the direction of reducing the salaries of the civil service. These results reflect the will of individual states to clean up the macroeconomic framework and to make productive public expenditures necessary for economic growth. However, there is a greater difficulty for the vast majority of countries to meet the structural criteria such as the external deficit met only by Côte d'Ivoire.

Also with the inability of tax administrations to capture the tax base already very small, the states do not unfortunately meet tax ratio. Unable to ensure macroeconomic stability due to insufficient tax revenues, countries with the exception of Benin, have difficulties complying with the key criterion of the basic fiscal balance. In fact deprived of the use of monetary policy to cope with asymmetric shocks, fiscal policy appears to be the only policy instrument available. Guinea-Bissau remained outside any dynamic convergence even if it has made efforts with regard to the rate of inflation. These results confirm previous studies such as Decaluwé and al (2001) which show that the application of common external tariffs leads to painful adjustments in public finances in many WAEMU countries. Furthermore, the divergence was particularly evident for the ratio of capital expenditures. Given the role of investment in economic growth, this finding is

---

[8] The curves relating to Guinea Bissau were suppressed due to the magnitude of relatively high coefficients b relative to that country.

updating the debate on the benefits of economic integration. This brings us to verify the second hypothesis of our study, whether WAEMU member countries can expect a reduction of disparities between their living standards.

3.2 Analysis of the convergence of per capita income

In this study, the hypothesis of convergence in per capita real income across WAEMU countries is analyzed through three tests: the absolute and conditional beta convergence, the sigma convergence and the determination of clubs of convergence. For the different hypotheses of convergence, the analysis has been done not only throughout the period but also considering the sub periods 1980-1999 and 2000-2008. This specification is made because we want to see if the adoption of compact convergence of WAEMU in 1999 has boosted per capita income convergence in member countries.

3.2.1 beta convergence tests

To test the hypothesis of beta convergence, equation (2) has been transformed see Table 3.2.1. $Y_{i,t}$ represents the logarithm of per capita real GDP of country i at time t, μ_t and υ_i represent respectively the unobservable temporal effects and individual. $\varepsilon_{i,t}$ is a white noise. The estimated coefficient of $Y_{i,t-1}$ is "$b+1$". b is the coefficient of $Y_{i,t-1}$ in the initial model. The estimation results are as follows[9]:

Absolute beta convergence: $Y_{i,t} = a + (b+1)Y_{i,t-1} + \mu_t + \upsilon_i + \varepsilon_{i,t}$				Conditional beta convergence: $Y_{i,t} = a + (b+1)Y_{i,t-1} + XM_{i,t} + \mu_t + \upsilon_i + \varepsilon_{i,t}$		
Périods	1980-1999	2000-2008	1980-2008	1980-1999	2000-2008	1980-2008
Y_{-1}	0.79^{***}	1.09^{***}	0.82^{***}	0.78^{***}	0.95^{***}	0.80^{***}
XM				0.19^{**}	-0.08	0.07
Constant	1.19^{**}	-0.50	1.03^{*}	0.50	0.61^{**}	0.83^{**}
b	-0.21^{**}	0.09	-0.18^{***}	-0.22^{*}	-0.05^{**}	-0.196^{**}
Speed of convergence β (%)	1.26	-1.08	0.72	1.33	0.65	0.78
Arellano-Bond test for AR(1)	0.04	0.08	0,04	0.01	0.12	0.03
Arellano-Bond test for AR(2)	0.65	0.25	0.28	0.87	0.80	0.59
Hansen test	0.99	1.00	1.00	1,00	1.00	1.00

---

[9] The command Xtabond2 automatically provides an estimate of "b 1", the command LINCOM can be set, the t-statistic, p-value and confidence interval of b. The star *, **, *** respectively indicate that the coefficient is significant at 10%, 5% and 1%.

Source: Results of our estimates in Stata 9

➢ Estimation diagnosis

The diagnosis elements are presented in the last two rows of the table. These are essentially the Hansen test and the Arellano-Bond test of residual autocorrelation. The Hansen test judges the validity of instruments used in the model. The null hypothesis is the validity of the instruments, that is to say non-correlation of instruments with the residuals. The p-values obtained show that there was not enough evidence to reject the hypothesis of instruments' validity. Moreover, the Arellano-Bond test rejects the assumption of no autocorrelation of order 1 in some cases at 10% threshold but does not reject the absence of autocorrelation of order 2. As the autocorrelation of order 1 does not call into question the estimates by the generalized method of moments, our models can be considered valid.

➢ Interpretation of Results

In WAEMU, the process of absolute convergence has been slow throughout the period with an average speed of 0.72% per year. Thus, WAEMU countries will converge on the same level of per capita income after nearly two centuries. Indeed, with this speed of convergence, countries need more than 96 years to close half of the gap separating them from their steady state. Moreover, considering the sub-periods, we find that the hypothesis of absolute convergence can not be accepted for the period before the implementation of the Pact of convergence. By cons over the period 2000-2008, the results of our estimates show that per capita income of year t is positively correlated, but not significantly, than the previous year. From these results, either initially WAEMU poorer countries will record growth rates lower than initially richer countries, or the initial income level has no effect on the growth rate of WAEMU's countries. Thus over this period, the model rejects the hypothesis of a neoclassical growth whatever the interpretation adopted.

Taking into account the specific structural characteristics of countries in the analysis of growth dynamic has been achieved by introducing into the model (2) structural control variables whose role in assessing the speed of convergence has been confirmed by other empirical work (Philip (1997), Barro (1991), Hondo (2003), Ndiaye (2006)): the ratio of industrial added value to agriculture added value, the rate of trade liberalization calculated by the ratio of the sum of imports and exports in nominal GDP, the investment rate. Thus, several regressions were performed both by considering these variables in one to one combination. Finally, the model containing only the rate of trade liberalization is one who has a higher speed of convergence. The

results indicate that the rate of trade liberalization has a significant positive effect on economic growth over the period 1980-1999. An increase of 1% of rate of trade liberalization would generate an increase of 0.19% in growth rate. The negative non significant coefficient obtained over the period 2000-2008, can be explained by the increasing in imports relatively to WAEMU exports over this period. Indeed WAEMU exports decreased from 90.40% of imports in 2000 to 81.12% in 2008 (Author's calculations based on data from the database of the ADB).

As the table illustrates, the results regarding the convergence of living standards are better when we consider the hypothesis of conditional convergence. Thus, the convergence rate rose to 1.33% over the period 1980-1999 against 1.26% for the absolute convergence. The most significant change compared to the results of absolute convergence is that of the sub period 2000-2008. Indeed, the hypothesis of conditional convergence has been accepted for this period with a convergence rate of 0.65% or about half that of the previous period. These results confirm those obtained by Dramani (2007) showing that the speed of conditional convergence is lower in 1994-2000 than before. In addition over all the period, compared to the absolute convergence, we notice improving in the convergence rate, which reached 0.78%. By dwelling on these results, we conclude that WAEMU countries with similar structural characteristics would converge to the same level of per capita income after 179 years against 194 years for all countries regardless of their economic structures. Such an improvement is too small to meet our analysis' objectives of convergence in WAEMU. Better still, the poor results on post pact period shows that the adoption of the Pact of WAEMU convergence has been accompanied by a reduction in the rate of convergence in living standards between WAEMU countries thus presaging slow process of convergence in future all things being equal. To deepen the analysis of real convergence between WAEMU members, the next paragraph will be devoted to the analysis of per capita income disparities between countries over time.

3.2.2 Test of sigma convergence

The evolution of the cross section dispersion between per capita incomes of member countries and the average of WAEMU can be divided into three periods (see figure 1 in Annex 2). The first, which goes from 1980 to 1994 is characterized by a strong trend towards convergence of per capita income to the Union average. The second period, which covers the years 1995-1998, is marked by a very pronounced difference between the per capita incomes with a peak in 1998. The last period, which ranges from 1999 to 2008, is marked by a small fluctuation in the dispersion between the per capita incomes of WAEMU member states around 0.52. It is

reasonable to say that after 1998, the average dispersion between per capita incomes of WAEMU countries is 0.52. Moreover, the trend towards convergence observed in the first period does not necessarily represent a catch process of WAEMU's initially richest countries by those who have smallest per capita income. Rather, this convergence is the result of differing trends in different countries; especially the poor performance of Côte d'Ivoire with a GDP per capita which fell by 36% over this period. The strong divergence over the period 1995-1998, with a sharp rise in per capita income disparities in 1997 and 1998 can be explained by the resumption of growth of GDP per capita in Côte d'Ivoire, but especially by Guinea Bissau's declining per capita standard income between 1997 and 1998 (GDP of Guinea Bissau dropped by 70%). The low variation observed after 1999 can be explained by a slight fluctuation in living standards in different countries, a decline in Côte d'Ivoire, Togo and Guinea Bissau offset by increasing in other countries. In total, this uneven evolution of per capita income in WAEMU does not allow us to conclude whether the differences in per capita income between countries have dropped after 1999 with respect to the period before. To achieve this, we refer, as outlined in the methodology, to Wilcoxon-Mann-Whitney's non parametric test.

The average cross-sectional dispersion in per capita income between the countries of WAEMU is 0.51 before 1999against 0.52 after. These results seem to show that the adoption of compact convergence of WAEMU has been followed by increasing disparities between per capita incomes of countries. However, the test statistic gives $\mu_{\alpha/2}^{c} = 0$ so far below 1.96. So we did not have enough arguments to reject the null hypothesis that the average dispersion between WAEMU countries' per capita income is the same before and after 1999 with a confidence level of 95%. The upward trend of the disparity between the incomes of WAEMU member states after 1999 is not significant. But given the fact that increasing in the standard deviation over the period 1997-1998 is mainly due to the poor performance of Guinea Bissau which joined WAEMU in 1997, we have taken the test excluding this country. In doing so, we find that the average dispersion over the period before 1999 is higher than after 1999.

The statistic $\mu_{\alpha/2}^{c}$ gives 4.05 well above 2.5758 which is the 0.995 of the Gaussian fractile. These results therefore conclude with a maximum error of 1% that the disparity between per capita incomes of WAEMU member states has declined over the period 2000-2008 compared to the previous period. The analysis of sigma convergence, therefore, indicates that the conclusions on the convergence of per capita income between WAEMU countries can vary by group of countries regarded as the results vary depending on whether the exclusion of Guinea Bissau. It could be

that the process of convergence occurs between clubs in WAEMU countries and not at all Union countries. The identification of potential convergence clubs in WAEMU will build on the answer to this concern.

3.2.3   Identification of convergence clubs in WAEMU

As outlined in our methodology, the estimate of convergence clubs by Chatterji (1992)'s method requires the definition of a target for convergence. In our case here, the ideal would be to take the level of per capita income in Côte d'Ivoire, the leader in the area, as a target but the diminishing of the per capita income of this country throughout the period disincentive to such a choice. Also accepting the model of Chatterji against a linear growth function implies that at least one of the two coefficients b_2 and b_3 are significant. Using of per capita income of Côte d'Ivoire gives insignificant coefficients. The second potential target is the average of the region. The regression's results reject the null hypothesis of no joint significance of coefficients b_2 and b_3 with a maximum error of 7%, whatever the considered period. This target has been used instead of the leader country. The sample includes the eight WAEMU countries. Also given the non-uniformity of the convergence process over the entire period, the analysis has been made here also following the different sub-periods. Moreover, the sample was split in two. Senegal and Côte d'Ivoire have been segregated from other countries because they seem to converge over the period of analysis to a level above the average of the union. For both, the analysis was made considering the Ivory Coast as a leader.

Over the period 1980-1999, the estimated coefficient b_1 is slightly less than 1. It could therefore be at most three equilibria with one unstable according to the model of Chatterji (1992). Figure 2 in Annex 2 shows that apart from the equilibrium represented by the origin of reference, there is no other stable equilibria. In summary, only Benin, Burkina Faso and Mali have shown a trend of convergence towards the mean of WAEMU. Togo, Niger, Guinea Bissau, have diverged from the average of WAEMU. The gap between per capita income of Côte d'Ivoire and Senegal is growing on the period. Thus, Senegal converges certainly above the average WAEMU but would not reach that of Côte d'Ivoire.

Over the period 2000-2008, the estimated coefficient b_1 is slightly greater than one. We can therefore have a maximum of three equilibria, two unstable. Figure 3 in Annex 2 supports this by showing that the only possible equilibrium is the E2 which implies a divergence in per capita income of WAEMU countries to the union average. Togo and Guinea Bissau are the countries whose per capita incomes diverged most from the union average. The evolution of per capita

income of WAEMU countries over the period supports this analysis. Indeed, both countries experienced a drastic fall in their per capita income over the period and diverge more from the Union average. Even if WAEMU countries do not converge towards the Union average, they can still form at least two clubs of convergence among them: Togo, Niger and Guinea Bissau will converge towards equilibrium E2, an income level below the Union average; Senegal and Côte d'Ivoire constitute a club with an income higher than the average of the union (figure 4 in annex 2). The remaining countries borrow different growth paths.

Throughout the period 1980-2008, according to our results, Benin, Burkina Faso and Mali converge to the average of WAEMU. These countries constitute therefore a convergence club. On the other hand, Figure 5 in Annex 2 shows that the gap is widening between per capita income of Guinea Bissau, Niger and Togo and WAEMU average. These countries therefore diverge. As shown in figure 6 in Annex 2, there is only one plausible long-run equilibrium for Senegal, that to converge to the level of per capita income in Côte d'Ivoire.

4. Conclusion

This study analyzed the economic convergence between WAEMU countries in several forms. It follows that individual countries have great difficulties in meeting WAEMU standards even if the macroeconomic performances, in terms of criteria of convergence of member states, taken together have been improved over time. Given the low rates of real convergence, the assumptions of absolute or conditional beta convergence does not seem relevant in the context of WAEMU.

However, the analysis of the evolution of income dispersion between WEAMU countries does not allow us to conclude to an increase in welfare disparities after the adoption of the pact of convergence. Quite the contrary, when we exclude Guinea Bissau from the sample, there is a reduction of these disparities. The test of clubs of convergence hypotheses indicates the existence of at least two long run equilibria, whatever the period we consider. Throughout the period, we note the presence of three groups of countries. Guinea Bissau, Niger and Togo diverge taking each one growth paths leading them to equilibria lower than the Union average. Benin, Burkina Faso and Mali converge towards the union average. Finally, Senegal and Cote d'Ivoire are converging towards equilibrium higher than the UNION average. In addition, it should be noted that the geographic position of countries does not justify the establishment of clubs.

Another conclusion no less important is that the results do not support the conclusion that the pursuit of nominal convergence leads to a reduction of performance in terms of per capita income

for several reasons. First, Senegal, Benin, Burkina and Mali are the most virtuous countries of the group without necessarily converging towards the levels of lowest life. Meanwhile, Togo, Guinea Bissau and Cote d'Ivoire which countries are the most recalcitrant of the group when we take into account the respect of the community standards converge, the two firsts to the lowest income of the group while the last converges to higher per capita income. The inability to explain the formation of these different convergence clubs is a limitation of this study. We could overcome this handicap by using methods that allow determination of endogenous target convergence.

Given the results of this study and to maximize the positive impact of integration on the development prospects of WAEMU countries, we recommend in addition to the recommendations of Ndiaye (2007) and Bamba (2004) to help the poorest countries to lead sectoral policies. It can be funds for social cohesion as in the European Union. This will help them to take a path of growth leading to a higher level of income. It should also encourage regional trade by strengthening the customs union and increasing the ease of movement of persons, goods, services and capital. Finally, WAEMU must promote mechanisms for preventing and resolving conflicts by creating a socially stable area with the freedoms of opinion. This is particularly important because when a country is suspended from international institutions, relations of the Union with foreign investors and even domestic are necessarily affected, at least, for the community projects.

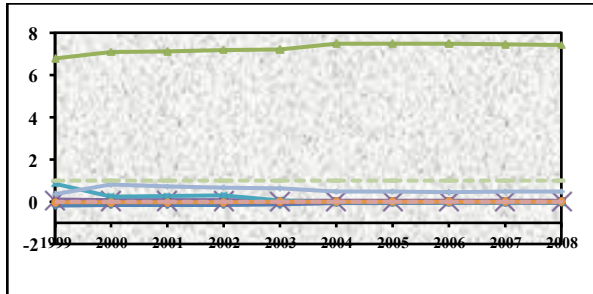# Appendix 1: Analysis of nominal convergence
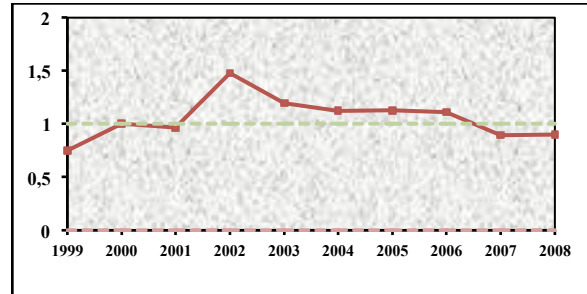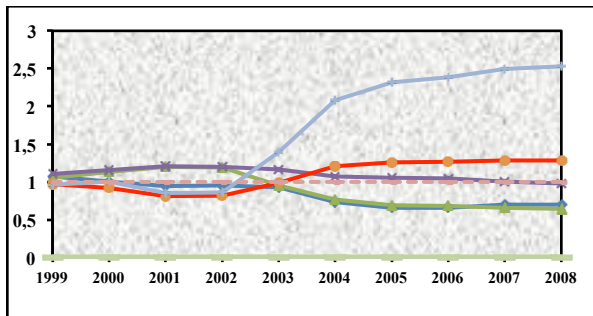
1) Solde budgétaire de base
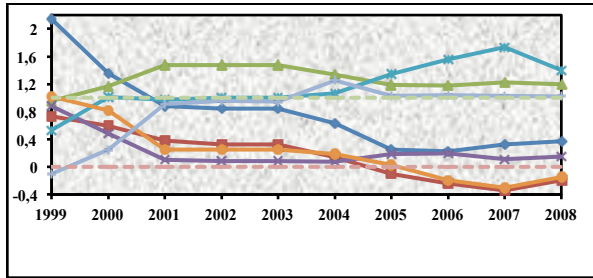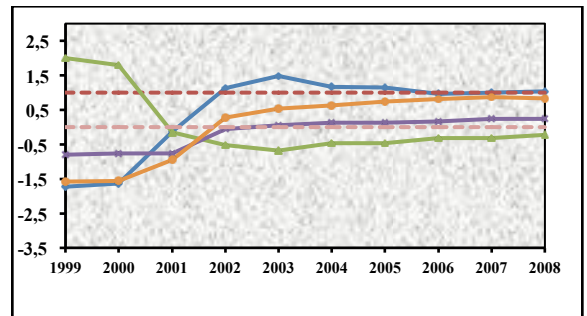

2) Inflation
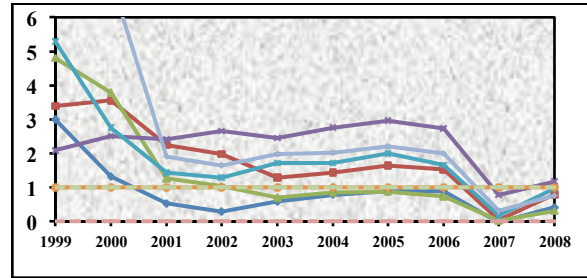
3) Arrears in payment

4) External and internal debt rate
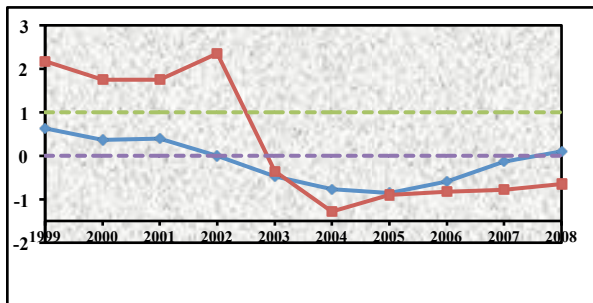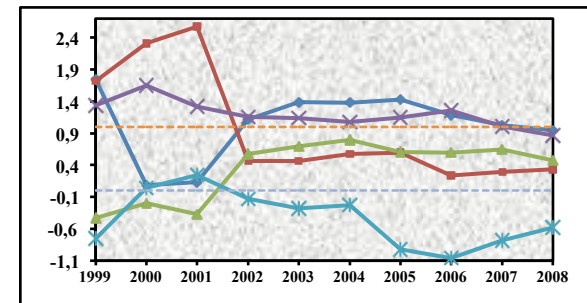

5) Wages rate

6) Investment rates

7) Fiscal policy rate
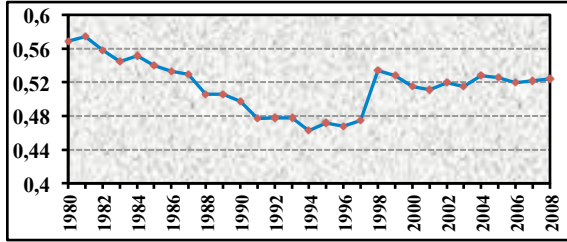

8) External deficit rate

Legends: Guinea Bissau hasn't been taking into account

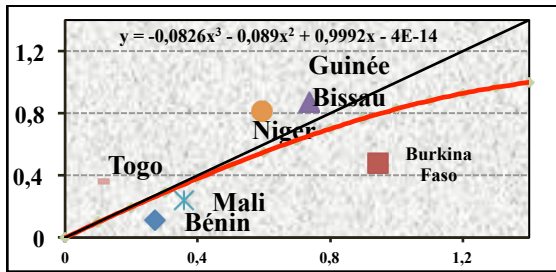Bénin — Burkina Faso — Côte d'Ivoire — Mali — Niger — Sénégal — Togo

Annex 2

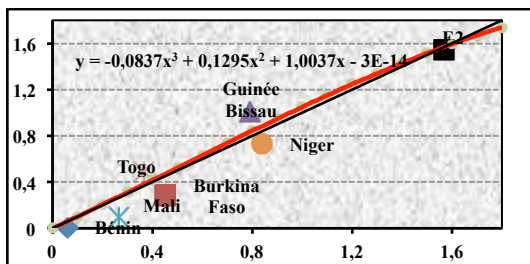**Figure 1: Evolution of the dispersion across per capita income of WAEMU countries**

Source of Data: BAD

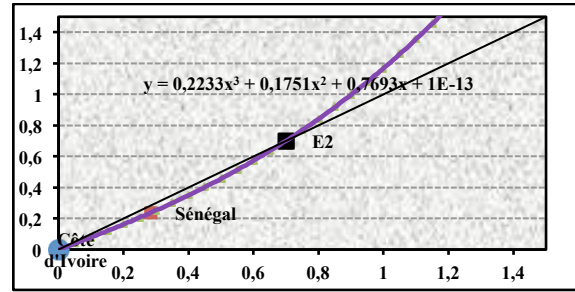**Figure 2: Chatterji model for WEAMU countries on 1980-1999**

$y = -0,0826x^3 - 0,089x^2 + 0,9992x - 4E-14$

Source of Data: BAD

Figure 3: Chatterji model for WEAMU countries on 2000-2008

$y = -0,0837x^3 + 0,1295x^2 + 1,0037x - 3E-14$

Source of Data: BAD

Figure 4: Chatterji model for Senegal and Côte d'Ivoire on 2000-2008

$y = 0,2233x^3 + 0,1751x^2 + 0,7693x + 1E-13$

Source of Data: BAD

Figure 5: Chatterji model for WEAMU countries on 1980-2008

$y = -0,0002x^3 - 0,061x^2 + 0,9476x - 2E-14$
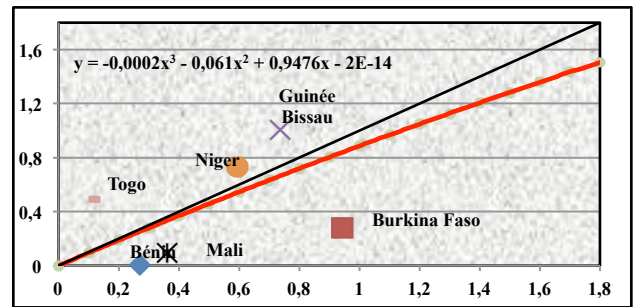
Source of Data: BAD

Figure 6: Chatterji model for Senegal and Côte d'Ivoire on 1980-2008

$y = -1,3885x^3 + 1,2016x^2 + 0,7047x - 2E-14$
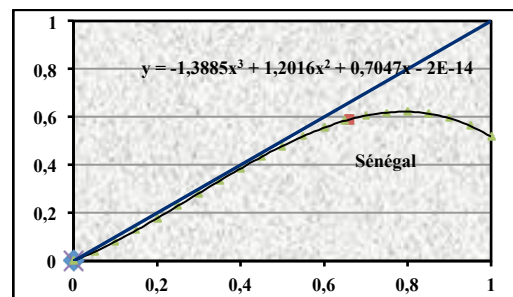
Source of Data: BAD

REFERENCES

1. Bamba, N. L. (2004). "Analyse du Processus de Convergence dans la Zone UEMOA", *WIDER Research Paper* N°. 2004/18, World Institute for Development Economics Research, United Nations University.

2. Bamba, N. L. et Diomandé, K. (2000)."Y a-t-il convergence des performances macroéconomiques au sein de l'UEMOA?", in *L'avenir de la zone franc: perspectives africaines*, Hakim Ben Hammouda et Moustapha Kassé (éds), Codesria Karthala, pp. 61-98.

3. Barro, R. J. (1991). "Economic Growth in a Cross Section of Countries", *The Quarterly Journal of Economics*, Vol. 106, No. 2 (May, 1991), pp. 407-443.

4. Barro, R. J.; Sala-I-Martin, X.; Blanchard, O. J. and Hall, R. E. (1991). "Convergence across States and Regions", *Bookings Papers on Economic Activity*, Vol. 1991, No. 1 (1991), pp. 107-182.

5. Diop, P. L. (2002). "convergence nominale et réelle: une application des concepts de σ-convergence et de β-convergence aux économies de la CEDEAO", BCEAO*, Notes d'Information et Statistiques* N° 531, décembre 2002, Dakar.

6. Fielding, D. et Shields, K. (2000). "Modeling Macroeconomic Shocks in the CFA Franc Zone", Second Draft, June 2000, Department of Economics, University of Leicester.

7. Galor, O. (1996). "Convergence? Inferences from Theoretical Models", *The Economic Journal*, Vol. 106, N° 437 (July 1996), pp. 1056-1069.

8. Islam, N. (1995). "Growth Empirics: A Panel Data Approach", *The Quarterly Journal of Economics*, Vol. 110, N°. 4, November 1995, pp. 1127-1170.

9. Kpodar, K. (2005). "Manuel d'initiation à Stata (version 8)", Janvier 2005, CERDI, Clermont Ferrand, France.

10. Mignon, V. et Lardic, S. (2002), *Econométrie des séries temporelles macroéconomiques et financières*, Economica, Paris

11. Ndiaye, M. B. O. (2006). "UEMOA: une intégration économique à deux vitesses à travers des clubs de convergence", Communication présentée aux 7èmes journées scientifiques du réseau *Analyse Economique et Développement de l'AUF*, Paris, les 7 et 8 septembre 2006.

12. Plane, P. et Tanimoune, N. A. (2005). "Performance et convergence des politiques économiques en zone franc*", Revue française d'économie*, Année 2005, Volume 20, Numéro 1, pp.235 – 268.

13. Saporta Gilbert, (2006). *Probabilités, analyse des données et statistiques*, Editions Technip, 2006, Paris.

14. Schor, A. D. (2000). "La théorie des zones monétaires optimales: l'optimum, le praticable, le crédible et le réel", *L'Actualité économique*, vol. 76, N° 4, pp. 545-576.

15. SERRANITO, F. et GUETAT, I. (2008). "Convergence des pays de la région MENA vers le niveau de revenu des pays du Sud de l'Europe: une évaluation empirique", document de travail du Centre d'Economie de l'Université Paris Nord-CNRS UMR, N°7115.

16. Solow, R. M. (1956)."A Contribution to the Theory of Economic Growth", *The Quarterly Journal of Economics,* Vol. 70, No. 1 (Feb., 1956), pp. 65-94.