Fiscal Convergence in Africa:
What Role for Regional Economic Communities?

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Abstract The literature on Optimal Currency Areas (OCA) has identified several channels for the ex post justification of the synchronicity criterion of common monetary areas. These include trade, cross-border investments, mobility of factors, mobility of goods and services, and fiscal convergence of member countries. We focus on the later for the African continent. We analyze the role of African regional economic communities (RECs) in the convergence of fiscal policies from 1990 to 2015. Our estimates show that African RECs significantly reduce fiscal divergence between countries. Furthermore, we find that common monetary areas are more effective in fostering fiscal convergence. This result is in line with the argument of self-validation of monetary arrangements in Africa, despite low levels of cycle synchronization and trade intensity.

Keywords: Fiscal convergence, Common monetary areas, Africa

I. Introduction

The OCA theory states that the key requirement for suitable monetary zones is the symmetry of shocks. Such symmetry of economic shocks offsets the costs induced by delegating monetary policy to a regional central bank, unilaterally pegging a local currency to a foreign one, or adopting a foreign currency as legal tender. Under such conditions, monetary policy is no longer targeted to country-specific objectives.

The level of business cycle synchronicity is relatively low in existing or contemplated African monetary zones (Tapsoba 2009, Simons and Jean Louis 2018). However, this finding is not

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necessarily permanent because synchronization may be endogenous to the integration process. It is possible that creating a monetary zone arrangement fosters the synchronization of economic shocks among countries. This is the argument defended by Frankel and Rose (1997, 1998) for the European countries. They suggested that the traditional OCA paradigm does not provide a full picture of the (a)symmetry of shocks within a monetary zone since some parameters, such as the level of trade integration and business cycle synchronicity, are not irrevocably fixed and may be endogenous to the integration process itself. On the one hand, business cycle synchronicity creates appropriate conditions for monetary zones which, in turn, increase trade within the zone. On the other hand, the degree of trade integration may increase the synchronicity of business cycles. In these matters, the literature focuses mainly on the role of trade, specialization, and financial integration (Baxter and Kouparitsas 2005, Rose and Engel 2002, Imbs 2004, Issiaka and Gnimassoun 2013).

In a seminal article, Darvas *et al*. (2005) show that for Organization for Economic Cooperation and Development (OECD) countries, similarity of fiscal stances could lead to synchronization of economic shocks and promotes a framework consistent with the OCA theory. The authors explain that idiosyncratic shocks may be the result of irresponsible fiscal policies, i.e., high and persistent fiscal deficits. Fiscal divergence due to the existence of excessive and persistent fiscal deficits in some countries relative to others may also explain the macroeconomic volatility observed among OECD countries.

Macroeconomic convergence programs are often used to bring domestic policies closer and reinforce the monetary integration process. This is a characteristic of existing or future monetary zones. Before an economic or a monetary zone can exist, a set of criteria is usually established, and observance of these criteria is sometimes a requirement for joining the monetary zone. Usually, the creation of a monetary zone or union is predicated on compliance with monetary and fiscal convergence programs, which at first glance have no direct connection to the theory of OCAs (Darvas *et al*. (2005))[1]. Such programs are intended to align domestic policies with respect to fiscal deficits, public debt, inflation, interest rates, and exchange rates. The criterion regarding fiscal deficits is probably the most basic condition in various macroeconomic convergence programs, which has the objective of bringing fiscal stances close to a specified norm (usually defined as a maximum permitted deficit as a percent of Gross Domestic Product (GDP)). Darvas *et al*. (2005) provide the case of the Maastricht Treaty as an example. Because of its quantitative criteria with respect to public deficits and public debt levels, the Treaty defined eligibility conditions for countries wanting to join the eurozone. Darvas *et al*. (2005) give the example of Italy that to comply with the Maastricht criteria, lowered its fiscal deficit significantly, from more than 10 percent of GDP in 1992 to less than 2 percent in 1999. This shows the great

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[1] The adoption of such programs follows the logic of the Treaty of Maastricht (1992) and the European Union Stability and Growth Pact (1997).

extent to which joining an economic or monetary integration provides incentives for countries to work toward fiscal convergence.

This article focuses on the role of African RECs, through their convergence programs, on the similarity of fiscal stances in Africa. Several integration arrangements in Africa, (WAEMU, CAEMC, ECOWAS, COMESA, EAC, and SADC) have adopted coordination mechanisms to promote the convergence of fiscal positions (see Table 1). If fiscal convergence facilitates the synchronization of economic cycles, a key question is whether there are strategies for policy makers to foster fiscal convergence. More specifically, because of coordination mechanisms often embedded in their frameworks, do RECs promote fiscal convergence?

RECs have different levels of coordination. They start with customs unions (free trade agreements)[2], then migrate or transform into economic unions (in which economic policies are coordinated), and economic unions progress to common monetary areas (monetary zones i.e., zones with similar implicit monetary policies) and then ultimately to monetary unions (i.e., adopting a single monetary policy from a common central bank)[3]. We therefore investigate which type of REC is most effective in fostering fiscal convergence. Are RECs enough to ensure fiscal convergence? Is the creation of a monetary zone (usually accompanied by a macroeconomic convergence program) a necessary step? Are African monetary zones self-validating over time through the coordination of fiscal policies? In light of these questions, we investigate the main determinants of fiscal divergence among African countries using an empirical approach and a panel data approach that control for unobservable country characteristics. We explore which types of RECs create a greater convergence of fiscal positions. To the best of our knowledge, no study has analyzed the drivers of fiscal convergence in Africa. This paper proposes to close the gap.

Our key results are as follows. In Africa, RECs in general and monetary zones in particular significantly reduce fiscal divergence among member countries. The study contributes to the literature by providing a strong argument in favor of auto-validation of African monetary zones, despite the current low levels of synchronicity and trade intensity. The study also shows that a monetary zone is the most effective type of REC in terms of reducing fiscal divergence.

The remainder of this article is structured as follows. Section 2 presents background information, including a brief literature review. Section 3 discusses the methodology and the data used. The results are presented in Section 4. Section 5 concludes.

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2) In case of WAEMU and CEMAC, the integration process is reversed insofar as the introduction of the common currency preceded the formation of the customs union and the coordination of fiscal policies through the convergence criteria.

3) A monetary union implies a single currency issued by a common central bank and a single monetary policy. A currency zone is defined as an agreement between countries to fix their exchange rates and to assist each other in maintaining that exchange rate. A monetary zone does not imply a single currency or a common central bank. Monetary unions represent narrow versions of currency areas. Figure 1 in Appendix 1 shows that the African monetary unions (UEMOA and CEMAC) are a subset of a currency zone.

II. Background

A. Overview of African RECs

Creating a monetary union is the overarching objective for most RECs in Africa. Since the early days of independence for many countries in Africa, several RECs have emerged to help promote regional economic integration. Regional integration is seen by African policy makers as a means of raising the low level of intra-regional trade and integrating the economies of African countries into the global economy. Fiscal convergence is a necessary condition for the success of a monetary union, which constitutes the highest degree of integration. Regional integration is also a lever for accelerating structural transformation in African countries through economies of scale, improved competitiveness, more effective resource mobilization and the promotion of regional value chains. Thus, in the long term, regional integration promotes economic growth and reduces inequalities. As shown in Table 1, the landscape of economic and monetary integration in Africa is highly diversified.

There are two monetary zones on the continent: the CFA Franc Zone and the Common Monetary Area (Rand Zone). The CFA Franc Zone is a monetary area that includes fourteen countries. All are former French colonies that, after achieving independence, signed monetary cooperation agreements with France. These agreements have two main features: they guarantee the convertibility of the CFA Franc, which was pegged to the French franc before the euro was launched in 1999, and then to the euro since then. In return for the CFA Franc, members had to deposit at least 65 percent, renegotiated to 50 percent, on September 5 2005, of their external reserves into special accounts held by the French treasury. This zone includes two monetary unions: the West African Economic and Monetary Union (WAEMU) and the Central African Economic and Monetary Community (CEMAC).

The Common Monetary Area (CMA) is a currency agreement in which the South African Rand links South Africa, Namibia, Lesotho, and Swaziland. In the CMA, each country has the right to issue its own national currency, and that currency is legal tender only in that country. However, the South African Rand is also legal tender throughout the CMA. *De facto*, all member countries follow South Africa's monetary policy. It is worth noting that this area does not have a common central bank and lacks a framework for macroeconomic policy coordination. As a result, the rand zone does not qualify as a monetary union.

In the recent decades, several regional monetary integration projects have been initiated within existing RECs: the ECOWAS (Economic Community of West African States), the COMESA (Common Market of Eastern and Southern Africa), the SADC (South African Development

Table 1. main regional economic communities (RECs) in Africa

Arrangements	Type	Member countries	Year	Macroeconomic convergence program
CFA Franc Zone	MZ	Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Comoros, Congo, Gabon, Cote d'Ivoire, Equatorial Guinea, Guinea-Bissau (1997), Mali, Niger, Senegal, and Togo.	1948	No
West African Economic Monetary Union (WAEMU)	REC, CU	Benin, Burkina Faso, Cote d'Ivoire, Guinea-Bissau (1997), Mali, Niger, Senegal, Togo	1962	Macroeconomic convergence program since 1994 and formally since 1999 • Basic fiscal balance/GDP $\geq$ 0 • Inflation $\leq$ 3 percent • Public debt/GDP $\leq$ 70 percent • No accumulation of domestic and foreign arrears
Central African Economic and Monetary Community (CEMAC)	REC, CU,	Cameroon, Congo, Gabon, Central African Republic, Chad, Equatorial Guinea	1964	Macroeconomic convergence program since 1994 and formally since 2002 • Inflation $\leq$ 3 percent • Basic fiscal balance/GDP $\geq$ 0 percent • Public debt/ GDP $\leq$ 70 percent • No accumulation of domestic and foreign arrears
Rand zone / Common Monetary Area (CMA)	REC, MZ	South Africa, Lesotho, Namibia (1990), Swaziland.	1974	No
Economic Community of West African States (ECOWAS)	REC, CU (project)	Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo.	1975	Macroeconomic convergence program since 1999 and revision since 2012 • Fiscal deficit ratio, including grants (commitments basis) to nominal GDP $\leq$ 3 percent • Average Inflation $\leq$ 5 percent • Central Bank financing of the fiscal deficit $\leq$ 10 percent of the previous year's fiscal revenue • Gross reserves $\geq$ 6 months of imports
West African Monetary Zone (WAMZ)	CU (project)	Ghana, Guinea, Gambia, Nigeria, Sierra Leone.	2000	Macroeconomic convergence program since 1999 • Inflation $\leq$ 5 percent • Fiscal deficit/GDP $\leq$ 4 percent before 2002 • Central Bank financing of the fiscal deficit $\leq$ 10 percent after 2002 • Gross reserves $\geq$ 6 months of imports after 2003

Table 1. Continue

Arrangements	Type	Member countries	Year	Macroeconomic convergence program
East African Community (EAC)	REC, CU (project)	Burundi, Kenya, Uganda, Rwanda, South Sudan, Tanzania	1967	Macroeconomic convergence program since 1997 • Inflation < 8 percent • Fiscal deficit/GDP < 3 percent • Public debt/GDP < 50 percent • Gross reserves ≥ 4.5 months of imports
Common Market for Eastern and Southern Africa (COMESA)	REC, CU (project)	Burundi, Comoros, Djibouti, Egypt, Eritrea (1994), Ethiopia, Kenya, Libya (2005), Madagascar, Malawi, Mauritius, Uganda, Democratic Republic of the Congo, Rwanda, Seychelles (2001), Sudan, Swaziland, Zambia, Zimbabwe.	1994	Macroeconomic convergence program since 1992 and revision since 2012 • Fiscal deficit/GDP < 5 percent • Inflation < 5 percent • Central Bank financing of the fiscal deficit limited to 0 • Gross reserves ≥ 4 months of imports
Southern Africa Development Community (SADC)	REC, CU (project)	South Africa (1994), Angola, Botswana, Lesotho, Madagascar (2005), Malawi, Mozambique, Mauritius (1995), Namibia, Democratic Republic of the Congo (1997), Seychelles, Swaziland, Tanzania, Zambia, Zimbabwe.	1992	Macroeconomic convergence program since 2004 • Inflation < 10 percent • Fiscal deficit /GDP < 5 percent • Public debt/GDP < 60 percent
Arab Maghreb Union (UMA)	REC	Morocco, Tunisia, Algeria, Mauritania, Libya.	1989	No formal macroeconomic cooperation

(Notes) REC stands for Regional Economic Community, CU for monetary union (or monetary union), MZ

Community), and the EAC (East African Community).[4] With the goal of monetary integration at some point in the future, the ECOWAS, the COMESA, the SADC, and the EAC have adopted convergence criteria inspired by the Maastricht Treaty and the Stability and Growth Pact of the Eurozone.

B. Macroeconomic convergence programs in Africa

There are two main arguments that support the adoption of fiscal convergence programs in monetary zones. First, imposing limits on fiscal deficits and debt ratios prevents volatile and unstable public finances in one country from negatively affecting other members of the monetary zone. This could be accomplished by putting pressures on the common central bank to monetize public spending (Buti and Guidice 2002, Beetsma 2001, and Dixit 2001). For instance, when a member country is faced with an adverse economic shock, it could run excessive deficits to stabilize its economy and neutralize the impacts of the shock on production. However, other member countries would be affected by the externalities of the growing deficit (spillover effect) in that country through production losses due to the increase in the common interest rate unless they also increase their public spending in response to this shock. Second, implementing fiscal policy rules in a monetary area is expected to strengthen fiscal policy discipline and the credibility of monetary policy (Creel *et al.* 2001). The need to coordinate economic policies among member countries is also an argument in favor of adopting fiscal rules in a monetary zone. Such rules are intended to ease the job of the common central bank by preventing conflicts of objectives, such as higher public deficits and lower policy interest rates (Besancenot *et al.* 2003).[5]

There is no consensus in the literature about the positive impact of fiscal convergence programs after countries have entered a monetary zone. In the case of the European Monetary union for instance, many critics consider the Stability and Growth Pact (SGP)—which is supposed to ensure better fiscal performances of the member states–to be unsustainable because of the strategic debt accumulation of some member states (McKay (1999), Ferguson and Kotlikoff (2000)). The loss of monetary sovereignty could encourage countries to use fiscal policy to dampen any asymmetrical shocks they face. Under these conditions, the monetary zone could actually promote fiscal divergence, notwithstanding the pre-established rules and enforcement mechanisms. Kocenda *et al.* (2008) for example, examine the fiscal convergence of ten recent European Union (EU) members using the Maastricht fiscal convergence criteria. They relied on beta and sigma-convergence tests of the new members compared to the Maastricht

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4) The Arab Maghreb Union (UMA) between North African countries (Algeria, Libya, Mauritania, Morocco, and Tunisia) comprises only the African RECs with no formal macroeconomic cooperation and monetary union project.

5) Several authors have theorized this argument: (Barrell and Sefton 1997, Beetsma and Bovenberg 1998, Hughes-Hallet and Ma 1996, Jensen and Jensen 1995, or van der Ploeg 1995, and Leith and Wren-Lewis 2000).

benchmarks, as well as to the EU-15 figures. The results show a lack of fiscal convergence in the EU in general, suggesting that monetary unions do not necessarily promote fiscal convergence among its member countries. However, Busemeyer (2004) shows that the process of European monetary integration and the Stability and Growth Pact have had a positive impact on budgetary performance. Bertarelli *et al*. (2014) evaluate the impact of the Euro on the process of fiscal convergence. Their results show public deficits converged rapidly during the 1990s, replaced by a divergence trend in the following decade. Moreover, their findings give some support to the idea that the common currency encouraged convergence of total expenditures and revenues. When limited to government spending, this conclusion is confirmed by Ferreiro, Garcia-Del-Valle, and Gomez (2009, 2013).

Most studies of macroeconomic convergence programs in African countries focused on the CFA Zones: the WAEMU and the CEMAC. Empirical studies show that the program led to a relative convergence of the fiscal stances of the countries in the two unions. To analyze the WAEMU, Bamba (2004) used the Kalman filter methodology for the period from 1980 to 2001. He concluded there was an overall convergence of tax revenues, but the analysis of fiscal surpluses/deficits shows alternatively phases of divergence and convergence. Tanimoune and Plane (2005) used the sigma-convergence approach, focusing on the period from 1994 to 2002. They found that after the 1994 CFA devaluation and the adoption of a formal macroeconomic convergence program, the fiscal performance of this monetary union improved. The results showed that the primary fiscal balances and debt ratios have converged significantly. Sarr and Ndiaye (2011) found there was a sigma-convergence in fiscal balances over the period 1980~ 2005. With respect to primary balances and overall fiscal balances, the authors showed that the convergence process began before the implementation of the WAEMU macroeconomic convergence program and was connected to structural adjustment programs in member states, with IMF and World Bank support in the 1980s (the programs aimed for better fiscal discipline). Cabrillac and Rocher (2013) show that, between 1994 and 2011, fiscal stances and debt levels moved closer together. For CEMAC, N'Kodia (2011) found that there was significant convergence among the main variables from 1989 to 2009. These dynamics can be explained by several factors: CFA Franc institutional mechanisms, the effects of the structural adjustment programs, and the devaluation of the CFA Franc. As for the WAEMU, Cabrillac, and Rocher (2013) showed that implementing macroeconomic convergence programs in the CEMAC helped debt levels to converge but fiscal deficits followed a dispersion trend.

There are few studies of other RECs. Only Carmignani (2005) focused on the COMESA region between 1980 and 2002. He found a succession of convergence and divergence phases of key macroeconomic variables. Regarding fiscal indicators, regional dispersion of fiscal deficits was substantial. Deficit levels remain generally high compared to established criteria despite progress observed in the 1990s. In the following section, we discuss our empirical analysis.

III. Empirical Analysis

A. Estimation methodology

In this section, we describe the methodology and data used in the study. The methodology follows a bilateral approach. We form a large dyadic panel dataset (panel of country pairs over time). The panel data allows us to control for country specific and time-specific factors. We assume two countries i and j that are members of a regional economic community or monetary zone. We estimate the impact of RECs on the divergence of fiscal stances using the following model:

$$FD_{ijt} = \alpha_0 + \alpha_1 REC_{ijt} + \alpha_2 X_{ijt} + \theta_i + \theta_j + \lambda_t + \epsilon_{ijt} \tag{1}$$

FD_{ijt} is a measure of fiscal divergence between countries i and j at time t. Formally, the divergence is computed as the absolute difference between the levels of this variable in the two countries $FD_{ijt} = |F_{it} - F_{jt}|$. Two countries become "fully fiscally divergent" if the absolute value previous difference increases and "fully converge fiscally" when the absolute value of the difference is zero. It is worth noting that fiscal convergence is observed between two countries when, over a long period, their budget surpluses or deficits relative to their respective GDPs remain similar. Fiscal divergence due to a short-term asymmetric shock experienced by one country does not put an end to fiscal convergence with another country. REC_{ijt} is a dummy variable taking the value of 1 if both countries in the pair belong to the same regional economic community (REC) and 0 otherwise.

X_{ijt} is a vector of control variables drawn from the literature on fiscal reaction functions. We include three types of control variables: economic and institutional.

- The first economic control variable is a measure of fiscal divergence between the two countries' debt ratios in terms of percent of GDP ($divdebt_{ijt}$). An increase in a country's debt ratio often leads to an improvement in its the budget deficit because of the pressure for adjustment it creates. Tujula and Wolswijk (2004) found that, from 1970 to 2002, OECD countries that experienced rapid increases in debt ratios made greater efforts to reduce their fiscal deficits. Crespo-Cuaresma *et al.* (2011) obtained a similar result for countries in the eurozone by showing that countries with disparate debt to GDP ratios tended to have divergent fiscal positions. When debt levels as a percent of GDP are similar between countries, they might face similar adjustment pressures and incentives to run similar fiscal deficits. More divergent debt levels may lead to divergent fiscal policies. The expected sign for this variable is positive.
- We include divergence of growth rates ($divigdpg_{ijt}$) and divergence of inflation rates

($divinfl_{ijt}$) between countries. Based on tax smoothing models developed by Barro (1979) and Lucas and Stokey (1983), the similarity of growth rates between countries may explain the convergence of fiscal deficits. These models suggest that negative shocks on production or temporary positive shocks on spending may be fully reflected in deficits. More divergent growth levels may lead to divergent fiscal policies. The expected signs of both variables are positive.

Following the twin deficits theory suggested by Checcherita-Westphal *et al.* (2017), we also consider the divergence of current account balances ($divca_{ijt}$) as a potential determinant of the divergence of fiscal balances between pairs of countries. We expect a positive coefficient associated with the current account balance divergence according to the twin-deficit hypothesis. $divdebt_{ijt}$, $divgdpg_{ijt}$, $divinfl_{ijt}$, and $divca_{ijt}$ are computed using the same strategy as for the dependent variable FD_{ijt}.

For institutional variables, the literature highlights the role of political stability, the level of democracy, rule of law, and fiscal rules[6]. These institutional variables were transformed into divergence indicators using the approach described above: the role of political stability in divergence ($divstab_{ijt}$), the impact of the level of democracy on divergence ($divdem_{ijt}$), the role of rule of law scores in divergence, $divrlaw_{ijt}$ fo, and $frules_{ijt}$ a dummy variable taking one the value of 1 when the countries in the pair adopt a fiscal rule and 0 otherwise. We also control for participation in IMF programs using a binary variable (imf_{ijt}) that takes the value of 1 if both countries in the pair have IMF programs and 0 otherwise. We expect the institutional variables to have positive coefficients. Negative coefficients are expected for the variables representing fiscal rule adoption and participation in IMF programs.

Admittedly, estimating Equation (1) is challenging because of potential endogeneity. The first challenge is the reverse causality between fiscal divergence and participation in an REC. Indeed, budgetary divergence may justify integration so that the less virtuous countries will become more like the more virtuous ones. A country with a high budget deficit may join an REC composed of countries with controlled budget balances in order to benefit from multilateral surveillance. It is also plausible that countries that form RECs and currency areas are the ones that are most likely to converge in budgetary terms. Countries that are more likely to join the same REC or currency zone. Finally, another issue of endogeneity may result from the effect of fiscal divergences on control variables such as debt and inflation.

To address this endogeneity issue, the literature recommends making use of external instruments that would be related to participation in an REC without affecting the similarity of participating

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6) See Alesina and Perotti (1995), Woo (2003), Roubini and Sachs (1989), Corsetti and Roubini (1991) and De Haan *et al*. Crespo-Cuaresma *et al*. (2011) for a detailed review of the institutional determinants of budget deficits.

countries' fiscal stances. However, an appropriate instrument representing participation in an REC is hard to find, and is further complicated by the fact that the REC variable is a dummy variable. Moreover, there is little evidence in the literature of political economics that countries join RECs or monetary zones to reduce their levels of fiscal divergence (Tsangarides *et al.* (2006) and Masson and Pattillo 2004). Based on these arguments, we choose to treat RECs and monetary zones as exogenous variables with respect to fiscal divergence. Equation (1) is estimated using the panel LSDV method including country fixed effects and temporal effects. In addition, controlling for countries and year fixed effects should limit the potential endogeneity problem by controlling for (i) unobserved time-invariant factors that affect both fiscal divergence and REC and (ii) time-varying factors that affect fiscal divergence commonly across pairs of countries. Time fixed effects (λ_t) are introduced in the empirical model as dummy variables for each year, while θ_i and θ_j stand for country fixed effects. The hypothesis of country fixed effects that do not vary in time can also be used to check the unobservable variables that are specific to each country. Another technique often used in the literature is the generalized method of moments (GMM) method, which is particularly suitable for dynamic panels. We use this methodology to check the robustness of our estimates. The term ϵ_{ijt} represents the common error. All estimates are corrected for autocorrelation and heteroskedasticity.

B. Dataset

The primary data source for this paper is the World Economic Outlook. From this database, we extract fiscal indicators (public spending and primary fiscal balance, public debt), GDP deflator to capture the inflation rate, current account balance as a percent of GDP, and GDP. Data for the remaining variables are obtained from various sources. Institutional variables are drawn from the World Governance Indicators. Fiscal rules adoption variables and participation in an IMF program are from the IMF Fiscal Rules Dataset. We compute two different fiscal divergence indicators: FD1, based on primary spending, and FD2, based on primary fiscal balance. Following Reinhart, Kaminsky and Végh (2004) and for the remainder of the analysis, we focus mostly on the expenditure-based indicator to capture the true stance of fiscal policies in African countries.[7] The fiscal divergence indicator was calculated using public spending

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7) Reinhart, Kaminsky, and Végh (2004), among others, have questioned the accuracy of fiscal balance indicators in assessing fiscal policies, mainly on two grounds. First, fiscal balances (generally determined as a percentage of GDP) reflect policy outcomes and are only affected endogenously by the actions of policymakers. For this reason, the direction of co-movements between these fiscal indicators and economic cycles might be ambiguous. Second, expressing fiscal variables as proportions of output could yield misleading results because a cyclical fiscal stance may be dominated by the cyclical behavior of output. Reinhart, Kaminsky, and Végh (2004) advocate an approach that involves judging fiscal cyclicality by assessing the direction of co-movements between fiscal policy instruments, such as tax rates and government spending. For many developing countries, including African countries, the lack of comprehensive and systematic data on tax rates implies that government spending is probably the most reliable indicator for judging fiscal policy (Mpatswe, Tapsoba, and York 2011).

(FD1). Overall, the dataset covers 54 African countries from 1990 to 2015. Because of limitations with respect to data availability, we are left with a panel dataset with a maximum possible sample size of 37,206 observations; 1,431 bilateral country pairs with 26 annual observations per country pair. Descriptive statistics are presented in Tables 2 and 3.

Table 2 reports the averages of the fiscal divergence indicators (expressed in percent of GDP) discussed above. These descriptive statistics reveal that, on average, the fiscal stances of pairs of countries that belong to the same REC converge more than country pairs without an REC arrangement. This performance is statistically significant at the one percent level for the divergence indicator based on fiscal balance. Similarly, Table 2 shows that fiscal convergence deepens with the degree of monetary integration. Across the two fiscal indicators examined,

Table 2. Comparison tests for fiscal divergence averages between groups

Non-REC vs REC	Non-REC	REC	Difference	Total sample
Div. prim. spending (FD1)	8.0791	7.9711	0.1080	8.0469
Div. prim. fiscal balance (FD2)	5.7309	5.0301	0.7008***	5.5216
REC Non-MZ vs MZ	REC Non-MZ	MZ	Difference	Sample of RECs
Div. prim. spending (FD1)	8.6284	3.9223	4.7060***	7.9711
Div. prim. fiscal balance (FD2)	5.0994	4.6035	0.4959*	5.0301
MZ Non-CU vs CU	MZ Non-CU	CU	Difference	Sample of MZs
Div. prim. spending (FD1)	4.8130	3.9057	0.9073***	4.3493
Div. prim. fiscal balance (FD2)	9.0105	4.6788	4.3317***	6.7970

(Source) Authors' calculations using WEO data. REC: Regional Economic Communities; MZ: Monetary Zone; and CU: Monetary union. (***), (**), (*) are 1 percent, 5 percent and 10 percent respectively.

Table 3. descriptive statistics

Variables	Observations	Mean	Std, Dev	Min	Max
Economic variables					
Div. prim. spending	8105	8.046942	7.093079	0.003937	51.50191
Div. prim. fiscal balance	8105	5.525282	6.416613	0.000152	44.55577
Div. debt to GDP ratios	8105	58.52944	97.63922	0	765.9124
Div. inflation	8105	3.886772	21.19624	0.0000745	523.5405
Div. GDP growth	8105	7570.507	11210.57	0.153502	72597.88
Div. current account balance	8105	10.82672	10.79674	0	89.156
Institutional variables					
Div. rule of law scores	8105	1.233662	0.992512	0	5
Div. level of democracy	8105	1.359572	0.981746	0	5
Div. level of government stability	8105	1.479688	1.163765	0	7.75
Fiscal rules adoption	8105	0.107341	0.309566	0	1
Participation in IMF programs	8105	0.222579	0.416003	0	1

(Source) Authors' calculations using WEO data

monetary zones have lower fiscal divergence compared to RECs, as do monetary unions relative to monetary zones. These differences are all statistically significant, at least at the 10 percent level. The next section discusses the key results.

IV. Results

A. Baseline

In this section, we discuss key results based on estimations of Equation (1) using the divergence between public expenditures expressed as a percent of GDP. Results are reported in Table 4, columns [1], and [2].

The first column reports baseline results without the variable for REC. This helps to highlight the classical determinants of fiscal convergence. The *R*-squared is 0.49, implying that the variables selected explain about half of the variance of the fiscal divergence indicator. As expected, there is strong evidence that countries divergent in terms of debt to GDP ratios, inflation rates, and growth rates are also fiscally divergent. The associated coefficients are positive (0.005, 0.039, and 0.00005) and are statistically significant at the one percent level. A one standard deviation decrease in the divergence of public debt to GDP ratios, inflation rates, and growth rates respectively would reduce the divergence of fiscal stances by 0.071, 0.118, and 0.082 respectively. Surprisingly, divergence of current account balances reduces divergence of fiscal stances. The associated coefficient is negative (−0.023) and is statistically significant at the one percent level. A one standard deviation decrease in the divergence of current account balances would increase the divergence of fiscal stances by 0.035. The negative coefficient (−0.023) of this variable and its significance at the one percent level seems to invalidate the hypothesis of twin deficits.

Regarding the institutional variables, our estimates show that political stability plays a significant role in the similarity of fiscal policies. Divergence in political stability translates into divergent fiscal stances. The estimated coefficient is positive (0.281) and statistically significant at the one percent level. A one standard deviation increase in the divergence of political stability scores would increase the divergence of fiscal stances by 0.046. When countries simultaneously adopt fiscal rules, fiscal stances tend to become similar. The associated coefficient is negative (−0.351) and statistically significant at the 10 percent level. The presence of fiscal rules in African countries reduces the divergence of fiscal stances by 0.351. The implementation of an IMF program during the same period seems to accelerate fiscal convergence in African countries; however, the coefficient associated with the imf_{ijt} dummy is negative (−0.267) but is not significant at the conventional levels.

In the second column, we introduce the variable REC. As expected, we found that being

a member of the same REC significantly reduces fiscal divergence between two countries. The associated coefficient is negative (-0.74) and statistically significant at the one percent level. Being a member of the same REC reduces the divergence of fiscal stances by 9.20 percent. These results show that being organized in RECs has a positive influence on countries' fiscal indicators.

If being a member of an REC improves the convergence of fiscal stances, a relevant question is, what type of REC is most effective in accelerating fiscal convergence? We consider two forms of RECs: a simple REC and a monetary zone. To answer this question, we consider the sub-sample of RECs. Once again, the divergence in public spending is the preferred indicator for this test.

The sub-sample includes pairs of countries belonging to an REC (see Appendix 1, Figure A1). Using this sample, Equation 1 is re-estimated by replacing the variable REC_{ijt} with a dummy variable MZ_{ijt}, which takes the value 1 when a both countries in a pair belong to the same monetary zone and 0 otherwise. Pairs of countries that are members of an REC but do not belong to a monetary zone constitute the control group. With this same sub-sample, Equation 1 is re-estimated by replacing the variable REC_{ijt} with a dummy variable CU_{ijt} that takes the value 1 when a country pair belongs to a monetary union and 0 otherwise. Finally, we introduce three dummy variables for pairs of countries belonging to the WAEMU, CEMAC, and the rand zone, respectively.

The results are presented in Table 4, column [3], [4], and [5]. They show that when the overall sample is reduced to pairs of countries belonging to an REC, monetary zone arrangements make a difference. The associated coefficient is negative (-1.539) at the five percent level. Relative to simple RECs, the presence of MZs among countries reduces the divergence of fiscal stances by 1.539. This indicates that countries belonging to an REC would increase fiscal convergence by joining a monetary zone, all other things being equal.

The coefficient of the variable CU_{ijt} is negative (-0.461) but not significant (column [4]). This implies that in Africa, adopting a single currency and common monetary policy would not lead to fiscal convergence. This is explained by the fact that implementing fiscal convergence programs within African currency unions has been done differently, by different regions. While the convergence program seems to have been successful in the WAEMU and in the CMA region, the CEMAC zone has experienced divergence. Indeed, the results are quite robust when considering the three African currency unions. In column [5] of Table 4, all of the estimated coefficients are statistically significant at the one percent level. The estimated coefficient for the WAEMU and the CMA regions are negative, at -1.392 and -6.536, respectively. A pair of countries belonging to the WAEMU (CMA) region show fiscal divergence reduced by 1.4 (6.5) percentage points. On the contrary, the CEMAC arrangement is associated with relatively high fiscal divergence. The estimated coefficient for the CEMAC region is large and positive,

Table 4. Effect of RECs, MZs, and CUs on fiscal divergence in Africa

Sample	[1] All sample	[2] All sample	[3] Sample of RECs	[4] Sample of RECs	[5] Sample of RECs
Dependent variable	FD1: Divergence of General Government Expenditure (in percent of GDP)				
Economic variables					
$divdebt_{ijt}$	0.00515***	0.00518***	0.00163	0.00094	0.00094
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$divinfl_{ijt}$	0.03961***	0.03927***	0.05888***	-0.15429***	-0.15429***
	(0.005)	(0.005)	(0.012)	(0.053)	(0.053)
$divca_{ijt}$	-0.02304***	-0.02327***	-0.02512*	-0.02408*	-0.02408*
	(0.008)	(0.008)	(0.015)	(0.014)	(0.014)
$divgdpg_{ijt}$	0.00005***	0.00005***	0.00003*	0.05792***	0.05792***
	(0.000)	(0.000)	(0.000)	(0.014)	(0.014)
Institutional variables					
$divrlaw_{ijt}$	0.21032**	0.19933**	0.90118***	0.83309***	0.79207***
	(0.084)	(0.084)	(0.208)	(0.203)	(0.203)
$divdem_{ijt}$	0.05569	0.05893	0.15061	0.15499	0.12834
	(0.064)	(0.064)	(0.121)	(0.119)	(0.119)
$divstab_{ijt}$	0.28125***	0.27637***	0.39370***	0.43669***	0.46573***
	(0.056)	(0.056)	(0.113)	(0.112)	(0.112)
$frules_{ijt}$	-0.35179*	-0.13140	0.90377*	0.78919	0.63652
	(0.208)	(0.209)	(0.520)	(0.502)	(0.499)
imf_{ijt}	-0.26790	-0.22793	0.22696	0.27069	0.29262
	(0.166)	(0.166)	(0.323)	(0.324)	(0.323)
Regional economic community variables					
CER_{ijt}		-0.73818***			
		(0.144)			
MZ_{ijt}			-1.53904**		
			(0.612)		
CU_{ijt}				-0.46149	
				(0.595)	
$WAEMU_{ijt}$					-1.39265**
					(0.584)
$CEMAC_{ijt}$					5.79525***
					(1.861)
CMA_{ijt}					-6.53660***
					-1.39265**
Observations	8,105	8,105	2,420	2,417	2,417
Country dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
R^2	0.492	0.493	0.559	0.567	0.573

(Source) Authors' estimates. Results of estimates based on public spending, net of interest on the debt (*FD1*). (***), (**), (*) stand for significant at 1 percent, 5 percent and 10 percent respectively. The robust standard deviations are in parentheses.

at 5.795. This feature of the CEMAC arrangement is mainly due to the fact that the convergence criteria for this zone do not take into account oil production in five of the six member countries (Iossifov *et al*. 2009). The divergence in oil revenue trends between these countries (Cabrillac and Rocher 2013) would explain the specific case of the CEMAC zone.

Monetary zones proved to be the most effective form of integration in fostering fiscal convergence between countries. There are several reasons for the effectiveness of monetary zones with respect to fiscal convergence compared to RECs. The first is related to the intrinsic nature of monetary zones, wherein member countries relinquish *de facto* their monetary sovereignty by agreeing to an exchange rate regime. This loss of monetary sovereignty implies that each country loses the instrument for monetizing its public deficits, which lays the initial groundwork for the process of fiscal convergence. The second reason is related to establishing convergence criteria in monetary zones as part of efforts to coordinate economic policies at the regional level, to prevent conflicting objectives between conducting a common monetary policy and pursuing active domestic fiscal policies. To be effective, monetary policy in a monetary zone requires more rigorous management of public finances than in other RECs. More than just decorative, the adoption of convergence criteria in a monetary zone is the second phase in achieving convergence of the fiscal balances of member countries.

In sum, consistent with the argument of the endogeneity of OCA criteria, the results above show that the existence of RECs helps fiscal stances to converge. This is explained by the macroeconomic convergence programs that are often embedded in the policy coordination mechanisms of RECs. Convergence strengthens even further when monetary zones are in place. These results call for further discussions, in line with the theory of endogeneity, regarding OCA criteria and monetary integration projects on the African continent.

B. Robustness checks

We investigate the robustness of our baseline findings by using an alternative measure of fiscal stance, changing the timeframe for computing fiscal divergence, and applying the GMM methodology to account for potential endogeneity biases.

Alternative measure of fiscal stance. We explore the robustness of our findings using an alternative measure of fiscal stance: the primary fiscal balance (*FD2*). This fiscal indicator includes the effects of fiscal and non-fiscal revenues. Equation (1) is re-estimated and reported in Table 5 columns [1]. Including revenue in the measurement of the divergence of fiscal stances does not alter the baseline results. Membership in the same REC reduces fiscal divergence between countries at the 10 percent significance level.

Timeframe for computing fiscal divergence. We re-estimate Equation (1) using 3 and 5-year averages for fiscal divergence indicators. With this transformation, we expect to smooth out

potential short-term fluctuations and focus on the long-term relationship between our variables of interest. The results, provided in Table 5 columns [2] and [3], show that the effect of African RECs on the fiscal divergence between member countries remains unaffected after accounting

Table 5. Robustness checks

Sample	[1] All sample	[2] All sample	[3] All sample	[4] All sample
Dependent variable	FD2: Divergence of General Government Primary balance (in percent of GDP)	FD1: Divergence of General Government Expenditure (in percent of GDP), 3-year average	FD1: Divergence of General Government Expenditure (in percent of GDP), 5-year average	FD1: Divergence of General Government Expenditure (in percent of GDP), GMM
Economic variables				
$divdebt_{ijt}$	-0.00079	0.00594***	0.00267	0.00375*
	(0.001)	(0.002)	(0.002)	(0.002)
$divinfl_{ijt}$	0.02322***	0.02427***	0.02279	0.0196***
	(0.003)	(0.003)	(0.014)	(0.006)
$divca_{ijt}$	0.13155***	0.02365	0.06648***	-0.0263
	(0.009)	(0.016)	(0.023)	(0.017)
$divgdpg_{ijt}$	-0.00000	0.00005***	0.00005***	0.00004**
	(0.000)	(0.000)	(0.000)	(0.000)
Institutional variables				
$divrlaw_{ijt}$	0.00781	0.19427	0.15503	0.1744
	(0.074)	(0.133)	(0.180)	(0.359)
$divdem_{ijt}$	-0.03090	-0.01029	-0.03315	0.00666
	(0.059)	(0.104)	(0.144)	(0.150)
$divstab_{ijt}$	0.14762***	0.31602***	0.53406***	-0.01381
	(0.052)	(0.095)	(0.130)	(0.062)
$frules_{ijt}$	0.04161	0.01725	-0.04226	0.65735
	(0.250)	(0.327)	(0.441)	(0.566)
imf_{ijt}	1.09276***	0.51304	-0.10439	-0.56840
	(0.194)	(0.313)	(0.460)	(0.380)
Regional economic community variables				
CER_{ijt}	**-0.22121***	**-0.78747***	**-0.69017***	**-0.8993***
	(0.130)	**(0.216)**	**(0.276)**	**(0.392)**
Observations	8,103	3,091	1,987	8,105
Country dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
R^2	0.426	0.560	0.571	
Hansen test				0.416
AR(1) test				0.001
AR(2) test				0.676

(Source) Authors' estimates. (***), (**), (*) stand for significant at 1 percent, 5 percent and 10 percent respectively. The robust standard deviations are in parentheses.

for short-term fluctuations.

GMM methodology. We investigate whether our findings are robust when tentatively correcting for potential endogeneity. To this end, we re-estimate Equation (1) with the GMM methodology. The GMM methodology allows one to address potential endogeneity biases arising between explanatory variables and fiscal indicators and does not require the use of external instruments. More specifically, we assume that divergence of public debt to GDP ratios, inflation rates, growth rates, current account balances, adoption of fiscal rules and participation in IMF programs are endogenous. These variables are instrumented using all of their lags and difference in lags. We use the xtabond2 command with the collapse option to avoid over-instrumentation. To analyze the relevance of this instrumentation method, we also report in Table 5 (column [4]) the Hansen tests for over-identification (whose null hypothesis relates to the validity of the instruments) and autocorrelation (whose null hypothesis suggests that error terms should not be auto-correlated to the second order). They are satisfactory. The main results suggest that our baseline findings showing the beneficial effects of RECs in helping fiscal stances to converge are robust after accounting for potential endogeneity biases.

V. Concluding Remarks

This paper studied the role of African economic and monetary integration on fiscal convergence of between countries. Using a broad sample of African countries and a broad range of estimates, the results show that the existence of RECs decreases fiscal divergence of member countries significantly. Monetary zones proved to be the most effective form of integration in fostering fiscal convergence between countries. The traditional theory of OCAs has postulated that various criteria be observed before a monetary zone is formed. These criteria include strong trade intensity and high synchronization of the economic cycles of member countries. The endogeneity thesis of OCA criteria, initiated by Frankel and Rose (1997), showed that a monetary zone generates structural changes that mitigate the results of the standard theory of monetary zones to a great extent. Countries with strong trade ties have more correlated business cycles (Frankel and Rose (1998)). In addition to the channel of trade integration, the work by Darvas *et al*. (2005) points out a second channel of endogeneity for the cycle synchronization criterion. The authors showed a significantly negative relationship between fiscal divergence and cycle synchronization. Countries with relatively similar fiscal deficits tend to be in the same phases of economic cycles. Several papers, including Tapsoba (2009), illustrated the phenomenon of endogeneity for African countries, in the manner of Frankel and Rose (2009), i.e., through trade: countries that trade more have more synchronous business cycles. In this paper, we show that monetary zones in Africa create the conditions for them to be sustained by fostering convergence of fiscal stances.

This paper is the first step in exploring the OCA endogeneity argument through the fiscal channel. Future studies could focus on the relationship between fiscal convergence and business cycle synchronicity.

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Appendix 1

Figure A1. Regional economic communities (RECs) structure