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The Economic Value of Regional Integration in Africa

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Introduction

Membership in regional integration arrangements (RIA) is a widespread strategy of African countries that has grown in importance over the last 25 years. The main African RIAs can be categorized as follows: 1) Customs and monetary unions: Union Economique et monétaire Ouest Africaine (UEMOA), Communauté économique et monétaire de l'Afrique Centrale (CEMAC), 2) Customs unions: East African Community (EAC), 3) Multilateral Free Trade Areas: Southern Africa Development Community (SADC), Arab Maghreb Union (AMU), Common Market for Eastern and Southern Africa (COMESA), Community of Sahel-Saharan States (CEN-SAD), 4) Developmental: Economic Community of West African States (ECOWAS), Communauté Economique des Etats d'Afrique Centrale (CEEAC) and Intergovernmental Authority for Development (IGAD). Every single country on the continent is a member of one or more RIAs.

The diversity of goals pursued by the various RIAs may help explain the multiplicity of national memberships, which raises the question of the motives for African countries to enter into specific regional integration initiatives. One of the issues that arises from this situation is to investigate the form of RIA that is most beneficial in the African context. A common yardstick is needed to assess the value of each form of RIA for the countries not only as an ex-ante decision tool, given the possibility to choose to join one form or another, but also to evaluate the welfare outcome of membership over time.¹ The approach to evaluation of the benefits of RIA membership that is used in this paper does not take into account non-economic motives such as defense or political considerations, which, arguably, may not be shared by many countries and therefore serve as common assessment tools. Consequently, economic welfare is the only goal that is assumed to be pursued by an African country considering or evaluating its RIA membership.

The theoretical model

Assessment of the economic gain that accrues from regional integration is based on the theoretical model proposed by Baldwin and Venables (1995). The gain measures welfare by the level of consumption.

Suppose the welfare of a representative consumer is formulated by the following indirect utility function:

$$V(p + t, n, E)$$

p = vector of border prices

t = vector of trade costs including the tariff equivalent of import barriers

n = vector of the number of product varieties available in each industry

E = Total spending on consumption

Considering that, as an accounting identity, the total of sources of income is equal to the total of applications of income (consumption and investment), consumption is equal to total income minus investment:

¹ There is debate regarding multiple membership of many African countries in more than one RIA, the African Union seeking rationalization through single membership while countries adhere to the policy of multiple membership. So far, no argumentation for or against has prevailed.

$$E = wL + rK + X[(p + t) - a(w,r,x)] + \alpha m - I \quad (1)$$

Where,

L = supply of labour

K = supply of capital

r and w are factor prices for capital and labor respectively

X = production vector

$a(w,r,x)$ = average cost that reflects the average cost and the production level in each sector

α = diagonal matrix that captures the wedge t that creates income for domestic agents given that $\alpha = 1$ for a tariff or other barrier that generates domestic rent income, or $\alpha = 0$ where there is no rent.

m = net imports

I = investment.

The different components of total income are:

$wL + rK$ is total factor income, wL is labor income and rK is capital income

$X[(p + t) - a(w,r,x)]$ is the level of profit in the economy

αm = income accruing from import rent.

Totally differentiating the indirect utility function and dividing it by the marginal utility of expenditure gives:

$$\begin{aligned} dV/V_E = & \alpha t \, dm - m \, d[t - \alpha t] - m \, dp \\ & + [p + t - a] \, dX - X a_x \, dx + (V_n/V_E) \, dn + (R/\rho - 1) \, dI \end{aligned} \quad (2)$$

In cases of increasing returns to scale and imperfect competition

- $[p + t - a] \, dX$: is the output effect
- $X a_x \, dx$: is the scale effect resulting from changes in average costs as firm scale changes
- $(V_n/V_E) \, dn$: is the variety effect, i.e. happens when the number of differentiated consumer products changes
- $(R/\rho - 1) \, dI$ is the profitability of investment where R is the social rate of return, ρ is the social discount rate so,
If $R > \rho$ then a positive change in investment will result in higher profits.

Case of African country: small economy and fixed prices

African countries have small economies and do not enjoy a high degree of international competitiveness. They also trade very little with each other. As a result, most RIAs that they enter into seek to increase their intra-regional trade, some form of protection through high external tariff and other external trade barriers. Given their limited influence on international markets, they are price takers and face fixed prices. In other words, the following conditions apply to them: $\alpha = 1$, $t - \alpha t = 0$ and $dp = 0$

Given these three conditions, eq. (2) reduces to

$$dV/V_E = \alpha t dm + [p + t - a] dX - X_{a_x} dx + (V_n/V_E) dn + (R/\rho - 1) dI \quad (3)$$

The analysis below focuses on the welfare effect caused by changes in the factors that can result from the RIA, namely increase in imports (dm), increase in production (dX), increase in investment (dI), increase in number of sectors (dx) and increase in number of consumer products (dn). If there is economic value in regional integration, it will materialize through one or more of them.

Based on the model the conditions for positive economic value of regional integration are: $dm > 0$, $dX > 0$, $dI > 0$, $dn > 0$ and $dx < 0$.

The empirical evidence

Empirical assessment of the economic value of regional integration is conducted at the level of individual countries considering that they decide to enter or leave a RIA. Given the relatively large number of RIAs in Africa and the need to measure as accurately as possible their impact through stronger attribution of the endogenous economic variables, the cases of advanced integration are examined. In this regard, the analysis will focus on the UEMOA and CEMAC, which are customs and monetary unions, and the EAC, a customs union. The analysis will use a before-after approach which consists in comparing the levels of the endogenous variables during the years before the year of inception of the RIA and the years after its creation. Welfare is measured by Per Capita Growth Domestic Product (GDP). Considering that economic variables may change irrespective of the RIA status of the country, the residual imputation approach is used. It consists in estimating the trend of the endogenous variables for the period preceding inception of the RIA and comparing their actual values with the values that are obtained if the pre-RIA trend is extended.

The residuals that are calculated, difference between actual and trended values are considered to be the impact of the RIA; Clavaux (1969), Truman (1969). The underlying rationale is that the residuals are fully attributed to the impact of the RIA although, in reality other factors including shocks, may also be at play. Econometric techniques are proposed in the literature to address this issue but require considerable data that are not available for most African countries. As a result, the residual imputation approach is utilized in the present study despite the criticism that is leveled at it.²

In order to conduct the empirical inquiry two questions are investigated. The first one is whether there is an economic gain that arises from the RIA and its size. The second question addresses the speed of accrual of the gain that follows inception of the RIA.

Existence and size of the economic gain

The measure of economic welfare that is most common in developing economies is the Per Capita GDP. Statistical data related to it are readily available from a number of sources in a standardized form. Therefore, the Per Capita GDP in constant 2010 Dollars published by the World Bank's World Development Indicators (WDI) is used in this study. As stated earlier,

² Alternative econometric techniques are proposed by Aitken and Lowry (1973), Balassa (1974), Resnick and Truman (1973), Winters (1984), Coe and Moghadam (1993), Carrere (2004), Tegoum et al. (2013), Afesorbor (2017).

African countries with the most advanced agenda for regional integration are included in the sample. Specifically, they cover UEMOA countries: Benin, Burkina Faso, Côte d'Ivoire, Guinea Bissau, Mali, Niger, Senegal and Togo; CEMAC countries: Cameroon, Central African Republic, Chad, Republic of Congo, Equatorial Guinea and Gabon; and East African Community (EAC): Burundi, Kenya, Rwanda and Uganda. Tanzania has been left out for lack of data.

The technique of residual imputation is used to measure the economic gain. The Per Capita GDP trend line is computed for the years prior to the inception of the RIA. The trend equation is used to extend the trend over the RIA years thus giving projected value of the Per Capita GDP. The difference between the actual value of the Per Capita GDP and the projected value gives the imputed residual for each year in the RIA period. The rationale is that gain from RIA is attributed to the imputed residual. It is noteworthy that, at the single country level, other factors such as policy changes or shocks that are independent from regional integration could affect Per Capita GDP. However, imputed residuals can be a convenient way of assessing the economic value of regional integration if there is congruence between different countries of the same integrated zone.

Table 1 presents the results of the calculation of economic gains accruing to the member countries based on the imputed residuals. For the UEMOA the mean imputed residual, calculated over the RIA period, 1994-2016, shows a strongly significant economic gain for all the countries except for Guinea Bissau that experienced a civil war in 1998 and 1999, immediately after it became a member of UEMOA in 1997. CEMAC fared more modestly with 3 of the 6 sampled countries showing a significant gain while 3 others had negative mean imputed residuals. These countries, Cameroon, Congo and Gabon, have the three largest economies, which is puzzling unless one considers that the adjustment sought with the reform underlying the RIA initiative was more adequate for UEMOA countries than for CEMAC countries bearing in mind that the RIA measures were identical for the two zones and taken simultaneously in January 1994.

An alternative explanation could be that the economies of Cameroon, Congo and Gabon were close to their full GDP potential prior to the RIA and that after inception of the reform its costs were higher for them than its benefits. It is worth noting that Equatorial Guinea has scored a very large mean imputed residual during the RIA period, most likely owing to the very high increase in revenues from oil, its main export commodity. The East African Community has recorded results similar to UEMOA's because all four countries (Tanzania being excluded) display positive and significant mean imputed residuals.

Table 1. Statistics of the Mean Imputed Residuals**Union Economique et Monétaire de Ouest Africaine (UEMOA)**

	Mean Imputed Residual	Standard Error	t. Value	Signif.	Ratio Mean Imputed Residuals / Actual Values
Benin	75.52	5.72	13.20	***	0.099
Burkina Faso	93.65	14.27	6.56	***	0.168
Côte d'Ivoire	324.45	55.64	5.83	***	0.246
Guinea Bissau	-176.04	14.42	-12.21		-0.331
Mali	51.49	8.20	6.28	***	0.091
Niger	115.94	17.06	6.79	***	0.327
Senegal	173.35	26.67	6.50	***	0.175
Togo	45.00	10.01	4.50	***	0.086

Communauté Economique et Monétaire de l'Afrique Centrale (CEMAC)

	Mean Imputed Residual	Standard Error	t. Value	Signif.	Ratio Mean Imputed Residuals / Actual Values
Cameroon	-591.64	13.31	-44.44		-0.508
Central African Rep.	65.47	11.75	5.57	***	0.157
Chad	258.98	44.66	5.80	***	0.308
Congo, Republic	-1230.56	49.25	-24.99		-0.482
Equatorial Guinea	10944.62	1367.69	8.00	***	0.862
Gabon	-1758.36	208.79	-8.42		-0.188

East African Community (EAC)

	Mean Imputed Residual	Standard Error	t. Value	Signif.	Ratio Mean Imputed Residuals / Actual Values

Burundi	0.103	0.017	6.06	***	0.103
Kenya	83.469	26.206	3.19	***	0.078
Rwanda	263.12	27.95	9.41	***	0.421
Uganda	102.07	13.13	7.77	***	0.175

Note: Confidence levels are 99% (***) and 95% (**). Sampling periods are 1970-2016 for UEMOA and CEMAC countries and 1978-2016 for EAC countries except for Equatorial Guinea, 1980-2016 and Uganda 1982-2016. RIA periods are 1994 – 2016 for UEMOA and CEMAC and 2000-2016 for EAC. However, for Guinea Bissau the RIA period is 1997-2016. For Rwanda and Burundi it is 2007-2016.

The last column of Table 1 reports the size of the economic gain of the RIA accruing to each country. The mean Ratio of imputed residuals over Actual Values of Per Capita GDP provides the proportion of the Actual Per Capita GDP that is contributed by the RIA. In the case of UEMOA, the RIA contributed sizable shares of the Per Capita GDP, especially for Niger: 32.7%, Côte d'Ivoire: 24.6%, Senegal: 17.5% and Burkina Faso: 16.8%. As for Guinea Bissau, it lost one third (-33.1%) of its Per Capita GDP mostly owing to its civil war in 1998 and 1999.

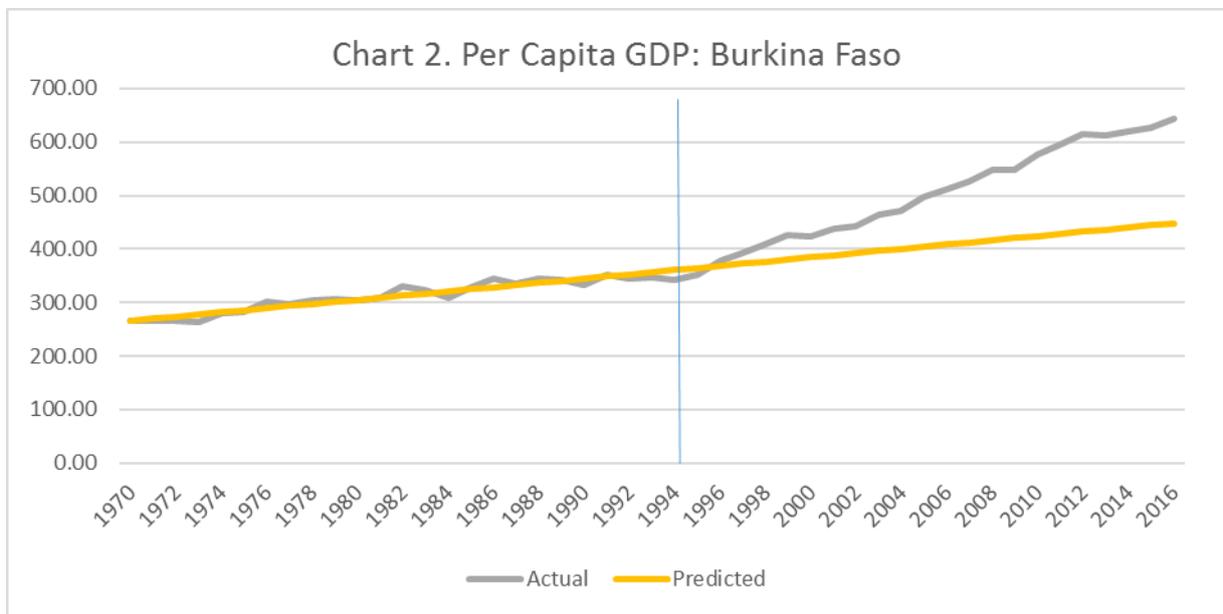
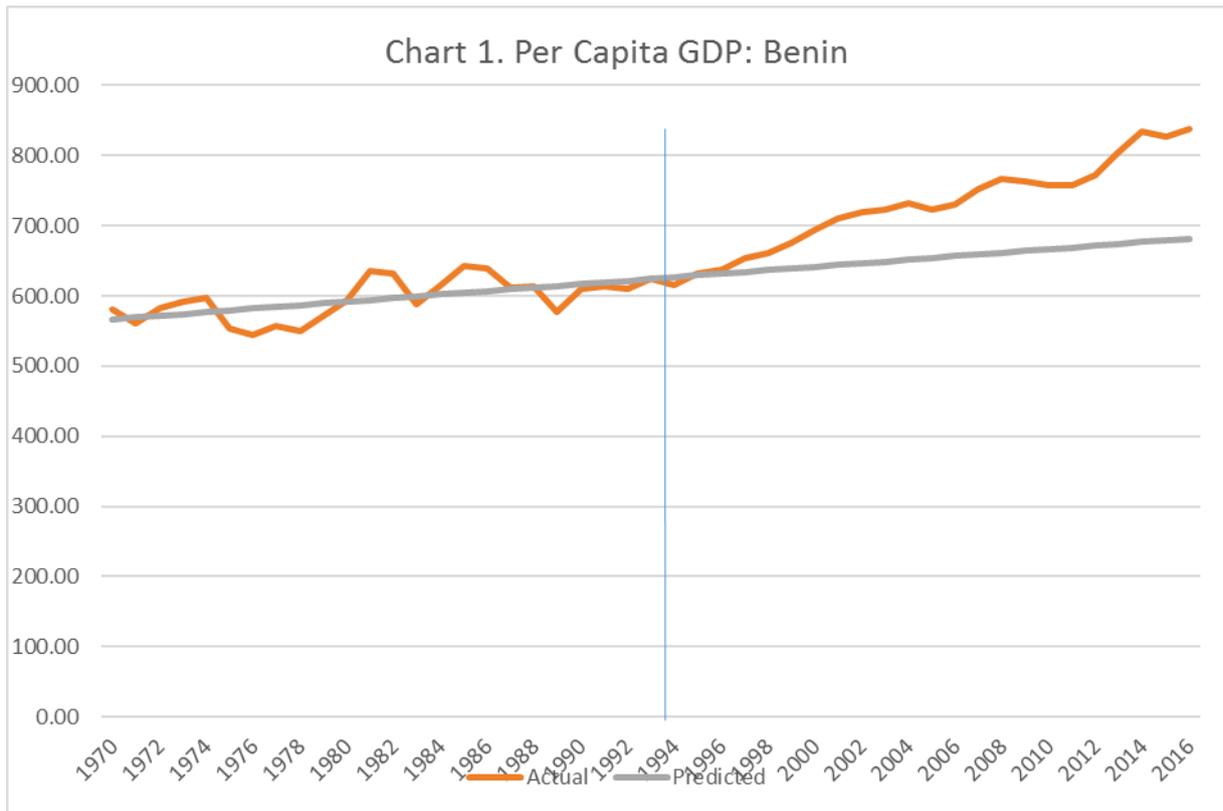
Results of the CEMAC sub-region are more diverse, ranging from a reduction of -50.8% of Per Capita GDP of Cameroon imputed to the onset of the RIA and -48.2% for Congo to a sharp increase of 86.2% for Equatorial Guinea. Such results call into question the uniform adequacy of the reforms underlying inception of CEMAC for its member countries and, by extension, as compared to member states of UEMOA which underwent the same measures. Therefore, out of a total of 14 countries (8 for UEMOA and 6 for CEMAC) that experienced the same RIA measures, 10 recorded a significantly positive mean imputed residual which is tantamount to a positive impact of the integration initiative. Apart from the case of Guinea Bissau which saw a debilitating civil war early during its membership years, more study is needed to investigate the factors that prevented the central African countries of Cameroon, Congo and Gabon from benefitting from their RIA.

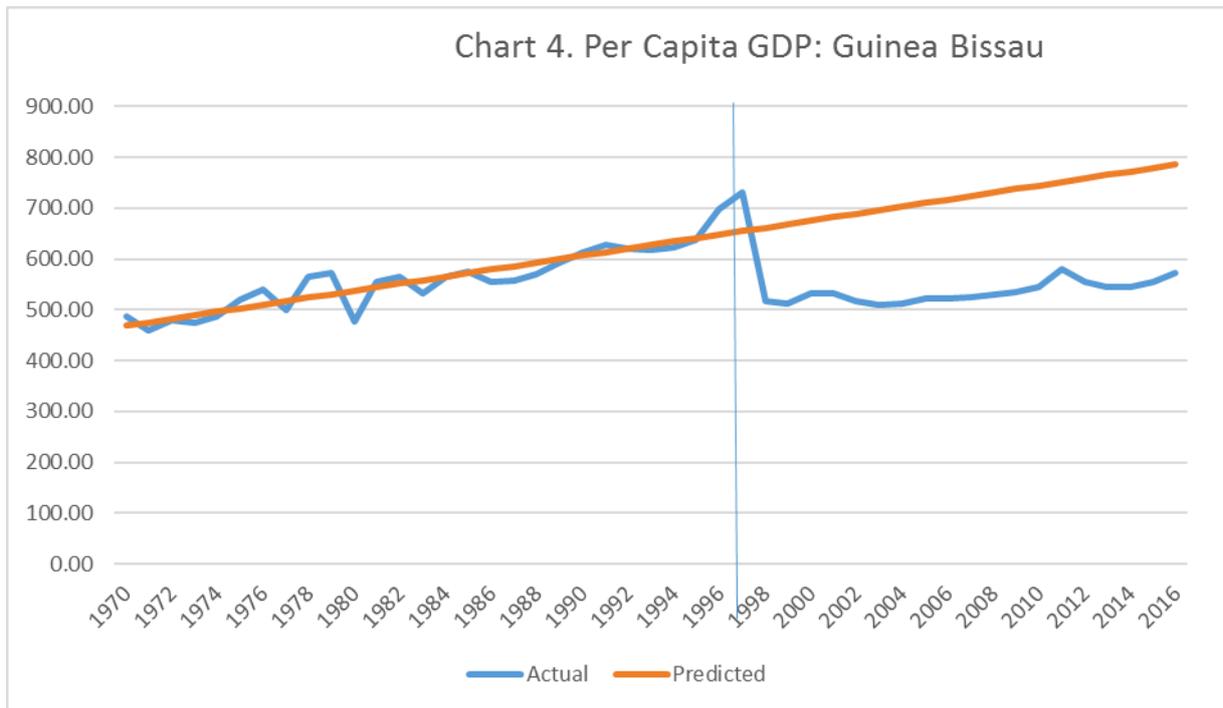
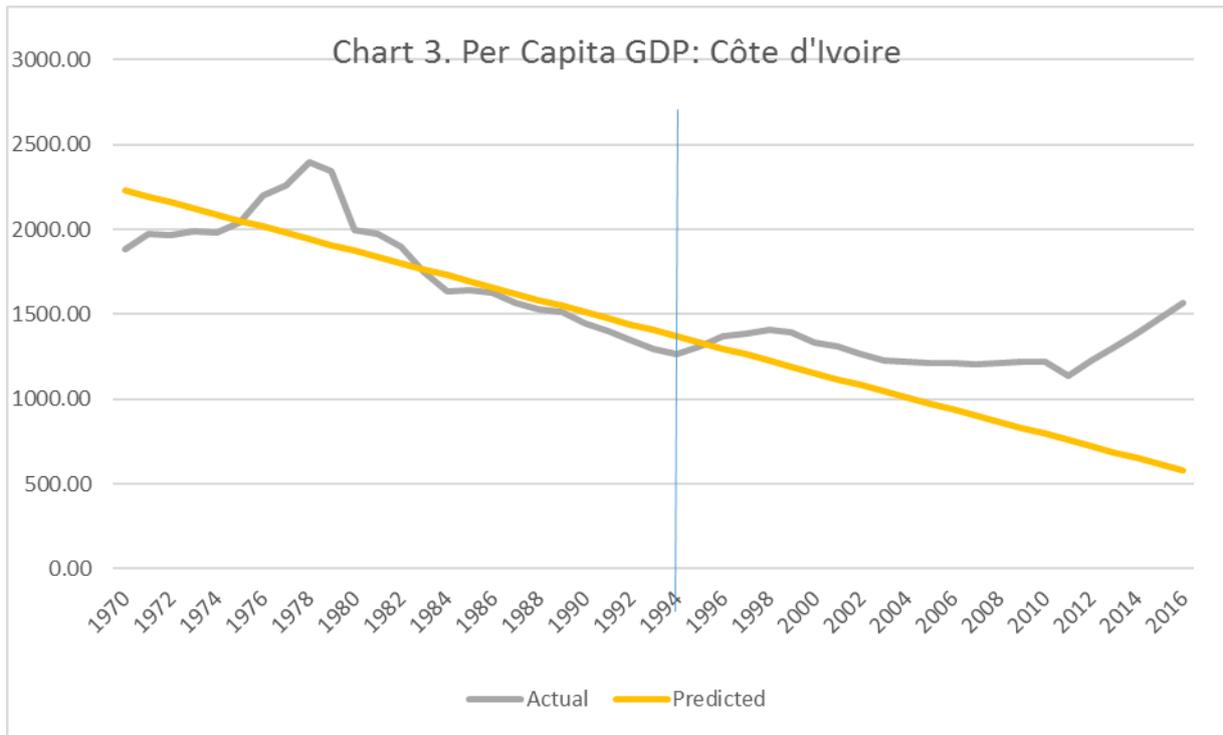
The East African Community recorded a uniform outcome of its RIA on its members. All the countries benefitted from the RIA and, except for Kenya that had a modest mean ratio of 7.8%, the mean value was considerably higher for Burundi (10.3%), Uganda (17.5% and Rwanda (42.2%). In summary, 18 African countries from various parts of the Continent were investigated and 14 reported a positive economic impact of regional integration based on the imputed residual approach.

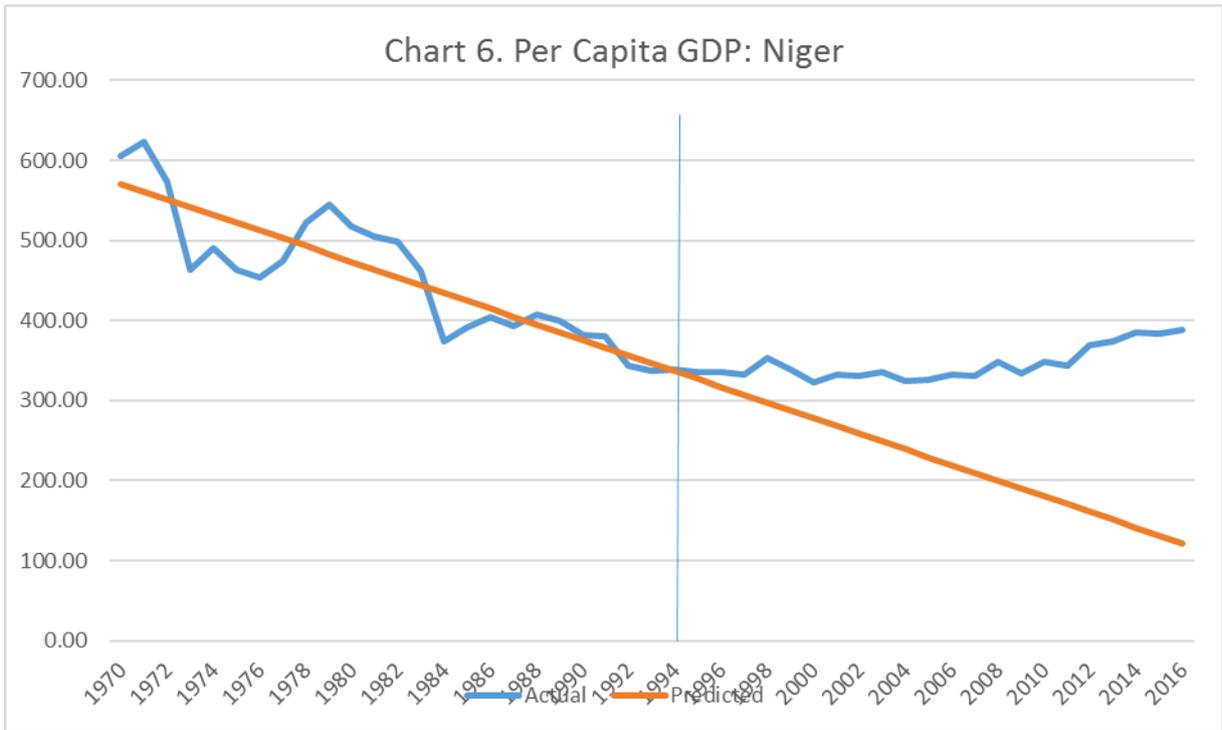
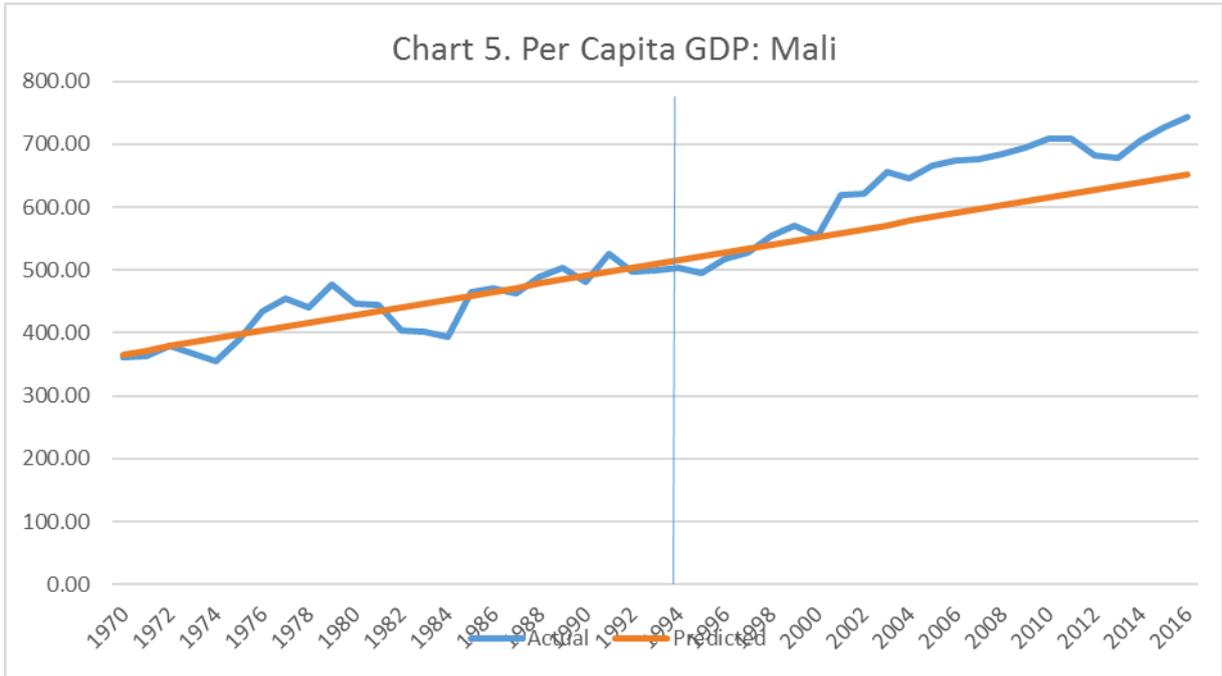
Speed of the economic gain from regional integration

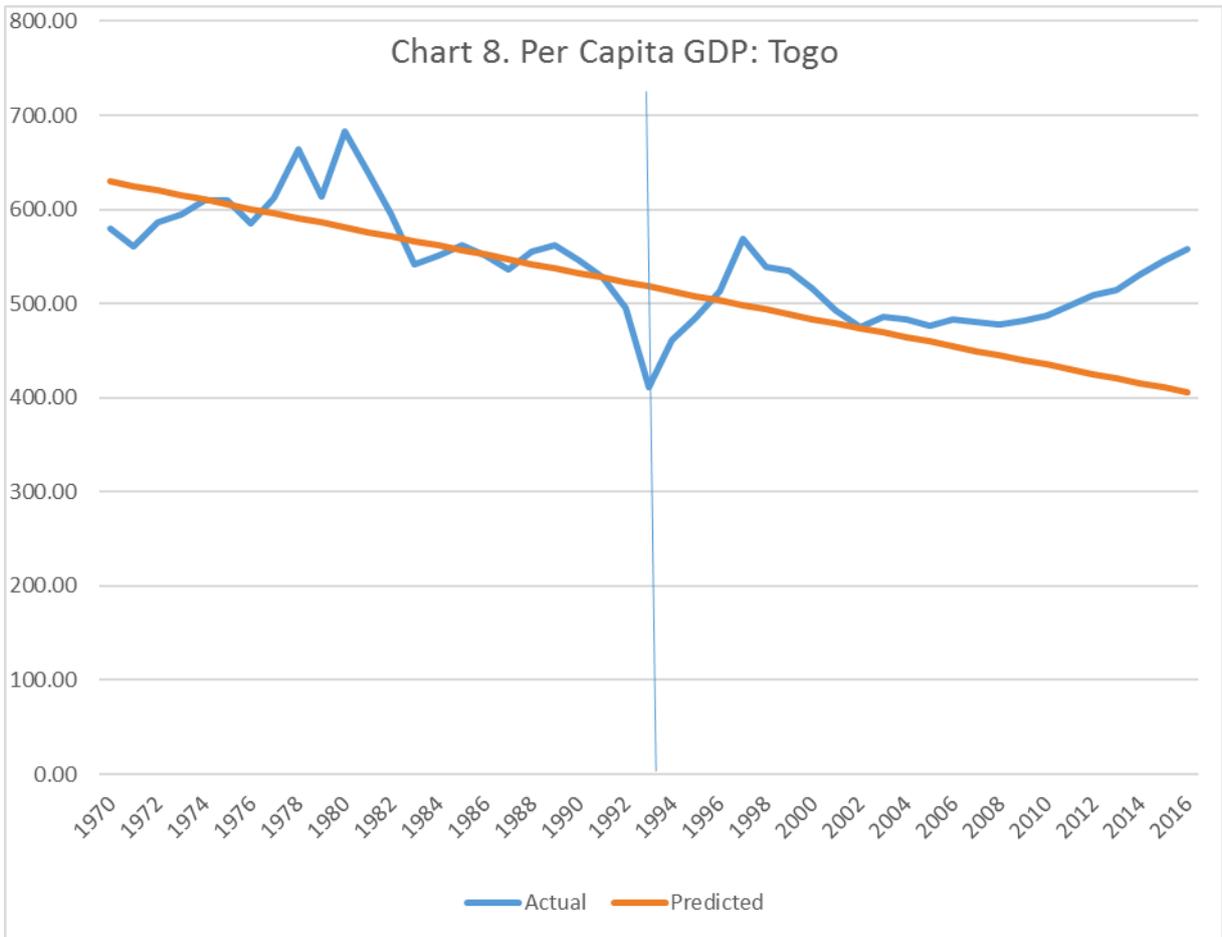
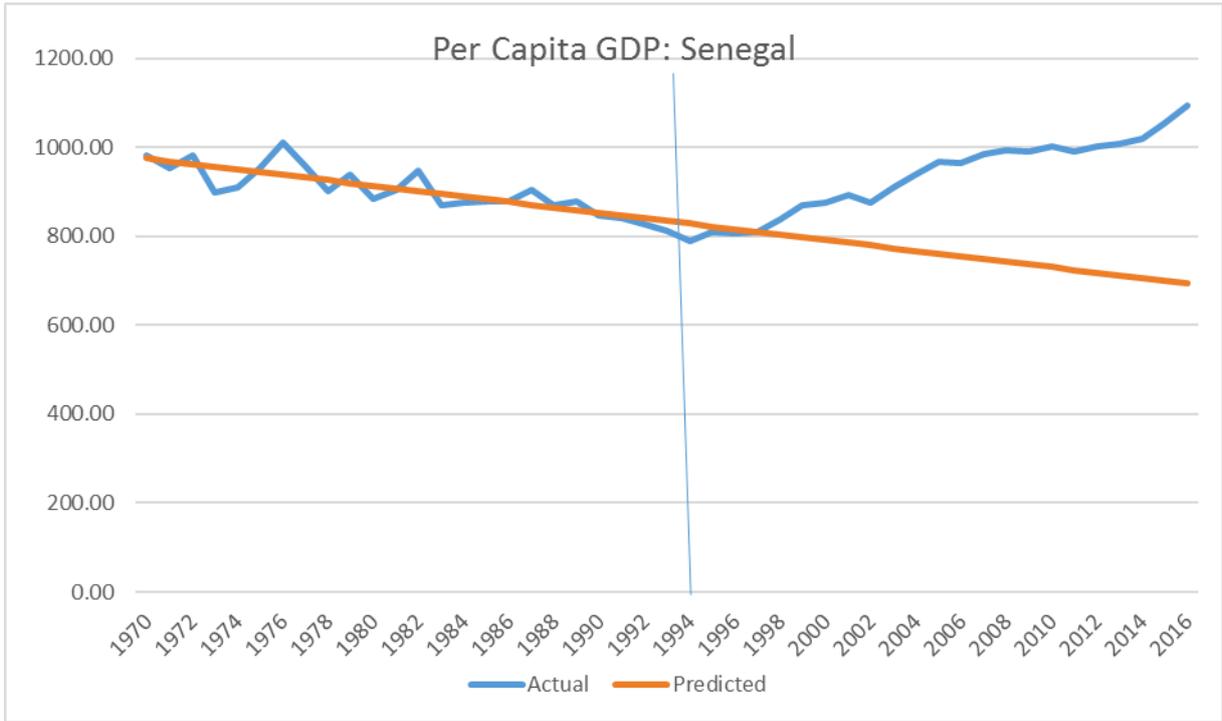
Assessment of the economic gain that accrues to African countries that participate in a RIA is based on identification of the year during which Actual Per Capita GDP departs significantly and consistently from the predicted values after inception of the RIA. Speed is measured by the lag between the date of inception and the beginning of departure, itself captured by the rising (or declining) imputed residual over time. For all the charts presented below, for UEMOA, CEMAC and EAC, the inception date is indicated by a vertical line drawn in the inception year. UEMOA and CEMAC were created on the same day, in January 1994. Bissau Guinea joined UEMOA in 1997. The East African Community was operational in July 2000, and Rwanda and Burundi acceded in July 2007.

Charts 1 through 8 depict the evolution over time of the imputed residuals of the UEMOA countries. Except for Guinea Bissau that experienced a severe civil war in 1998-1999, an upturn starting in 1994 or the year after is the most common characteristic of the countries' Per Capita GDPs. This is true even for countries, notably Côte d'Ivoire, Niger, Senegal and Togo that were on a sharp downward trend during the years prior to enactment of UEMOA. The speed of the economic gain captured by a positive and consistent imputed residual can be considered fast because the upturn is observed in 1994 for all countries, even for Guinea Bissau after the two-year hiatus of the civil war, although to a lesser extent. Furthermore, for most countries, the speed remained constant during the 24 years after inception of UEMOA, the implicit trend line of the Actual Per Capita GDP having stayed relatively linear during the period 1994-2016, thus a linear increasing imputed residual over time.

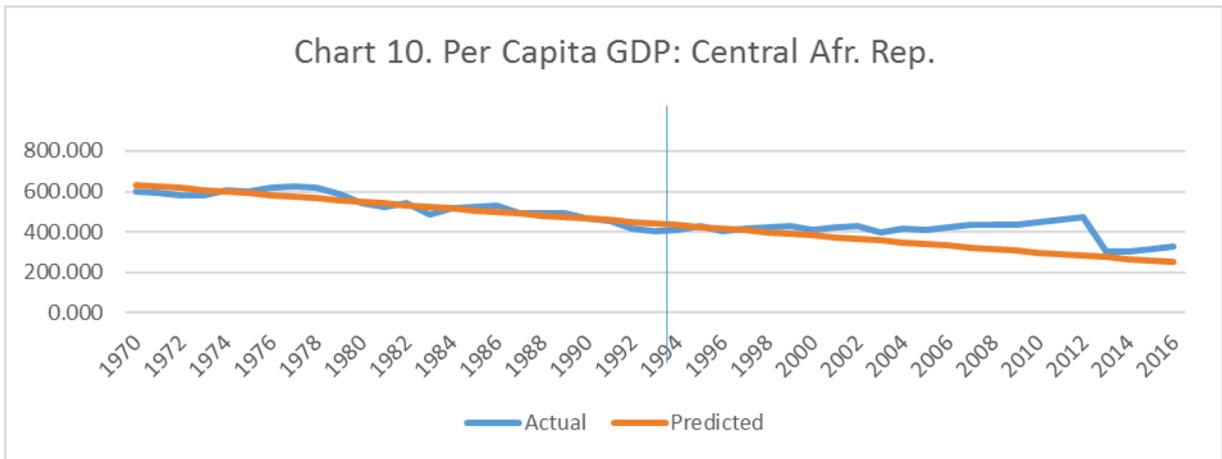
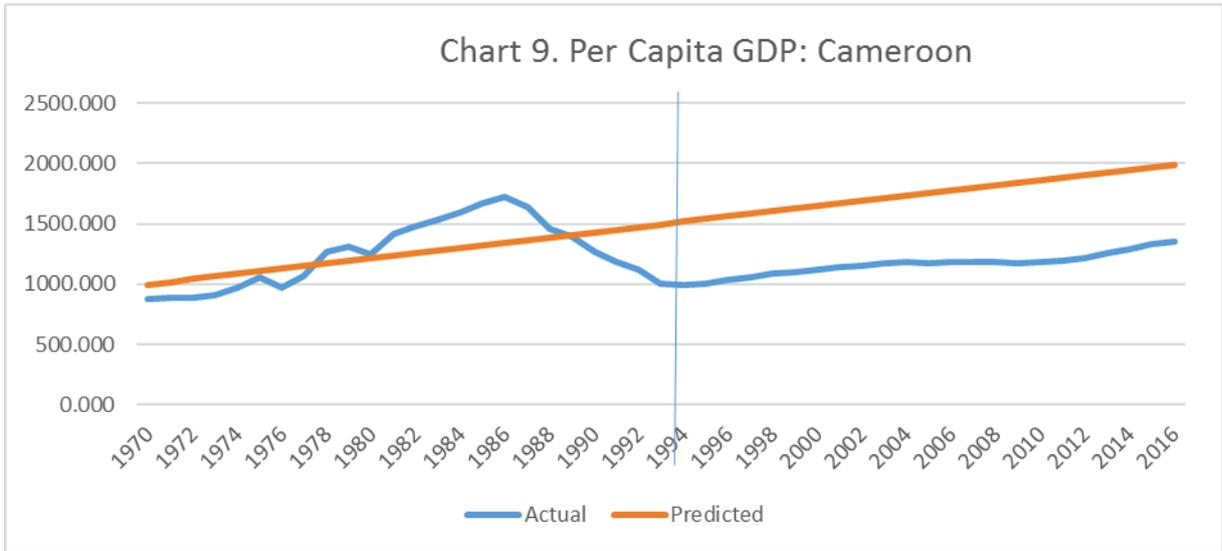


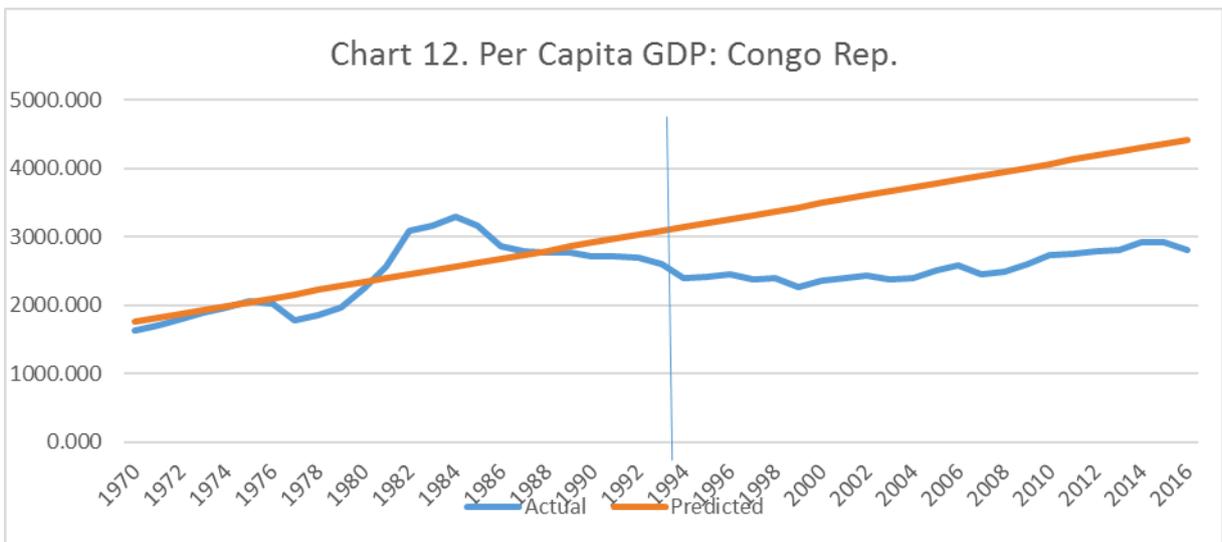
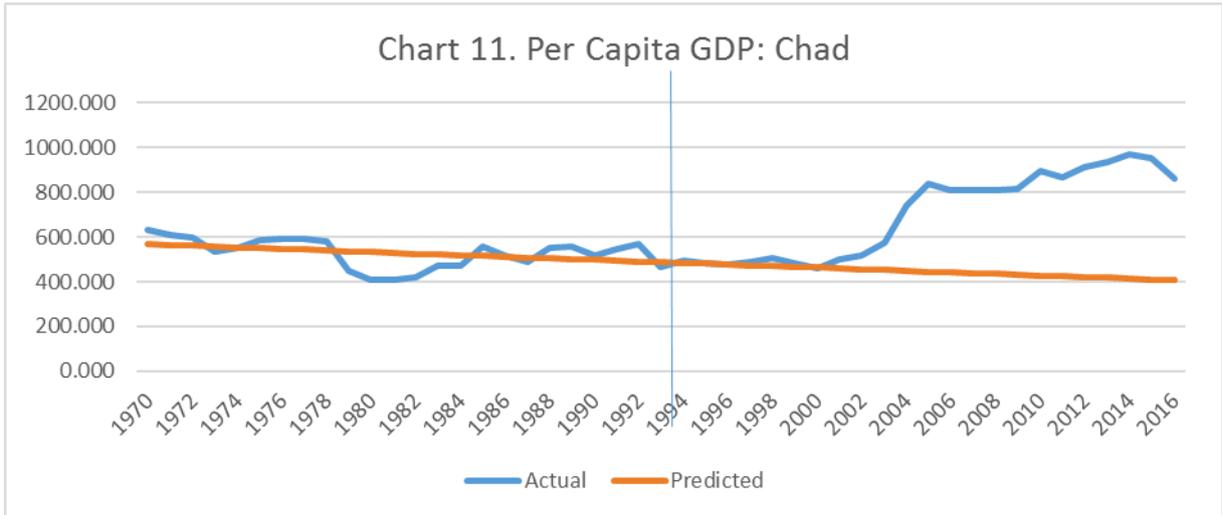


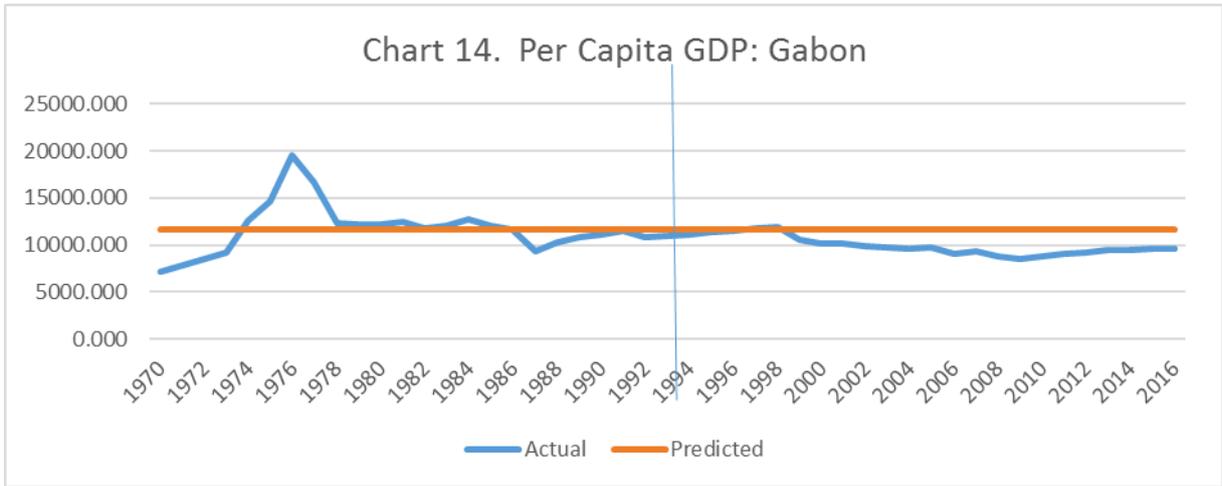
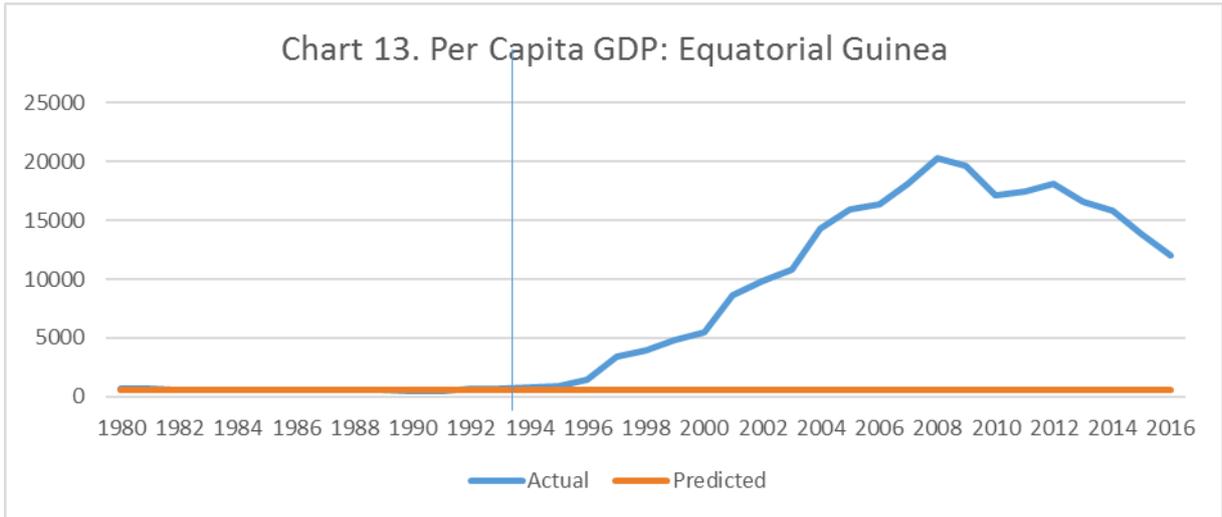




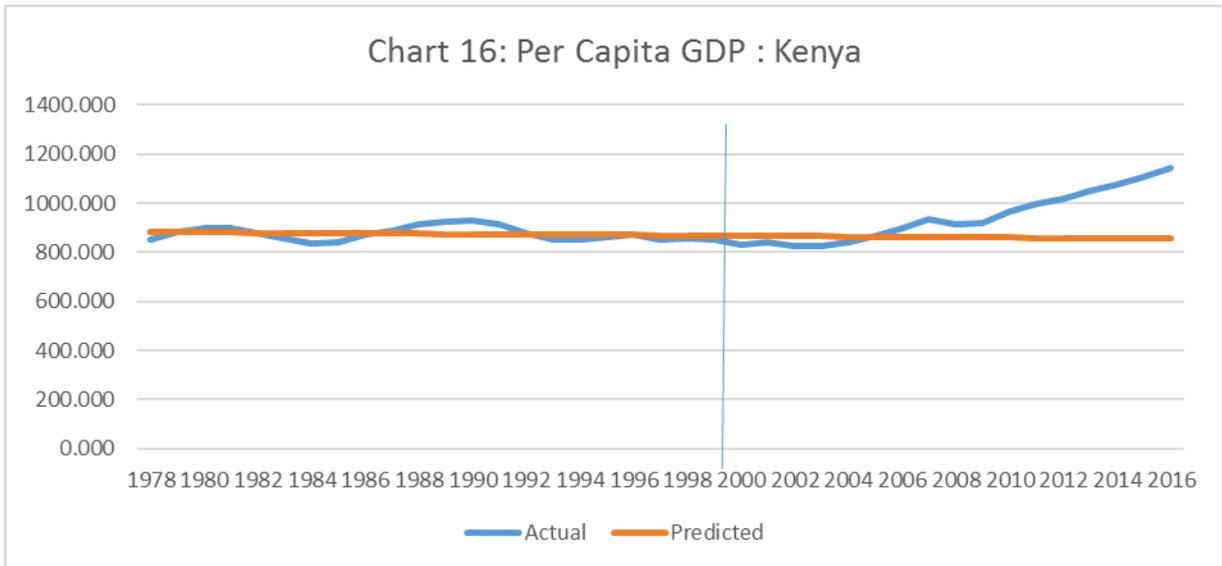
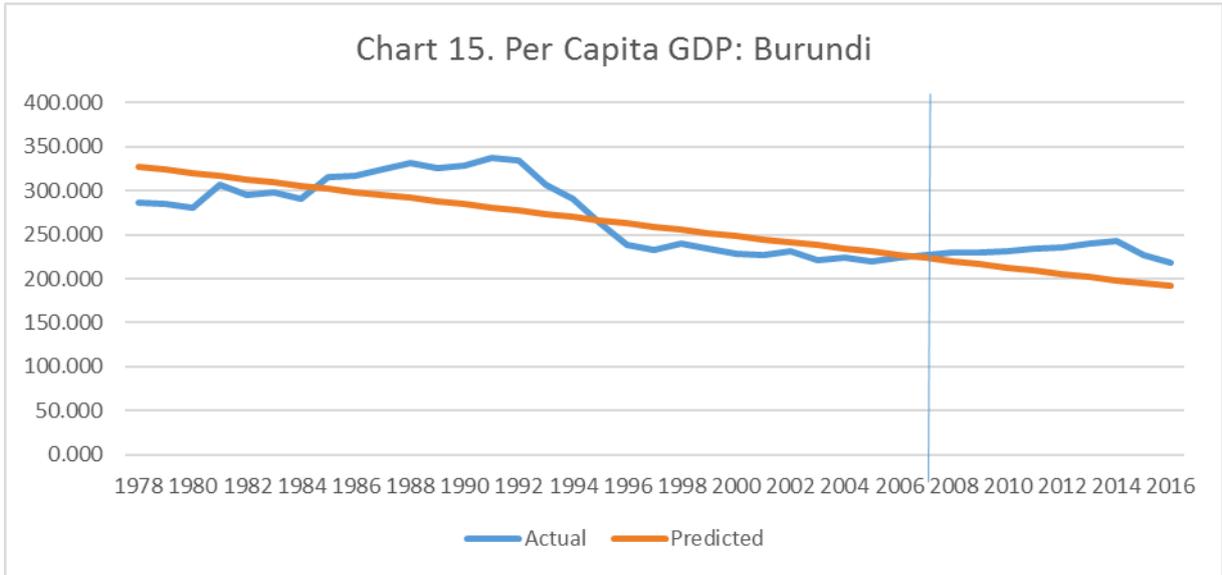
Speed of the economic gain for CEMAC countries is captured in charts 9 through 14. Unlike in UEMOA, starting inception in 1994, these countries experienced mild variations in the imputed residuals which showed modest speed. For many countries, Cameroon, Central African Republic, Chad and Gabon, the residuals were constant for several years after 1994, and equal to zero in some cases, thus showing slow economic gain. Finally, it can be argued that for Gabon and to a lesser extent the Central African Republic, no economic gain accrued from the CEMAC RIA.

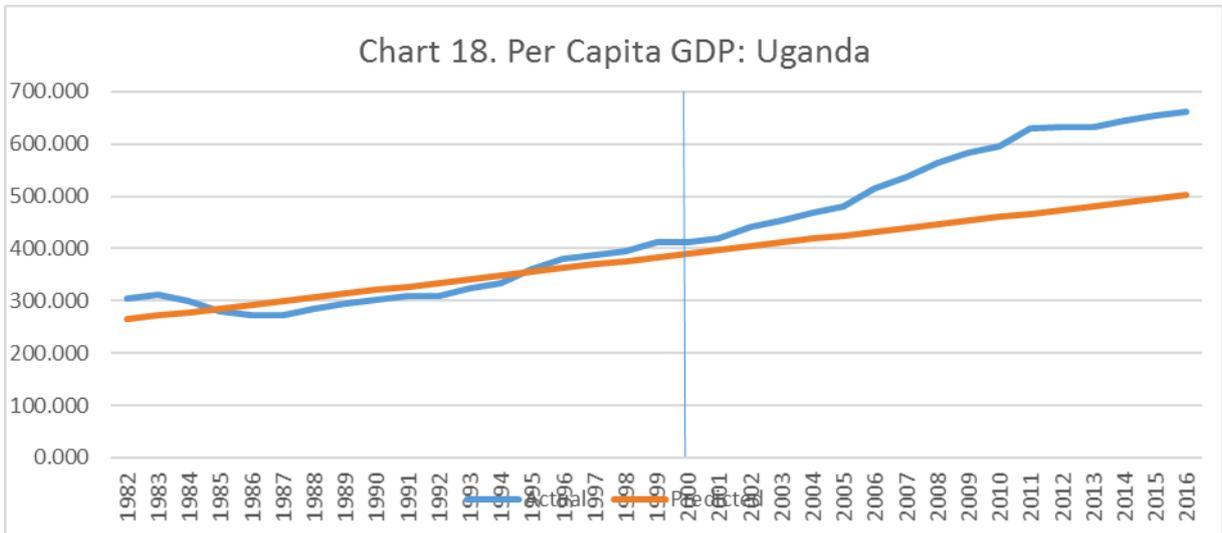
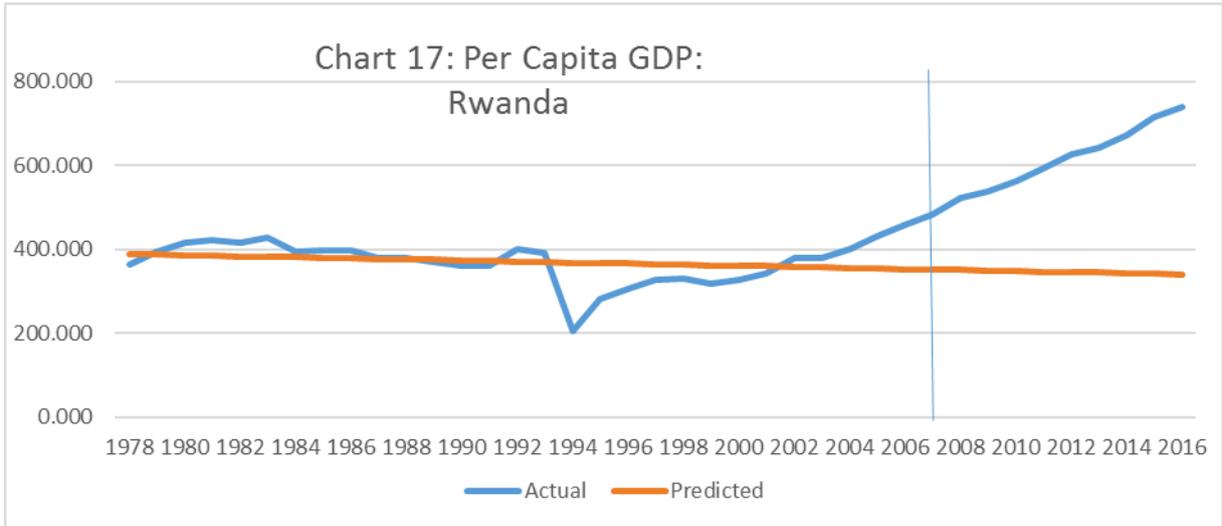






Charts 15 through 18 display the evolution of the imputed residuals for EAC countries. Two countries, Kenya and Uganda, joined EAC in July 2000, and two others, Rwanda and Burundi, acceded in July 2007. Kenya took four years and Uganda one year to show an upturn and start benefitting from the RIA but, once the imputed residual turned positive, it increased fast almost in a straight line as can be seen from the difference between Actual and Predicted Per Capita GDP starting in 2004 for Kenya and 2001 for Uganda. The new entrants, Burundi and Rwanda, recorded an even faster economic gain following their accession in 2007, their respective imputed residuals growing linearly, albeit with a little drop following the political crisis that has afflicted the former over the last three years. It is noteworthy that Rwanda began a fast increasing imputed residual immediately after its civil war in 1994 and kept the same pace after joining EAC, which raises the question of the relative role of the RIA in its Per Capita GDP growth relative to its own efforts, a topic for another study.





Conclusion

The present study sought to answer two questions regarding the economic value of regional integration in Africa. First, do African countries gain from Regional Integration Arrangements (RIA) of which they are members and what is the size of that gain? Second, how fast does the gain materialize after accession to RIA membership? The three sub-regions with the most advanced integrative agendas, UEMOA, CEMAC and EAC, were sampled. The residual imputation technique was used to compute the gain. Out of the 18 countries included in the study, 14 recorded a significant economic gain, which represented a sizable percentage of their actual Per Capita GDP after inception of the RIA. Except for Guinea Bissau that experienced a civil war immediately after it joined UEMOA, all the UEMOA and EAC countries gained from regional integration. For CEMAC, only three out of six countries benefitted from RIA although the reform measures were identical and adopted simultaneously with UEMOA. This result leads to the question whether those reforms were more attuned to the economies of the UEMOA sub-region than to those of CEMAC.

With respect to the speed of the economic gain, most UEMOAS countries had an immediate reaction, within a year or two, to the RIA enactment and benefitted from that new source of growth for a sustained period. Benin, Burkina Faso, Mali and Senegal had the fastest reactive gains. The speed of the gain was more modest for CEMAC countries and, except for Chad and Equatorial Guinea that benefitted mostly from a sharp increase in their oil revenues, they did not show immediate economic gains and recorded unchanged Per Capita GDP over several years after inception of the RIA. Accrual of the gain for EAC countries was uniformly immediate, not unlike in the case of UEMOA. The upturn of the Per Capita GDP during the year of accession to EAC membership was significant for all countries while Rwanda maintained previously strong growth well before joining the RIA, in fact immediately after its 1994 civil war.

Results of the present study have given empirical evidence that there is economic value in regional integration in Africa, most sampled countries having benefitted from it in several sub-regions of the Continent. However, several questions remain unanswered. First, considering eq. (3), what factors are the main determinants of the economic gain that arises from regional integration? Second, why did some countries that had no specific adverse shock such as civil war fail to benefit from regional integration? Third, would more advanced integrative agendas yield higher gains for participating countries? Finally, would alternative measurement techniques give results that differ from the ones obtained through residual imputation? Clearly, investigation of the economic value of regional integration in Africa is of significant interest and calls for more studies.

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