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WHO IN THE WORLD CAN AFRICA CATCH-UP TO? EVIDENCE FROM INCOME CONVERGENCE ANALYSIS

ABSTRACT

This study investigates the convergence hypothesis in African countries motivated by the increasing interest to measure disparities in establishing an economic union. The objective of this study is to provide an analysis of convergence in Africa by looking at the African Continental Free Trade Agreement (AfCFTA) against 6 of its top trading partner groups, APTA, NAFTA, MERCOSUR, ASEAN, EU, and G20. This study seeks to establish whether Africa converges toward the growth rates of its more developed trading partners. The data sample spans from 1971-2020. The method of analysis employed in this study is the Fractional Frequency Flexible Fourier Function (FFFFF) unit root tests to account for different forms of nonlinearities and unobserved structural breaks. The preliminary analysis using linear and nonlinear unit root tests reveals inconclusive results, with convergence being found for the African continent as a whole and not for sub-groups. However, in applying the more powerful FFFFF, we find more consistent results indicating convergence both at the continental and regional levels. We, therefore, conclude that Africa exhibits strong catch-up effects towards its major trading partners, and the AfCFTA should focus on strengthening economic ties with international trading blocs.

Keywords: Convergence; African Continental Free Trade Agreement (AfCFTA); Economic Growth; Fractional Frequency Flexible Fourier Function (FFFFF) Unit Root Test; Asymmetries; Unobserved Structural Breaks
JEL Classification: C22; C51; C52; O47

RIASSUNTO

Con chi può stare al passo l'Africa? Evidenze da un'analisi convergente del reddito

Questo articolo esamina l'ipotesi di convergenza nei paesi africani motivata dal crescente interesse verso la misurazione delle disparità nello stabilire un'unione economica. Il fine è

quello di fornire un'analisi di convergenza in Africa tramite il confronto dell'accordo AfCFTA con i primi suoi sei partner commerciali: APTA, NAFTA, MERCOSUR, ASEAN, EU e G20. Questo articolo tenta di stabilire se l'Africa tende verso i tassi di crescita dei suoi partner commerciali maggiormente sviluppati. Il campione copre il periodo 1971-2020. Il metodo di analisi impiegato è il test di integrazione Fractional Frequency Flexible Fourier Function (FFFFF), test che permette di considerare forme differenti di non-linearità e break strutturali non notati. L'analisi preliminare tramite l'uso di test a radice unitaria lineare e non-lineare mostra risultati inconclusivi, essendo la convergenza trovata riferita all'Africa come continente e non ai sotto-gruppi di paesi. Applicando il test FFFFF, invece, troviamo risultati più consistenti che indicano convergenza sia a livello continentale che regionale. Pertanto, si evince che l'Africa converge verso i suoi maggiori partner commerciali e che l'AfCFTA dovrebbe concentrarsi sul rafforzamento degli accordi commerciali con i blocchi internazionali.

1. Introduction

Economic growth is an important indicator of human development and the overall well-being of society (Mankiw, 2003). It is for this reason that economists and researchers alike have spent decades studying the factors behind the economic differences between countries. This forms the basis behind the theory of economic growth convergence or the 'catch-up' effect, which presumes that as poor nations move towards the technological advancement of high-income countries and become susceptible to international markets, their *per capita* GDP tends to grow faster than the rich countries and they converge towards these countries. This idea is supported by the neoclassical Solow model, which predicts that long-run economic growth depends on reducing the population growth rate, encouraging saving, and promoting technological advancement and capital accumulation (Liu, 2007).

Trade is perceived as being directly responsible for the accelerated growth and resulting catch-up effects in many regions worldwide, including Asia, Europe and South America (UNCTAD, 2005; Malefane and Odhiambo, 2018). Thus, the African Continental Free Trade Agreement (AfCFTA) is Africa's biggest effort to enhance its position in the global trading landscape. The AfCFTA was created to provide a mutually beneficial trade environment free of restrictions for member states and is expected to increase the competitiveness of African industrial products, offer a wider variety of goods and services for consumers, boost employment opportunities,

encourage better allocation of resources, and reduce the susceptibility of countries to external shocks associated to trade by reducing the trade balance deficits of member countries (UNCTAD, 2005). Economists and policymakers have dubbed the AfCFTA an opportunity for a competitive continental market that could lead to an increase in the GDP growth rate of Africa and improve the standard of living of the population at large. However, one criticism of the agreement is its exclusive focus on strengthening intra-relations amongst African countries whilst seeking to weaken its ties and dependency on more advanced economies. If conventional theory is correct and developing countries tend to converge towards their industrialised counterparts over the steady state, then African countries can benefit from strengthening economic ties with these trading partners.

In this paper, we will examine growth convergence between the incoming African Continental Free Trade (AfCFTA) and Africa's biggest international trading partners to establish whether Africa converges towards a mutual steady state with its more developed and industrialised trading partners. For analytical purposes, this paper classifies each of the trading partners according to their economic unions, namely, the Asia-Pacific Trade Agreement (APTA), North American Free Trade Area (NAFTA), Southern Common Market (MERCOSUR), Association of Southeast Asian Nations (ASEAN), the European Union (EU), and the G20. The theory behind the strategy used in this research proposes that different groups converge towards a common steady state if the difference between their GDP is stationary over time. To this end, our study uses the Fractional Frequency Flexible Fourier Function (FFFFF) unit root testing procedure of Omay (2015) for empirical purposes.

The contribution of our study to literature is two-fold. Firstly, in differing from previous studies, our study uses robust unit root tests, which are robust to nonlinearities and unobserved structural breaks commonly observed in time series variables. Secondly, and to the best of our knowledge, this study is the first to examine the convergence between Africa and other world regions. To ensure the robustness of our analysis, we further group our African sample into sub-group for regional analysis.

The rest of the study is structured as follows. The following section provides a literature review. Section 3 presents the methodology; section 4 provides the results, whilst section 5 concludes the study.

2. LITERATURE REVIEW

The theory of convergence provides a link between economic development and societal change. Some economists believe that for convergence to occur, countries must possess the necessary social capabilities, such as participating in global markets, technological innovation, and attracting capital for them to benefit from catch-up growth. According to Abramovitz (1986), these prerequisites explain why divergence still exists in the world today and what separates developed nations from developing nations. It follows that higher productivity can generate higher returns to capital, and an opportunity for catching up to higher-income countries may arise. The catch-up process continues if developing nations can adopt the growth-inducing methods of developed economies and will only stop when the knowledge gap between the two narrows down. The analysis for this has been divided between the neoclassical growth theory, according to which growth is due to exogenous technological advances. Critics of this theory and advocates of the new growth theory state that endogenous factors play a more significant role in economic growth (Sokoloff and Engerman, 2000) and the associated assumption that countries use the same production function is unrealistic in that it ignores international and structural differences in terms of inputs and processes used in production. Secondly, the supposed conditional convergence in per capita growth rates does not hold over long periods across nations (McCallum, 1995). This has been refuted in the works of Barro (1991) and Quah (1996).

According to Jahan (2013), the basic hypothesis remains that convergence depends on exogenous technological change, perfectly competitive markets, and similar technology throughout. Therefore, any failure of convergence to hold is a result of the breakdown of this criterion. Many researchers have conducted empirical studies looking at growth convergence internationally and within the realm of Africa using several different approaches. Mendes (1987) states that studies on the idea of convergence can be classified as ones that suggest that integration induces increased inequalities between nations, ones that claim that integration reduces inequalities among countries, and ones being inconclusive. The reason for conflicting results is the difficulty of the research question and the different methodologies of analysis. Conventional unit root tests, for example, fail to account for structural breaks and nonlinearity. As our study is unit root based, we limit the discussion of the literature review to unit root-based studies.

We note that much of the research on the convergence hypothesis is predominantly conducted

within the realm of developed countries, which may exhibit differing traits from the less developed countries of Africa. Carmignani (2007) examines *per capita* income in regional integration initiatives using panel unit root testing procedures. The study entails 28 groupings and a sample of more than 100 countries with data from 1964-2004. The study finds convergence effects in the Caribbean Community (CARICOM), Cross Border Initiative (CBI) in Eastern and Southern countries, Central European Free Trade Agreement (CEFTA), and MERCOSUR. It is also noted that cross-country convergence appears to occur at a rather flat regional growth trend. Whilst there appears to be a South-South regional integration agreement convergence towards the regional average, the regional average fails to catch up to that of industrialised countries.

King and Ramlogan-Dobson (2014) examine the hypothesis of income convergence for 24 OECD countries using *per capita* GDP data from 1950-2008 and Fourier-based unit root tests and find that the countries follow a nonlinear underlying growth path and show relative convergence relative to the United States over the post-war era as a result of post-war reconstruction. However, the authors assert that these results do not indicate the current catch-up position among these countries. This is consistent with the finding of Bahmani-Oskooee *et al.* (2018), who alludes that negative shocks due to World wars I and II and subsequent events may have transitory or permanent effects in different countries. King and Ramlogan-Dobson (2016), Furuoka *et al.* (2018), and Yaya *et al.* (2020) examine convergence in Latin America, ASEAN-5, and Asian countries, respectively, using Fourier tests. King and Ramlogan-Dobson (2016) test income convergence in Latin American countries relative to the United States using data from 1950-2009 and find that Latin American countries exhibit convergence towards the income of the United States. Furuoka *et al.* (2018) examined income convergence in five member states of ASEAN using data from 1960-2015 and found evidence of convergence only between Malaysia and Indonesia. Finally, Yaya *et al.* (2020) test for convergence in nine Asian economies with data from 1967-2017 and find greater income convergence in South Asia, where there are minimal income inequality issues and weak evidence of convergence in Northeast Asia and Southeast Asia regions characterise the region.

McCoskey (2002) examines the idea of convergence and convergence clubs in Africa using panel unit root tests following the methodology of Im *et al.* (1997) and panel cointegration tests. The data set spans from 1960-1990 for the countries Ivory Coast, Kenya, Malawi, Mauritius, Nigeria,

and South Africa. In the ADF and panel unit root tests, the null hypothesis of nonstationary is rarely rejected. In the case of cointegration tests, there is no evidence of a long-run relationship between the clubs, except for South Africa. The study further explores the idea in the SACU and SADC economic communities, finding no evidence of convergence. Anoruo (2019) uses panel convergence to study convergence in income *per capita* among ECOWAS member states over three sample periods, pre- and post-ECOWAS, and for the full period. The results indicate that none of the countries have converged to a steady state in any of the periods due to the union's lack of proactive economic policy coordination.

Phiri (2018a) investigates income convergence in Eswatini relative to the country's top five trading partners, South Africa, the United States, EU-28, Japan, and China. The study uses Dickey-Fuller type tests and FFFFF unit root tests from 1950-2016 and finds no evidence of convergence between Eswatini and the trading partners. In examining convergence in BRICS countries, Phiri (2018b) uses panel data from 1971-2015 and finds convincing evidence of convergence for China and Brazil and weaker evidence in the remaining countries. Finally, Yaya *et al.* (2019) apply flexible Fourier function unit roots to investigate whether West African countries catch up with Nigeria in GDP *per capita* terms. The empirical results show that, while there is relative economic convergence in West Africa, only Ghana is likely to converge towards Nigeria. Matonana and Phiri (2020) studied the convergence hypothesis, examining the integration properties between south Africa and her main trading partners, including Belgium, Botswana, China, Germany, India, Japan, Mozambique, Namibia, Netherlands, South Korea, United Arab Emirates (UAE), United Kingdom (UK), United States (US), Zambia and Zimbabwe. The study employs the FFF unit root tests. The results point to convergence between South Africa and Belgium, Botswana, China, Germany, India, Japan, Mozambique, Namibia, Netherlands, South Korea, the UAE, the UK and the US but not with Zambia and Zimbabwe.

More recently, Kapotwe (2021), Nzimande (2021), Garang and Erkekoglu (2021), and Bako Ousmane and Sisman (2022) investigate the convergence phenomenon in Africa. Garang and Erkekoglu (2021) investigate convergence triggers and the formation of convergence clubs in Africa using log for t test, Least Square Dummy Variable Corrected (LSDVC), and Generalized method of moments (GMM) and find that there are four convergence clubs. The first and second group consist of countries characterised by strong institutions while the last two have weaker institutions. The authors contend that sound economic policies that strengthen institutions and

capacity development, promoting skills and knowledge transfer play an important role in growth convergence in Africa. Kapotwe (2021) studies GDP *per capita* convergence in 35 Sub-Saharan Africa countries using a unit root model and finds that six of the sampled countries converge towards the United States of America. Nzimande (2021) instigated income *per capita* convergence in the Southern Africa Development Community (SADC) between 1980-2017 and finds no convergence in the group and proposes that in order to promote convergence, the region needs to implement policies that will boost growth in low income countries. While Bako Ousmane and Sisman (2022) specifically look at structural convergence in African countries over a 25-year period from 1994-2019 and conclude on the existence of structural convergence among African countries.

3. METHODOLOGY

The study borrows the empirical specification from the work of Bernard and Durlauf (1996) and Evans and Karras (1996). Bernard and Durlauf (1996) provide an empirical framework procedure for testing convergence within countries and present two definitions of convergence. Convergence takes the empirical specification:

$$\lim_{i\to\infty} E_t(y_{n,t+i} - \bar{y}_{t+i}) = \mu_n \tag{1}$$

Convergence holds if the series $y_{n,t+i} - \bar{y}_{t+i}$ is a stationary series with an unconditional mean vector μ_n. If the series is integrated of order I(1) or higher, then the initial real *per capita* GDP values affect each other in the long run. Countries converge if *per capita* GDP approaches constant values as *i* approaches infinity in a limiting stochastic process.

For robustness' sake, we apply the more powerful Fourier-based unit root tests, which can capture different forms of asymmetries and unobserved structural breaks in the data. We follow Christopoulos and León-Ledesma (2010) and Enders and Lee (2012) by specifying the following DF-type regression in which the deterministic term, *d(t)*, is a time-dependent function:

$$q_t = d(t) + \gamma q_{t-1} + \lambda_t + \sum_{p=1}^{n-1} \alpha_p \Delta q_{t-p} + \varepsilon_t. \tag{2}$$

Where the initial value of y_t, that is y_0, is assumed to be a fixed value. Note from equation (6), that if the functional form of $d(t)$ is unknown, then the unit root test hypothesis (i.e. γ =1) is

misidentified. In such a case, Enders and Lee (2012) propose that the deterministic term, *d(t)* be approximated by employing the following Fourier expansion:

$$d(t) = \alpha_0 + \sum_{k=1}^{n} \alpha_k \sin\{\frac{2\pi kt}{T}\} + \sum_{k=1}^{n} \beta_k \cos\{\frac{2\pi kt}{T}\}; \quad n \leq T/2 \tag{3}$$

Where *n* is the number of frequencies and *k* is the frequency component. To avoid problems of overfitting and to allow for the gradual evolution of the nonlinear trend, Enders and Lee (2012) restrict the n=1, such that equation (3) can be represented as the following single frequency Fourier function:

$$d(t) = \alpha_0 + \alpha_k \sin\left\{\frac{2\pi kt}{T}\right\} + \beta_k \cos\left\{\frac{2\pi kt}{T}\right\} \tag{4}$$

And the integer frequency Fourier form (IFFFF) unit root testing procedure can be specified as:

$$\Delta q_t = \rho\, q_{t-1} + c_1 + c_2 t + c_3 \sin\left\{\frac{2\pi kt}{T}\right\} + c_4 \cos\left\{\frac{2\pi kt}{T}\right\} + \sum_{p=1}^{n-1} \alpha_p \Delta q_{t-p} + e_t \tag{5}$$

Omay (2015) proposes the use of fractional single frequency components (k^{fr}) in selecting the optimal Fourier approximation for the unit root test. Pragmatically, the FFFFF-test regression can be specified as:

$$\Delta q_t = \rho\, q_{t-1} + c_1 + c_2 t + c_3 sin\left\{\frac{2\pi k^{fr} t}{T}\right\} + c_4 \cos\left\{\frac{2\pi k^{fr} t}{T}\right\} + \sum_{p=1}^{n-1} \alpha_p \Delta q_{t-p} + e_t \tag{6}$$

Where the best fitting fractional single frequency (k^{fr}), is obtained by performing a grid search between the intervals $0.1 \leq k^{fr} \leq 2$, using progressive increments of 0.1, 0.01 and 0.001. From equations (9) and (10), the unit root null hypothesis (and hence the PPP hypothesis) can be tested as $\rho = 0$. The computational procedure for carrying out the Fourier-based tests is outlined as follows:

Step 1: Perform a two-dimension grid search to find the optimal frequency values and regression lag lengths, which conjointly minimise the sum of squared residuals (SSR).

Step 2: Once the optimal frequency k* and lag length p, then we estimate the t-statistic testing the null hypothesis $\rho = 0$, which we denote as τ^{fr}_{DF} for the FFFFF test. The test statistics are evaluated against the critical values reported in Enders and Lee (2012) and Omay (2015).

Step 3: Perform an F-test for the null hypothesis $c_3 = c_4 = 0$ to examine the significance of the Fourier terms using an F-statistic denoted $F(\hat{k})$. If the null hypothesis cannot be rejected, then

the conventional ADF test is a more appropriate test for unit roots. Since the test is non-standard, Enders and Lee (2012) and Omay (2015) construct appropriate critical values for the FFFFF unit root tests, respectively.

4. DATA AND EMPIRICAL ANALYSIS

The study uses secondary data from the United Nations Conference on Trade and Development (UNCTAD) database covering the period 1971-2020. The dataset consists of 54 African Countries that belong to the AfCFTA and 57 non-African countries classified into six regional economic trade groups, Asia-Pacific Trade Agreement (APTA), North American Free Trade Area (NAFTA) Southern Common Market (MERCOSUR), Association of Southeast Asian Nations (ASEAN), European Union (EU28), and G20.

Our analysis begins with a collection of annual GDP *per capita* data for all 54 African countries from the World Bank Development Indicators. Table 1 provides the average GDP *per capita* and average GDP *per capita* growth to show the dynamics of GDP *per capita* in our African dataset over the past five decades; 1970s, 1980s, 1990s, 2000s, 2010s-2020. The results indicate that Libya, Seychelles, Gabon, Lebanon, South Africa, and Mauritius have the highest GDP *per capita* levels, while Malawi, Burundi, Ethiopia, Burkina Faso, Mozambique, and Chad have the lowest levels across the five decades. Equitorial Guinea, Lebanon, Botswana, Tunisia, Eswatini, Cabo Verde, and Egypt show the most growth consistency over the five decades.

We observe growth dispersion in average GDP *per capita* from 1771.75 in the 1970s to 2795.54 in the 2010-2020 period, indicating unequal growth distribution among African countries. The dispersion in average GDP *per capita* growth shows a steady increase from 3,15% in the 1970s to 4.43% in the period of 2010-2020. This indicates a divergence among African countries. This is consistent with the findings of Ranjbar *et al.* (2014), who find sigma divergence in Africa's growth.

TABLE 1 - *GDP per capita over Five Decades*

Country	Average GDP per capita (Constant)					Average GDP per capita growth %				
	1970s	1980s	1990s	2000s	2010s-2020	1970s	1980s	1990s	2000s	2010s-2020
Algeria	2871,30	3333,37	2970,75	3592,06	4090,06	5,89	1,78	2,35	2,65	1,35
Angola	..	2442,81	1825,53	2374,92	2895,55	..	1,48	6,54	7,66	1,92
Benin	715,92	776,67	806,55	934,72	1051,74	2,57	4,12	2,41	1,72	2,57
Botswana	1459,96	2702,92	4316,23	5315,69	6006,95	10,44	7,35	3,69	3,11	4,43
Burkina Faso	296,01	330,27	372,10	488,02	642,92	2,87	4,29	4,41	2,80	2,95
Burundi	355,03	394,71	380,93	302,65	288,12	5,46	4,22	2,38	1,23	0,73
Cabo Verde	..	669,11	1130,23	2290,80	2976,53	..	4,37	9,80	6,59	2,86
Cameroon	1084,42	1601,12	1132,93	1228,54	1375,86	7,40	5,88	1,41	1,96	1,31
Central African Republic	582,26	564,54	473,85	452,24	404,22	2,77	4,00	2,19	3,14	2,38
Chad	459,07	401,29	413,92	562,60	706,22	2,72	6,58	4,28	10,71	5,01
Comoros	..	1262,80	1144,58	1218,18	1335,11	..	2,01	2,44	1,73	1,62
Congo, Dem. Rep.	1218,14	967,72	529,92	349,95	457,79	2,93	2,06	..	2,80	3,14
Congo, Rep.	1573,42	2486,84	2167,70	2099,15	2126,45	5,04	11,79	1,43	3,40	5,53
Cote d'Ivoire	2644,23	2236,46	1801,50	1588,63	1929,91	4,67	0,91	3,53	1,34	5,19
Djibouti	..	..	..	..	2546,64	..	..	..	..	4,49
Egypt, Arab Rep.	1116,27	1734,49	2144,11	2770,32	3458,38	4,47	3,86	2,54	2,89	2,35
Equatorial Guinea	..	436,05	1267,66	9801,70	9573,91	..	2,49	37,88	17,78	2,86
Eritrea	..	..	762,81	755,77	680,49	..	..	7,74	2,35	3,39
Eswatini	1168,63	1507,60	2233,61	2748,11	3533,50	6,54	6,46	3,76	2,90	1,99
Ethiopia	..	289,48	247,50	312,04	629,63	..	7,35	5,75	7,09	6,49
Gabon	9576,36	8683,43	8466,02	7067,34	6857,32	18,45	5,03	1,91	2,78	1,95
Gambia, The	620,52	671,26	641,88	664,11	635,96	4,22	2,47	1,91	3,26	2,63
Ghana	1038,98	796,42	928,76	1139,18	1732,84	3,79	3,17	1,77	2,63	4,81
Guinea	..	535,73	574,72	657,37	805,68	..	1,83	1,62	1,94	3,36
Guinea-Bissau	608,32	579,76	667,90	550,71	596,71	3,88	5,36	3,85	1,08	2,89
Kenya	1121,64	1242,21	1238,22	1224,97	1494,96	6,69	1,70	1,03	2,14	2,62
Lebanon	..	3074,84	5140,73	6824,84	7753,88	..	..	14,38	4,48	3,75
Lesotho	385,68	470,56	636,04	838,01	1033,19	10,24	3,29	3,14	3,53	2,82
Liberia	..	..	..	626,29	1248,98	..	..	..	2,05	3,64
Libya	..	..	10979,98	12088,34	8857,37	..	..	..	5,15	34,16
Madagascar	743,83	571,50	478,37	465,19	453,38	3,78	0,79	0,70	2,93	0,92
Malawi	281,00	266,64	264,17	294,83	406,87	4,32	0,99	5,23	3,48	2,04

TABLE 1 – *continued*

Country	Average GDP per capita (Constant)					Average GDP per capita growth %				
	1970s	1980s	1990s	2000s	2010s-2020	1970s	1980s	1990s	2000s	2010s-2020
Mali	405,38	441,57	514,08	650,68	805,59	6,51	6,69	3,90	3,56	2,30
Mauritania	1645,50	1484,43	1364,74	1374,18	2252,03	5,35	1,07	2,63	7,25	1,98
Mauritius	2538,00	2848,16	4542,16	6542,21	8845,34	3,01	5,62	4,00	3,83	3,60
Morocco	1026,47	1255,93	1559,16	1999,19	2703,39	3,65	4,58	6,46	3,40	4,33
Mozambique	__	204,79	235,88	385,81	891,76	__	7,72	6,36	5,44	2,78
Namibia	__	3278,82	2977,72	3565,35	4264,70	__	0,89	1,84	3,79	3,64
Niger	623,38	526,53	424,71	406,82	652,17	5,56	3,79	6,32	2,91	2,62
Nigeria	2156,25	1586,07	1501,35	1882,03	2383,96	5,20	2,32	2,58	4,82	2,73
Rwanda	341,30	410,24	311,24	443,89	804,28	7,78	2,19	18,04	6,59	4,26
Sao Tome and Principe	__	__	__	1204,65	1528,37	__	__	__	2,81	2,34
Senegal	1026,65	1055,66	1000,33	1121,94	2548,19	3,95	1,92	2,71	1,41	2,74
Seychelles	5487,98	6841,07	9700,10	11213,06	13639,94	10,67	5,95	5,56	6,53	3,59
Sierra Leone	630,79	623,58	452,00	458,50	602,76	1,25	2,47	1,15	4,92	5,21
South Africa	5218,46	5119,09	4460,74	5390,38	6150,00	1,49	2,34	1,60	3,17	1,15
South Sudan	__	__	__	2292,46	1483,70	__	__	__	0,43	3,87
Sudan	1324,80	1270,30	1560,01	2160,12	2161,55	8,42	5,86	4,74	2,75	2,32
Tanzania	__	514,54	524,61	659,21	927,50	__	1,01	1,97	3,51	3,08
Togo	563,39	544,85	487,80	474,72	553,88	3,53	4,06	8,30	2,22	3,07
Tunisia	1577,00	1959,87	2351,91	3260,07	3917,24	5,62	3,28	3,31	3,34	1,41
Uganda	__	349,20	430,75	613,93	858,11	__	2,96	4,00	4,42	2,38
Zambia	1217,61	984,29	822,55	941,60	1283,92	4,25	2,13	2,28	3,40	2,19
Zimbabwe	1586,84	1548,47	1663,11	1224,88	1347,55	3,87	4,71	4,40	5,83	8,74
Average standard deviation of African countries' GDP per capita	1771,75	1663,90	2323,24	2747,75	2795,54	3,15	2,28	5,81	2,72	4,43

"__" indicates lack of data during the period for the respective country.

Our empirical data is created by subtracting the GDP *per capita* of each international trade group from that of Africa, represented by the AfCFTA. The resulting descriptive statistics are given in Table 2, and their time series plots are presented in Figure 1. From Table 2, positive averages of GDP *per capita* differences between Africa and its subregions and the international

trade groups can be observed apart from North Africa and NAFTA, North Africa and MERCOSUR, and West Africa and MERCOSUR. This indicates that NAFTA has a higher *per capita* GDP average than Northern Africa, as does MERCOSUR to North Africa and West Africa. There is a large dispersion in the GDP *per capita* differences between Central Africa and the international trade groups. We also note that most time series are not normally distributed hence providing some preliminary evidence of nonlinear features in the series. In visually scrutinising the time series plots presented in Figure 1, there is little evidence to suggest that the variables evolve in a symmetric manner.

TABLE 2 - *Descriptive Statistics of GDP per capita Differences*

Series/Group	Mean	Median	Maximum	Minimum	Std. Dev	Jarque-Bera	Probability
AFR/APTA	5.07	5.48	10.96	-3.23	3.13	6.78	0.03
NOR/APTA	4.20	4.38	14.27	-9.72	4.52	14.02	0.00
EAS/APTA	4.68	4.72	11.64	-2.92	2.89	0.72	0.70
SOU/APTA	5.37	5.57	12.21	-2.41	3.12	0.39	0.82
CEN/APTA	6.09	5.83	22.82	-2.28	4.55	21.45	0.00
WES/APTA	4.51	5.01	15.57	-5.91	4.39	2.33	0.31
AFR/NAFTA	0.84	1.23	5.23	-5.32	2.55	1.51	0.47
NOR/NAFTA	-0.04	-0.03	8.07	-7.46	3.76	0.38	0.83
EAS/NAFTA	0.45	0.39	8.29	-8.02	3.07	0.23	0.89
SOU/NAFTA	1.13	1.11	6.85	-4.55	2.71	0.21	0.90
CEN/NAFTA	1.86	2.07	16.18	-5.54	4.51	4.03	0.13
WES/NAFTA	0.27	0.51	10.23	-11.09	4.02	1.35	0.51
AFR/MERC	0.47	0.99	6.73	-5.83	3.07	1.53	0.46
NOR/MERC	-0.40	-0.79	10.51	-7.81	4.27	4.74	0.09
EAS/MERC	0.08	0.36	8.67	-7.37	3.77	1.29	0.53
SOU/MERC	0.77	0.43	7.31	-8.33	3.27	0.18	0.91
CEN/MERC	1.49	1.06	17.15	-7.04	4.44	10.74	0.00
WES/MERC	-0.09	0.60	7.13	-13.87	4.13	7.51	0.02
AFR/ASEAN	3.01	3.29	8.42	-9.78	2.94	87.05	0.00
NOR/ASEAN	2.13	2.17	10.85	-11.57	4.14	4.91	0.09

TABLE 2 – *continued*

Series/Group	Mean	Median	Maximum	Minimum	Std. Dev	Jarque-Bera	Probability
EAS/ASEAN	2.62	2.39	8.65	-9.57	3.16	27.11	0.00
SOU/ASEAN	3.30	3.47	9.22	-821	2.99	23.68	0.00
CEN/ASEAN	4.03	3.48	20.2	-10.22	4.95	8.94	0.01
WES/ASEAN	2.44	2.39	11.74	-10.15	4.17	10.42	0.01
AFR/EU	1.05	1.65	4.53	-5.48	2.15	7.17	0.03
NOR/EU	0.17	0.35	8.73	-9.42	3.53	0.82	0.66
EAS/EU	0.66	1.15	6.23	-8.91	2.81	7.73	0.02
SOU/EU	1.34	1.68	6.11	-2.84	2.42	1.99	0.37
CEN/EU	2.07	0.96	14.07	-4.81	4.10	1.05	0.59
WES/EU	0.48	0.73	9.49	-10.77	3.77	2.50	0.29
AFR/G20	0.87	1.34	3.97	-4.33	1.89	5.12	0.08
NOR/G20	0.10	0.25	9.44	-7.36	3.49	0.65	0.72
EAS/G20	0.58	0.30	5.87	-7.09	2.34	3.44	0.18
SOU/G20	1.27	1.30	5.74	-3.51	2.13	0.04	0.98
CEN/G20	1.99	1.34	14.85	-3.89	3.95	4.62	0.10
WES/G20	0.41	0.78	8.98	-10.72	3.53	5.16	0.08

FIGURE 1 - *Time Series Plots of GDP per capita Differences between Africa and International Trade Groups*

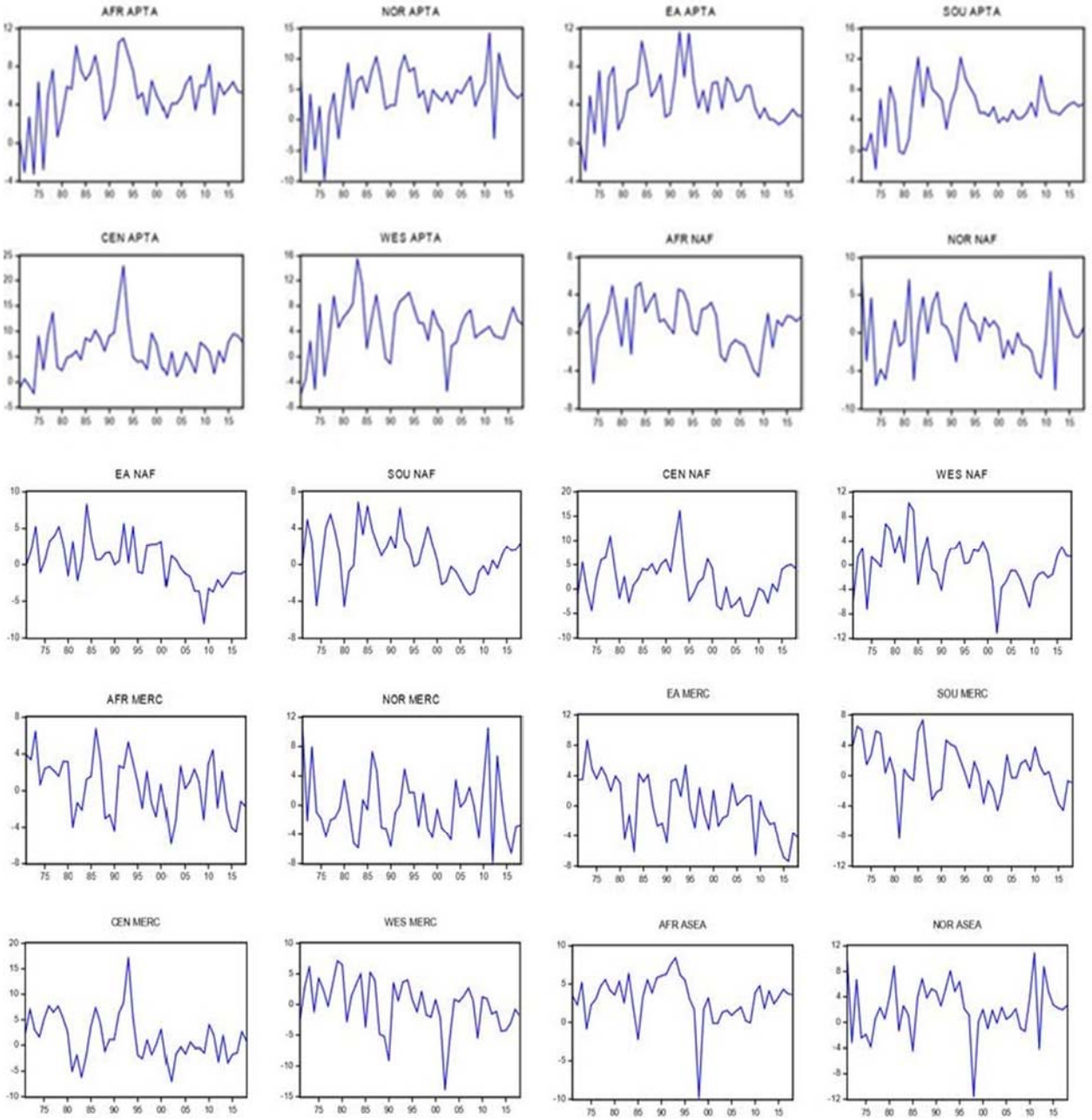
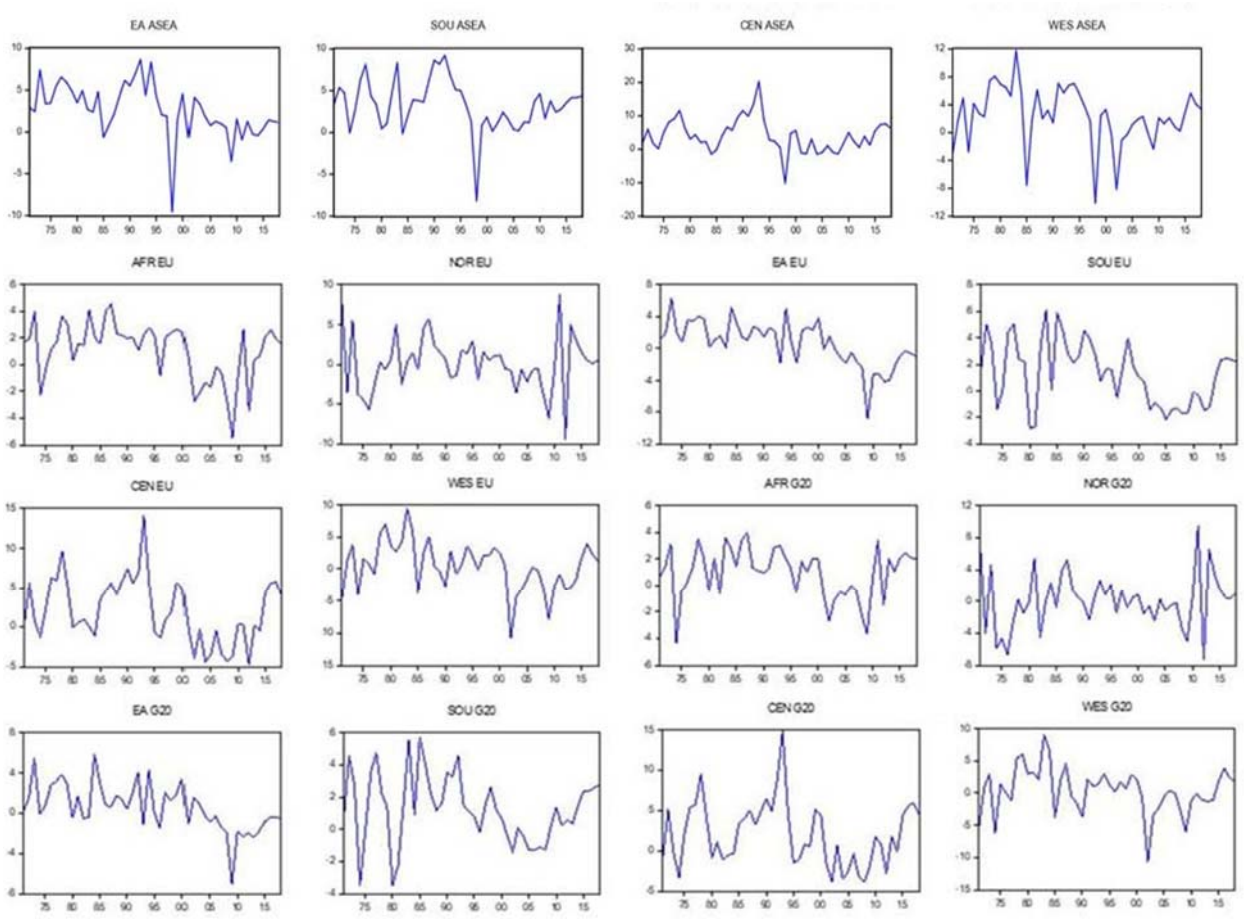


FIGURE 1 – *continued*



We begin our analysis by testing for convergence using two tests, the traditional ADF unit root test and the KSS nonlinear unit root test. From the results reported in Table 3 below, we note that from the ADF test, we find evidence of convergence (i.e. stationary time series) for the African continent as a whole against all international trading groups. In contrast, discrepancies are found for the disaggregated African groups against their international counterparts. The findings from the KSS tests are less encouraging as we only find convergence between the African continent and APTA, NAFTA, and MERCOSUR but not for ASEAN, EU and G20. In contrast, the results from the disaggregated groups are also mixed. Against these inconclusive results, we proceed to our main empirical analysis in which we employ unit root tests which are robust to different forms of asymmetries and structural breaks.

TABLE 3 - *Unit Root without Fourier: ADF and KSS*

Series/Group	**ADF**	**KSS**
AFR/APTA	-2.28**(1)	-3.76***(1)
NOR/APTA	-2.48**(1)	-3.86***(1)
EAS/APTA	-1.38(1)	-2.43**(1)
SOU/APTA	-1.34(1)	-1.97*(1)
CEN/APTA	-3.99***(0)	0.31(3)
WES/APTA	0.53(1)	-1.09(2)
AFR/NAFTA	-4.41***(0)	-1.67*(5)
NOR/NAFTA	-7.48***(0)	-8.17***(0)
EAS/NAFTA	-1.39(1)	-1.53(2)
SOU/NAFTA	0.91(1)	1.43(1)
CEN/NAFTA	-1.34(2)	-3.09***(0)
WES/NAFTA	-4.57***(0)	-3.75***(0)
AFR/MERC	-4.57***(0)	2.63***(7)
NOR/MERC	-7.09***(0)	-7.59***(0)
EAS/MERC	-1.56(1)	-2.11**(1)
SOU/MERC	0.89(1)	-4.08***(0)
CEN/MERC	1.03(1)	-3.15***(0)
WES/MERC	-4.93***(0)	-0.89(3)
AFR/ASEAN	-4.48***(0)	-0.82(1)
NOR/ASEAN	-0.99(1)	-6.23***(0)
EAS/ASEAN	-1.47(1)	-1.44(1)
SOU/ASEAN	-3.85***(0)	-3.54***(0)
CEN/ASEAN	-3.38***(0)	-0.31(1)
WES/ASEAN	-4.90***(0)	-0.88(3)
AFR/EU	-3.97***(0)	-1.58(2)
NOR/EU	1.07(3)	0.58(16)
EAS/EU	-1.66*(1)	-2.58***(2)
SOU/EU	1.05(1)	-0.78(11)
CEN/EU	-0.88(2)	-3.37***(0)
WES/EU	0.54(1)	-3.07***(0)
AFR/G20	-4.84***(0)	-1.53(5)
NOR/G20	-1.03(1)	-8.02***(0)

TABLE 3 – *continued*

Series/Group	**ADF**	**KSS**
EAS/G20	-1.50(1)	-2.20**(2)
SOU/G20	1.36(1)	-0.92(16)
CEN/G20	-1.07(2)	-3.35***(0)
WES/G20	0.49(1)	-2.45**(2)

Notes: "***", "**", "*" denote the 1 percent, 5 percent and 10 percent significance levels, respectively. Optimal lag lengths determined by information criterion are reported in parentheses ().

Considering possible spurious results attained from the conventional tests, we employ Fourier form testing procedures which allow us to detect possible structural breaks and the exact break dates in a time series. In closely following recommendations by Omay (2015), we first start the procedure from the optimal frequency level found in the IFFFF test, which we found to be at k=1 for all SACU countries. Note that these optimal integer frequencies fall within the interval $1 < k < 2$ prescribed by Omay (2015), thus making a re-estimation of the IFFFF regressions unnecessary. We then apply increments of 0.1 to these frequencies and perform a grid search on the resulting fractional frequencies, which fall within an interval of $0.1 < k^{fr} < 1.9$. Once we obtain the optimal value of k^{fr} which minimises the SSR, we repeat the procedure using fractional increments of 0.01 and then finally with increments of 0.001. It is interesting to note that at end of the empirical exercise, we would have obtained optimal frequencies for intervals of $0.001 < k^{fr} < 1.999$, although the step-wise grid search proposed by Omay's (2015) eases the computation burden of running thousands of regressions and allows the econometrician to evaluate the test statistic, τ^{fr}_{DF}, and the F-statistic, $F(\hat{k}^{fr})$, at each stage of the incremental process.

The main FFFFF test results are obtained after using the grid search methodology over fractional increments of 0.1, 0.01 and 0.001, and the results are reported in Table 4. The test statistics produce estimates which reject the unit root null hypothesis at significant levels of at least 5% for all groups except i) CEN/NAFTA ii) NOR/MERC, and iii) NOR/EU, where we do not reject the null hypothesis at all incremental frequencies. Further note that the co-joint test of the significance of the Fourier terms, $F(\hat{k})$, verifies the presence of nonlinearities and unobserved structural breaks existing in the data hence explaining why the ADF and KSS unit root tests produced inconsistent results. Overall, these findings indicate convergence between

African countries and international trading partners and are further compared with results obtained in the previous works of Yaya *et al.* (2020) and Matonana and Phiri (2020), albeit for convergence amongst African countries.

TABLE 4 - *Fractional Frequency Flexible Fourier Function (FFFFF) Unit Root Test: ADF and KSS*

Series/ Group	K	SSR	F($\widehat{k}$)	τ^{fr}_{DF}		
				T-stat	$R2$	DW
AFR/ APTA	2	343.74	8.10	-7.09***(0)	0.59	1.96
	1.5	327.33	11.43	-7.12***(0)	0.57	1.96
	1.53	327.21	11.34	-7.11***(0)	0.57	1.96
	1.523	327.00	11.37	-7.11***(0)	0.57	1.96
NOR/ APTA	2	748.58	23.42	-6.79***(0)	0.50	1.99
	1.9	743.99	22.15	-6.66***(0)	0.49	1.98
	1.93	743.38	22.49	-6.69***(0)	0.50	1.98
	1.927	743.37	22.46	-6.69***(0)	0.50	1.98
EAS/ APTA	1	255.38	13.94	-7.36***(0)	0.57	1.92
	0.9	254.77	14.33	-7.44***(0)	0.57	1.92
	0.91	254.76	14.29	-7.43***(0)	0.57	1.92
	0.913	254.76	14.28	-7.43***(0)	0.57	1.92
SOU/ APTA	2	320.69	8.35	-6.29***(0)	0.55	2.00
	1.6	313.17	8.93	-6.23***(0)	0.53	1.99
	1.57	313.05	8.78	-6.21***(0)	0.53	1.99
	1.565	313.05	8.75	-6.21***(0)	0.53	1.99
CEN/ APTA	2	625.36	3.94	-4.97***(0)	0.50	2.01
	1.5	580.94	6.23	-4.87***(0)	0.48	1.98
	1.49	580.92	6.28	-4.87***(0)	0.48	1.98
	1.489	580.93	6.28	-4.87***(0)	0.48	1.98
WES/ APTA	1	658.32	8.96	-7.20***(0)	0.55	2.00
	0.9	665.75	8.73	-7.20***(0)	0.55	2.00
	0.89	666.34	8.71	-7.20***(0)	0.55	2.00
	0.889	666.39	8.71	-7.20***(0)	0.55	2.00

TABLE 4 – *continued*

Series/ Group	K	SSR	$F(\hat{k})$	τ^{fr}_{DF}		
				τ^{fr}_{DF}	τ^{fr}_{DF}	τ^{fr}_{DF}
AFR/ NAFTA	1	218.30	12.75	-6.66***(0)	0.49	1.99
	0.9	227.01	12.08	-6.68***(0)	0.49	1.99
	0.89	227.80	12.00	-6.67***(0)	0.49	1.99
	0.889	227.88	12.00	-6.67***(0)	0.49	1.99
NOR/ NAFTA	2	551.33	16.41	-5.36***(0)	0.48	1.92
	1.5	485.07	25.69	-6.12***(0)	0.50	1.93
	1.49	485.42	25.53	-6.11***(0)	0.50	1.93
	1.489	485.42	25.52	-6.11***(0)	0.50	1.93
EAS/ NAFTA	1	275.28	15.33	-8.01***(0)	0.51	1.99
	0.8	261.91	17.75	-8.08***(0)	0.50	1.97
	0.77	261.75	17.94	-8.10***(0)	0.50	1.96
	0.768	261.75	17.95	-8.11***(0)	0.50	1.96
SOU/ NAFTA	1	227.32	16.95	-9.14***(0)	0.47	1.95
	0.9	231.95	17.63	-9.24***(0)	0.46	1.94
	0.89	232.39	17.67	-9.24***(0)	0.46	1.94
	0.889	232.43	17.67	-9.24***(0)	0.46	1.94
CEN/ NAFTA	1	578.26	5.69	1.66 (1)	0.46	2.00
	0.9	588.43	5.09	1.66(1)	0.56	2.00
	0.89	589.35	5.04	1.66(1)	0.46	2.00
	0.889	589.44	5.04	1.66(1)	0.46	2.00
WES/ NAFTA	1	507.89	13.30	-7.09***(0)	0.47	1.99
	0.9	519.71	13.61	-7.25***(0)	0.48	1.98
	0.89	520.95	13.59	-7.26***(0)	0.48	1.98
	0.889	521.08	13.59	-7.26***(0)	0.48	1.98
AFR/ MERC	1	262.20	9.56	-7.84***(0)	0.49	1.97
	0.1	344.22	10.38	-7.45***(0)	0.48	1.96
	0.01	344.11	10.38	-7.45***(0)	0.48	1.96
	0.002	344.10	10.38	-7.45***(0)	0.48	1.96

TABLE 4 – *continued*

Series/ Group	K	SSR	$F(\hat{k})$	τ^{fr}_{DF}		
				τ^{fr}_{DF}	τ^{fr}_{DF}	τ^{fr}_{DF}
NOR/ MERC	2	722.55	16.05	0.51(1)	0.52	2.03
	1.9	730.17	15.57	0.45(1)	0.52	2.02
	1.89	730.78	15.52	0.45(1)	0.52	2.02
	1.889	730.83	15.51	0.45(1)	0.52	2.02
EAS/ MERC	2	480.16	6.60	-7.29***(0)	0.54	1.92
	1.7	465.23	7.31	-7.11***(0)	0.53	1.92
	1.76	464.00	7.27	-7.06***(0)	0.53	1.92
	1.762	464.00	7.27	-7.06***(0)	0.53	1.92
SOU/ MERC	1	374.08	5.91	-6.13***(0)	0.49	2.02
	0.1	355.59	7.78	-6.14***(0)	0.47	1.99
	0.01	355.45	7.79	-6.14***(0)	0.47	1.99
	0.002	355.45	7.79	-6.14***(0)	0.47	1.99
CEN/ MERC	1	624.78	5.38	-6.01***(0)	0.46	1.94
	0.1	616.67	4.90	-5.64***(0)	0.45	1.93
	0.11	616.67	4.90	-5.64***(0)	0.45	1.93
	0.101	616.67	4.90	-5.64***(0)	0.45	1.93
WES/ MERC	1	667.56	11.48	-6.63***(0)	0.48	1.98
	0.1	633.11	13.68	-6.55***(0)	0.48	1.98
	0.01	633.10	13.69	-6.55***(0)	0.48	1.98
	0.002	633.10	13.69	-6.55***(0)	0.48	1.98
AFR/ ASEAN	2	322.21	8.89	-6.64***(0)	0.50	1.96
	1.1	316.79	9.07	-6.36***(0)	0.50	1.97
	1.19	311.20	9.46	-6.31***(0)	0.50	1.97
	1.199	310.74	9.49	-6.31***(0)	0.50	1.97
NOR/ ASEAN	2	608.54	28.25	0.67(1)	0.48	1.94
	1.9	605.51	30.45	0.77(1)	0.48	1.95
	1.89	605.57	30.60	0.77(1)	0.48	1.95
	1.899	605.51	30.47	0.77(1)	0.48	1.95

TABLE 4 – *continued*

Series/ Group	K	SSR	$F(\hat{k})$	τ^{fr}_{DF}		
				τ^{fr}_{DF}	τ^{fr}_{DF}	τ^{fr}_{DF}
EAS/ ASEAN	1	334.34	15.21	-9.09***(0)	0.51	1.92
	0.7	325.23	17.94	-9.79***(0)	0.51	1.93
	0.73	325.15	17.91	-9.74***(0)	0.51	1.93
	0.735	325.15	17.90	-9.73***(0)	0.51	1.93
SOU/ ASEAN	2	292.07	7.09	-4.96***(0)	0.48	2.00
	1.9	293.28	7.21	-5.02***(0)	0.48	2.00
	1.99	292.19	7.10	-4.97***(0)	0.48	2.00
	1.999	292.11	7.10	-4.97***(0)	0.48	2.00
CEN/ ASEAN	2	685.68	3.54	-4.29***(0)	0.48	1.94
	1.9	688.04	3.03	-4.28***(0)	0.48	1.94
	1.99	685.88	3.52	-4.29***(0)	0.48	1.94
	1.999	685.70	3.54	-4.29***(0)	0.48	1.94
WES/ ASEAN	1	608.30	33.40	-10.53***(0)	0.49	1.98
	1.2	597.04	26.67	-9.42***(0)	0.48	1.98
	1.16	595.93	27.96	-9.62***(0)	0.48	1.98
	1.159	595.93	27.99	-9.63***(0)	0.48	1.98
AFR/ EU	1	135.57	9.23	-5.55***(0)	0.48	1.97
	0.9	141.65	8.82	-5.59***(0)	0.48	1.96
	0.99	136.18	9.19	-5.55***(0)	0.48	1.96
	0.999	135.63	9.23	-5.55***(0)	0.48	1.97
NOR/ EU	2	474.22	15.67	0.10(1)	0.47	1.91
	1.5	421.06	26.14	-5.16***(0)	0.50	1.90
	1.52	420.89	26.56	0.96(1)	0.54	2.00
	1.522	420.89	26.59	0.86(1)	0.54	2.00
EAS/ EU	1	199.89	12.08	-8.03***(0)	0.52	1.94
	0.7	182.92	15.14	-8.06***(0)	0.50	1.92
	0.68	182.87	15.37	-7.99***(0)	0.50	1.91
	0.676	182.87	15.37	-7.99***(0)	0.50	1.91

TABLE 4 – *continued*

Series/ Group	K	SSR	$F(\widehat{k})$	τ^{fr}_{DF}		
				τ^{fr}_{DF}	τ^{fr}_{DF}	τ^{fr}_{DF}
SOU/ EU	1	173.49	5.25	-4.75***(0)	0.47	1.95
	0.9	176.99	5.27	-4.80***(0)	0.46	1.93
	0.99	173.81	5.25	-4.75***(0)	0.47	1.94
	0.999	173.52	5.25	-4.75***(0)	0.47	1.94
CEN/ EU	1	422.45	5.33	1.42(1)	0.45	2.03
	0.9	429.10	4.88	1.39(1)	0.45	2.03
	0.99	423.14	5.28	1.42(1)	0.45	2.03
	0.999	422.52	5.32	1.42(1)	0.45	2.03
WES/ EU	1	428.75	19.74	-9.81***(0)	0.47	1.97
	0.9	436.46	20.71	-10.16***(0)	0.47	1.97
	0.99	429.34	19.89	-9.86***(0)	0.47	1.97
	0.999	428.81	19.76	-9.82***(0)	0.47	1.97
AFR/ G20	1	134.85	14.01	-6.47***(0)	0.49	1.98
	0.9	140.17	13.78	-6.64***(0)	0.50	1.98
	0.99	135.46	13.99	-6.49***(0)	0.49	1.98
	0.999	134.91	14.00	-6.47***(0)	0.49	1.98
NOR/ G20	2	432.01	19.11	-4.87***(0)	0.48	1.90
	1.7	409.55	27.10	-5.34***(0)	0.50	1.91
	1.74	409.03	26.96	-5.31***(0)	0.50	1.91
	1.739	409.03	26.97	-5.31***(0)	0.50	1.91
EAS/ G20	1	172.41	16.30	-7.65***(0)	0.50	1.94
	0.7	158.88	18.40	-7.40***(0)	0.50	1.91
	0.68	158.86	18.36	-7.40***(0)	0.50	1.91
	0.679	158.86	18.36	-7.39***(0)	0.50	1.91
SOU/ G20	1	158.53	8.88	-6.47***(0)	0.46	1.93
	0.9	161.32	9.40	-6.62***(0)	0.46	1.92
	0.99	158.84	8.93	-6.48***(0)	0.46	1.93
	0.999	158.56	8.88	-6.47***(0)	0.46	1.93

TABLE 4 – *continued*

Series/ Group	K	SSR	$F(\widehat{k})$	τ^{fr}_{DF}		
				τ^{fr}_{DF}	τ^{fr}_{DF}	τ^{fr}_{DF}
CEN/ G20	2	435.75	4.74	1.62(1)	0.47	2.02
	1.9	434.18	4.45	1.57(1)	0.46	2.01
	1.87	434.07	4.36	1.56(1)	0.46	2.00
	1.866	434.07	4.35	1.55(1)	0.46	2.00
WES/ G20	1	421.70	20.72	-9.07***(0)	0.48	1.98
	0.9	431.33	21.13	-9.30***(0)	0.48	1.98
	0.99	422.64	20.83	-9.11***(0)	0.48	1.98
	0.999	421.79	20.73	-9.07***(0)	0.48	1.98

Notes: "***", "**", "*" denote the 1 percent, 5 percent and 10 percent significance levels, respectively.

5. CONCLUSION

Convergence theory presumes that as poor nations move towards the technological advancement of high-income countries and become susceptible to international markets, their *per capita* GDP tends to grow faster than the rich ones, and they converge towards these countries; therefore, all should reach an equal footing eventually. However, the actual process of convergence of these countries is not certain. This study investigated the convergence hypothesis between Africa and its main international trading partner groups over the 1971-2020 period. This study sought to contribute to the convergence hypothesis debate by examining whether Africa and African countries that belong to the African Continental Free Trade Agreement will ever catch up to the growth rate of their more developed trading partners. We use the Fourier form unit root test of Enders and Lee (2012) and Omay (2015) which captures different data dynamics and enables us to identify unspecified smooth structural breaks of unknown form in a time series. We find divergence in African countries between the 1970s and 2000s period when we consider the GDP *per capita* dynamics. However, the divergence observed in African countries can be classified as structural divergence, owing to the numerous periods of turbulence, political instability, social change and post-independence structural issues experienced by many African countries between the 1970s and 2000s period. During this period, most African countries were still in or recovering from the structural relations bound to them by

the regimes which confined their economic structures to either those of Britain, France, Germany, Spain, or Portugal.

The preliminary results of the ADF and KSS tests show some evidence of convergence at a continental level, and yet the results remain mixed at a regional level. However, in using the more powerful FFFFF-based unit root tests, we find evidence of convergence at both continental and regional levels except for the convergence between i) Central Africa and NAFTA ii) North Africa and MERCOSUR and iii) North Africa and the EU. Collectively, we conclude that there is evidence of long-run convergence effects between Africa and its main international trading partners once asymmetries and structural breaks have been considered in the unit root testing procedures. Given these results, we predict a trade-related growth of an integrated Africa and postulate that, under a single economic union, Africa can maximise growth and reap more benefits from trade partnerships with these international groups and advise policymakers to extend the scope of AfCFTA trade activity to strengthen economic ties with international trade partners and not to focus solely on intra-trade relations between African countries. The significance of strong institutions and policies tailored for the development of African economies has been largely stressed in literature as the path that most African countries need to take in order to attract growth.

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