Examining current regional intensity of trade in Africa: How strong are the trade linkages and implications for intra-Africa trade in the African Continental Free Trade Area

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Abstract

The African Continental Free Trade Area (AfCFTA) is a continent-wide free trade area which is expected to pave way for a continental customs union. This article assessed the current state and extent of intra-Africa trade in 2001-2018. The results give insights into the foundation which the current regional economic communities in Africa have put in place regarding intra- and inter-trade linkages. This is a foundation which the AfCFTA would utilise to achieve trade integration in a continent-wide economic integration arrangement that seeks to improve intra-Africa trade. Five regional groups were considered, namely Arab Maghreb Union, East African Community, the Economic Community of West African States, Economic Community of Central Africa States, and the Southern African Development Community. Intra-regional trade intensity index results show that trade within individual regional groups, and within Africa, is oriented towards respective member countries, although there is no evidence of increased inward orientation over time. Inter-regional trade intensity index results show that most regional groups trade intensively with each other, albeit at different levels. With increased market access in the AfCFTA through lower trade resistances between regional groups, inter-regional trade is expected to increase as per the volume of trade criteria in the natural trading partners hypothesis.

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1. Introduction

The African Continental Free Trade Area (AfCFTA) is an initiative by African countries which will pave the way to establish a continental customs union. This initiative is expected to expand intra-African trade through better harmonisation and coordination of trade liberalisation, trade facilitation, and trade instruments across the existing regional economic integration arrangements and across Africa in general. Furthermore, it is expected to enhance competitiveness at the industry and enterprise level through exploitation of opportunities for scale production, continental market access and better allocation of resources (UNCTAD, 2021; World Bank, 2020; South African Revenue Service, 2020; African Union et al., 2020; Traore, 2018).

On 30 May 2019, the AfCFTA entered into force, 30 days after the deposit of the 22nd instrument of ratification, as specified in Article 23 of the Agreement. On 7th October 2022, the AfCFTA Secretariat launched the AfCFTA Guided Trade Initiative to allow commercially meaningful trade under the Agreement to commence for 8 participating countries (Cameroon, Egypt, Ghana, Kenya, Mauritius, Rwanda, Tanzania, and Tunisia). These countries represent five regions of Africa and are being used to pilot

the operational, institutional, legal and trade policy environment under the AfCFTA (Tralac, 2023). From 30 May 2019 when the AfCFTA entered into force to the present, the AfCFTA is barely 5 years old. Therefore, accurately judging its effectiveness and the exact dynamics of trade between countries is currently constrained by this limited timespan of the AfCFTA.

There are 55 countries in Africa, and all are members of the African Union. Each country is a member of at least one of the eight regional groups recognised by the African Union as crucial building blocks to establish the African Economic Community (African Union Commission, 2019; Nagar and Nganje, 2016; African Union Commission et al., 2016). These eight regional groups are the Community of Sahel-Saharan States (CEN-SAD), the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC), the Economic Community of Central African States (ECCAS), the Economic Community of West African States (ECOWAS), the Intergovernmental Authority on Development (IGAD), the Southern African Development Community (SADC), and the Arab Maghreb Union (UMA).

Due to overlapping memberships, only five of the eight regional groups are considered in this research. These are the UMA which has been in place since 1988 and has five members; the EAC which was revived in 2000 and currently has six members; the ECCAS which has been functioning since 1985 and has 11 members; ECOWAS which has been in place since 1975 and has 15 members; and SADC which laid its foundation to focus on trade integration in 2000 and currently has 16 members. Other research like Bouët et al (2017, 2021), and Iapadre & Luchetti (2010) assessed the extent of regional intensity of trade and regional integration in Africa and conducted their respective analyses based on these five regional groups. Together, these five regional integration arrangements contain 49 out of the 55 countries in Africa. The countries that do not belong to any of these five economic integration arrangements are Djibouti, Egypt, Ethiopia, Eritrea, Sao Tome Principe, Somalia, and the Sudan.

2. Theoretical framework

The Natural Trading Partner Hypothesis argues that initial volume of trade and strong trade linkages between prospective member countries is important as noted by Marinov (2014:172), Khadan & Hosein (2013:5), World Trade Organisation & the United Nations Conference on Trade and Development (2012:28), and Shakur & Nees (2011:3078). Therefore, where countries intending to form a free trade area already trade disproportionately among themselves, a free trade area between them would reinforce the existing underlying trade patterns, thus, intra-regional trade is bound to increase upon its formation. Furthermore, the expected welfare benefits would be greater as there would be less scope for welfare reducing trade diversion. Therefore, if the assessment of the current regional intensity of trade in Africa shows high levels of regional trade introversion (i.e., high positive regional trade bias) with strong inter-regional trade links, this would indicate better possibilities for increased intra-African trade with the AfCFTA in place. This is because, in the AfCFTA, trade barriers will be reduced further, therefore enabling (i) easier access to markets for the respective comparative advantage goods, (ii) utilising more fully existing regional value chains and developing dynamic comparative and competitive advantages, and (iii) harnessing new trade opportunities to develop new regional value chains, as countries seek to harness more fully trade complementarities between regions.

One of the first steps to assess trade effects of a regional integration arrangement is to assess the actual intensity of trade among the potential members before the formation of the integration arrangement. Since the AfCFTA is expected to expand intra-African trade, it is important to measure the intensity of trade among the proposed members by assessing the current state and extent of intra-African trade. The results are thus considered as an insight into trade integration and intra-African trade with the AfCFTA in place.

3. Methodology, Techniques and Procedures

Establishing the current regional intensity of trade in Africa was done using inter-regional trade indexes and intra-regional trade indexes. Inter-regional trade intensity was used to examine the extent to which regional integration arrangements in Africa currently trade intensively with each other. Intra-regional trade intensity was used to examine the extent of trade introversion in the regional integration arrangements in Africa, *i.e.*, whether their trade is more oriented towards their respective member countries rather than towards the rest of the world. The results of the assessment of the current regional intensity of trade can be considered as insights into the nature of trade integration and intra-Africa trade with the AfCFTA in place. Computations for the trade intensity indices were done using UNCTAD trade data available at https://unctadstat.unctad.org/EN/

To measure and examine regional intensity of trade in Africa, the *trade introversion index* (TI_i), as noted by Hamanaka (2015:5), Iapadre & Luchetti (2010:4) or the bilateral *revealed trade preference index* (RTP_{ij}) as noted by Iapadre & Tajoli (2013:8) and Iapadre & Tironi (2009:9), was used. This is because the most widely used and well-known bilateral trade intensity index (I_{ij}) (see Appendix 1A) and its variations have some limitations, *viz*. range variability, range asymmetry, and dynamic ambiguity, which must be corrected for.

Range variability arises because the index is not homogeneous across regions as the range of its values and its maximum value are influenced by the size of the partner country (or region). The range symmetry problem arises because the index is asymmetric around the geographic neutrality threshold of 1, resulting in biased assessments of changes in the index, depending on whether such changes occur above or below the geographic neutrality threshold. Dynamic ambiguity occurs when trade bias towards the partner country and the bias towards the rest of the world move in the same direction, thus, the indices will be conveying ambiguous information. The bilateral revealed trade preference index (RTP_{ij}) and the trade introversion index (TI_i) are thus deemed robust and free of all the three limitations because all these limitations are corrected for (Hamanaka, 2015:2, 4-5; Iapadre & Tajoli, 2013:S93, 8; Iapadre & Luchetti, 2010:4-5; Iapadre & Tiron, 2009:7-10; Iapadre, 2006:68-71; Iapadre, 2004:7-9, 11-12, 14).

3.1 Inter-regional trade intensity

The bilateral revealed trade preference index (RTP_{ij}) shows the *relative bilateral trade intensity* between two regions, *i* and *j* (i.e., region *i*'s introversion towards region *j*), and is given by:

$$RTP_{ij} = (HI_{ij} - HE_{ij})/(HI_{ij} + HE_{ij}) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad [1]$$

Where: $-1 \leq RTP_{ij} \leq +1$.

HI_{ij} = *homogeneous bilateral trade intensity index;* HE_{ij} = *extra-regional homogeneous trade intensity* (see Appendix 1B). $RTP_{ij} = -1$ indicates no bilateral trade; $RTP_{ij} = 1$ indicates only bilateral trade (or no extra-regional trade); and $RTP_{ij} = 0$ indicates geographic neutrality (Hamanaka, 2015:2; Iapadre & Tajoli, 2013:8; Iapadre & Luchetti, 2010:5; Iapadre & Tironi, 2009:9). The bilateral RTP, unlike all the other trade intensity indices is perfectly symmetric, as $RTP_{ij} = RTP_{ji}$ independently of country size (Iapadre & Tajoli, 2013:8; Iapadre & Tironi, 2009:9; Iapadre, 2004:12). A higher RTP_{ij} index shows that region **i** and region **j**'s trade is relatively more oriented towards each other than toward the rest of the world. An increase in the RTP_{ij} index over the years shows increased trade orientation between region **i** and region **j** over the years.

3.2 Intra-regional trade intensity

For intra-regional trade, the share of region **i** in region **i**'s total trade is the intra-regional trade share. Since in intra-regional trade, region **i** is the same as region **j**, HI_{ij} and HE_{ij} are adjusted accordingly (see

Appendix 1C). Therefore, for intra-regional trade intensity, Equation 1 is adjusted to obtain the trade introversion index as follows:

$TI_i = (HI_i - HE_i)/(HI_i + HE_i)$ …….. [2]

Where $-1 \leq TI_i \leq +1$

$TI_i = -1$ indicates no intra-regional trade; $TI_i = 1$ indicates only intra-regional trade (or no extra-regional trade); and $TI_i = 0$ indicates geographic neutrality (Hamanaka, 2015:2; Iapadre and Luchetti, 2010:4, 5; Iapadre, 2006:71; Iapadre, 2004:11). A higher trade introversion index shows that the region's trade is relatively more oriented towards its member countries than toward the rest of the world. An increase in the trade introversion index shows evidence of increased inward orientation over the years, thus intra-regional trade is becoming relatively more important than trade flows with the rest of the world.

4. Results and Discussions

The indices were computed for the five regional integration arrangements, i.e., the UMA, the EAC, the ECCAS, ECOWAS and SADC. Some of ECCAS members are also members of EAC and SADC. Therefore, when indices were computed the countries with overlapping memberships were removed from the trade data for ECCAS, and the same was applied for trade data for Tanzania, as it is a member of both SADC and the EAC. The indices were computed for the period 2001-2018 as trade data were available for each regional group for this period. Throughout this period, the country composition of each regional group was kept as it was in 2001, regardless of the actual accession date of each member, to avoid distortions due to changes in the number of member countries. For example, the ECCAS was taken with 9 members and not 10, EAC was taken with 5 members and not the current 6; SADC was taken with 15 members and not the current 16; the UMA has 5 members; and ECOWAS has always had 15 members. Keeping membership constant is consistent with the approach taken by other authors, like Iapadre & Luchetti (2010) who carried out similar work on examining the regional intensity of trade in Africa's regional integration arrangements.

The trade introversion indices computed were used to establish and describe (i) the extent to which each regional group's trade is oriented towards itself (i.e., intra-region orientedness or regional introversion); as well as (ii) trade introversion between regional groups to illustrate the current status of trade linkages between the five regional groups in Africa.

4.1 Intra-regional trade intensity within Africa's regional groups (2001-2018)

Table A-1 (Appendix 2) shows results for the *trade introversion index* (TI_i) for each region, thus showing the extent to which each region's trade is oriented towards itself. The results show that all regional groups (except the UMA) are highly inward looking when it comes to trade (intra-regional orientedness) throughout the period, with no sign of weakening. Comparatively, very high levels of intra-regional orientedness are found in the EAC and SADC, with introversion indexes of $0.98 \leq TI_i \leq 0.99$ and $0.90 \leq TI_i \leq 0.94$, respectively. Although still high, the levels of intra-regional orientedness are lower for ECOWAS and ECCAS with introversion indexes of $0.86 \leq TI_i \leq 0.95$ and $0.61 \leq TI_i \leq 0.83$, respectively. Thus, the EAC and SADC are relatively the most introverted (least extra-regional oriented) followed by ECOWAS. Throughout the period, the UMA is the only regional group that has low to moderate levels of intra-regional orientedness, with introversion indexes of $0.52 \leq TI_i \leq 0.68$, although its intra-regional orientedness seemed to slightly strengthen after 2013 as shown by its introversion indexes of $0.63 \leq TI_i \leq 0.68$. Thus, the UMA is the most extra-region oriented, as shown by the extra-regional homogeneous trade intensity index ($0.978 \leq HE_i \leq 0.984$). These results are consistent with findings by Bouët et al (2021:37-38), Bouët et al (2017:59) and Iapadre & Luchetti (2010:5).

Given African countries' small shares and participation in world trade, intra-regional trade becomes more important, an observation also noted by Bouët et al (2017:55) and Iapadre & Luchetti (2010:3). Iapadre & Luchetti (2010:6) argued that the inability of the sub-Saharan Africa countries to participate successfully in extra-regional trade translated into relatively high trade introversion and that the regional trade introversion was relatively low in the UMA region mainly due to its more intense linkages with the European Union (EU). In their study, the UMA was the only African regional group that had a positive RTP_{ij} index with the EU, i.e. $RTP_{ij} = 0.60$ in 2000 and 0.48 in 2008.

A high trade introversion index can occur despite low intra- and inter-regional trade shares. Table A-2 (Appendix 2) shows that while the regional groups are highly inward looking when it comes to trade, as shown by the index (TI_i), this does not necessarily mean that intra-regional trade is high. Table A-2 (Appendix 2) shows that intra-regional trade share (Si) for each regional group is quite low (i.e., $2.3\% \leq Si \leq 3.2\%$ for the UMA; $10.5\% \leq Si \leq 14.1\%$ for the EAC; $1.5\% \leq Si \leq 3.1\%$ for the ECCAS; $8.1\% \leq Si \leq 11.6\%$ for the ECOWAS; $14.1\% \leq Si \leq 21.1\%$ for SADC; and $11.2\% \leq Si \leq 15.3\%$ for Africa). Similar findings of low intra-regional trade shares (Si) were found by Iapadre & Luchetti (2010) for the African regional groups they considered. Therefore, high trade introversion indexes (TI_i) coupled with the low levels of intra-regional trade (Si) show, as argued by Iapadre & Luchetti (2010:8) that high intra-regional trade preferences, TIi (trade introversion), are not so much the result of deep and successful integration policies, but the unavoidable outcome of problems in extra-regional trade.

Iapadre & Tajoli (2013:S94), Iapadre & Luchetti (2010:8) and Iapadre (2006:81; 2004:18) noted that even if the process of preferential integration was not particularly deep, a high trade introversion, as depicted by a high TIi, could occur due to developing countries' trade opportunities being severely limited by protectionist trade policies in the rest of the world as well as structural problems that may limit the region's members' ability to participate more in the international trade network. Table A-2 (Appendices) shows that regional groups' participation in world trade is very limited, as shown by their share of trade in the rest of the world (Vi) which has continued to be very low at less than 1%. Furthermore, it has also been observed that while traditional trade protection measures such as tariffs and quotas have been declining, these are being replaced by domestic technical regulations that permit countries to bar products from entering their markets if the required standards are not met. Nontariff measures (NTMs), particularly sanitary and phytosanitary measures (SPSs) and technical barriers to trade (TBTs) implemented by developed countries hurt exports from developing countries (Bouët et al., 2017:16; Mutume, 2006; Commission for Africa, 2005). Therefore, with limited market access to international markets, African countries have resorted to looking more to each other for trade than to the rest of the world, thus resulting in a high trade introversion.

An inward looking approach which thus serves to help foster a high trade introversion has been noted among the African integration arrangements through, (i) their resistance to Economic Partnership Agreements with the EU (Lagan, 2019; Ekeke, 2017; Woolfrey & Bilal, 2017; Hurt et al., 2013); (ii) a low degree of overall trade openness as evidenced by relatively low and often decreasing and even negative trade openness indicators (Bouët et al., 2017:5; Iapadre & Luchetti, 2010:9); (iii) Africa's increasing loss of competitiveness relative to the rest of the world, and thus looking inward to regional trading partners (Bouët et al., 2017:5, 51); as well as (iv) the small number of trading partners and the low diversification of products exported to the rest of the world compared to more diversification in intra-African trade (Bouët et al., 2017:5, 51).

Also to note is that where there is a 'hub-and-spoke' regional trade network, the importance of the 'hub' country for the rest of the region (the spokes) is greater than the importance of the spokes to the hub (Iapadre and Tajoli, 2013:S94). In this case therefore, a high trade introversion would emerge as 'the spokes' depend heavily on the hub for trade. This is evident in SADC where South Africa is the hub country (Mutambara, 2013; McCarthy, 1999). Furthermore, as per economic integration theory, trade creation and trade diversion

effects of economic integration foster increased inward-looking regional trade (Appleyard and Field 2017; Lipsey, 1960), and this helps to facilitate high trade introversion. Thus, the forces driving towards global integration can be less strong than the trade-diverting and trade creating effects of regional integration.

4.2 Inter-regional trade intensity between Africa's regional groups (2001-2018)

The results for inter-regional trade intensity (RTP_{ij}) between the five regional groups are presented in Table A-3 (Appendix 2) and show that trade linkages between the regional groups vary with some regions being more closely linked than others. Similar findings were obtained by Iapadre & Luchetti (2010:6) for the period 1990-2008.

The UMA has a negative trade bias (negative trade links) with both the EAC and SADC with $-0.67 \leq RTP_{ij} \leq -0.06$ and $-0.4 \leq RTP_{ij} \leq -0.01$, respectively, while it has positive trade bias towards both ECOWAS and the ECCAS, with $0.45 \leq RTP_{ij} \leq 0.70$ and $0.14 \leq RTP_{ij} \leq 0.53$, respectively. Its trade linkages with ECCAS were strong in the early years, i.e., 2001-2004, weakening thereafter. The UMA's trade linkages with ECOWAS were at their strongest in 2004 and 2005. The UMA had a negative trade bias towards Africa for most of the period. However, in the last few years, it has shown a positive trade bias towards Africa although these trade linkages are very weak as evidenced by the very low indexes of $-0.07 \leq RTP_{ij} \leq 0.15$. Therefore, trade links with regions outside Africa are more important to the UMA.

The EAC, ECCAS and SADC have very strong trade linkages with each other. Furthermore, the EAC and the ECCAS have strong trade linkages with Africa (with $0.55 \leq RTP_{ij} \leq 0.75$ and $0.50 \leq RTP_{ij} \leq 0.64$, respectively) thus reflecting a positive regional bias. However, unlike the EAC and the ECCAS who have strong trade links with Africa, SADC has weak trade links with Africa in general, with $0.14 \leq RTP_{ij} \leq 0.37$. ECOWAS has very strong trade links the ECCAS and SADC (with $0.84 \leq RTP_{ij} \leq 0.98$ and $0.74 \leq RTP_{ij} \leq 0.91$, respectively). However, ECOWAS has very weak and mostly negative trade linkages with the EAC as shown by $-0.4 \leq RTP_{ij} \leq 0.23$, except in 2004 and 2005 where $0.50 \leq RTP_{ij} \leq 0.59$ which shows moderate trade linkages. Its trade links with the Africa are moderate with $0.33 \leq RTP_{ij} \leq 0.59$.

4.3 Implications of trade intensity for intra-Africa trade with the AfCFTA in place

Some regional groups, i.e., SADC-EAC-ECCAS as well as ECCAS-ECOWAS-SADC currently have very strong trade linkages with each other, and as such already trade intensively with each other. Therefore, as per the Natural Trading Partner Hypothesis, the AfCFTA would reinforce and enhance their existing strong trading relations which would strengthen trade between them. With improved market access, logistics and awareness of trade opportunities due to the AfCFTA, these regional groups would be able to examine and explore more fully (i) the regional value chains opportunities already developed in their markets; (ii) developing and harnessing new regional value chains opportunities that may emerge; and (iii) harnessing emerging opportunities for joint production given the overlapping areas of comparative advantage between the regional groups. All this will be in line with Part II Article 3 of the Agreement establishing the AfCFTA.

EAC-ECOWAS currently have weak trade linkages, AMU has negative trade linkages with both the EAC SADC, while the AMU has moderate trade linkages with both the ECCAS and ECOWAS. With the AfCFTA in place and improved market access into each other's markets, these regional groups would be able to investigate and explore (i) trading opportunities to improve trade relations with each other; (ii) opportunities to develop regional value chains between other; and (iii) existing non-tariff barriers between them and how these could be resolved to improve their trade linkages. Improving inter-trade between these regions would have a positive impact on raising intra-Africa trade.

Easier market access in the AfCFTA would help regional groups to focus on utilising the dynamic effects of economic integration. The trade intensity indexes show that a relevant foundation already exists regarding strong trade linkages between most regional groups in Africa. This foundation could be

strengthened and utilised more fully and enhanced by a functioning AfCFTA. Co-ordinating and harmonising tariff and non-tariff systems with a view to establish a seamless continental movement of goods, as per the AfCFTA, would improve intra-Africa trade.

While trade-facilitating measures have been put in place to promote intra-Africa trade, it has been observed that there are other trading costs that slow down trading across borders. United Nations Economic Commission for Africa (2019:22) and Bouët et al (2017:17, 26, 88) observed that trading costs in Africa are still relatively high, with such costs arising mainly from transportation costs due to inadequate and unreliable communication and transport infrastructure; documentary compliance costs; and border compliance cost which arise from inefficiencies in documentary and border compliance procedures in the various regions. Despite the strong trade linkages, such trading and transaction costs would have implications for the accessibility of markets in the AfCFTA.

4.4 Implications of inadequate and unreliable communication and transport infrastructure

It has been argued that when it comes to linking countries, the current transport infrastructure is generally inadequate and falls short. Therefore, investment in infrastructure to ensure better and more efficient infrastructure is needed to increase intra-African trade and support the AfCFTA. To close Africa's huge infrastructure gap, the African Union Commission (2019:12) noted that the Programme for Infrastructure Development in Africa (PIDA) was launched in 2021 to develop a regional and Continental vision, policies, and strategies for infrastructure development. African Union et al (2020:31) observed that strong economic links in trade, finance, production, and social development were dependent on well-designed and well-connected infrastructure, and therefore, strategies to address the infrastructure deficit were urgent.

Table A-4 (Appendix 2) shows that the infrastructure dimension of the African Regional Integration Index has very low scores for the different regional groupings averaging 0.220 in 2019. African Union et al. (2020:31) noted that many countries' score were near zero and the infrastructure of 31 countries was poorly integrated, and that only 11 African countries had infrastructure that was moderately well integrated in their region. Therefore, failing to adequately address the Continent's infrastructure deficit would hamper regional economic and social integration because production would be constrained due to (i) a lack of intermediate inputs and raw materials; (ii) goods would not reach consumers timeously; and (iii) trade and financial activities either within or across borders would be compromised (African Union et al., 2020:18).

The results have shown that trade linkages between some of the regional groups are weak. Therefore, adequate infrastructure is essential to strengthen and to facilitate the current inter-regional trade linkages between regional groups, and thus enhance regional integration as well as to improve inter-regional trade. The UMA has the weakest trade links with the other regional groups, as well as an overall negative trade bias with the African Continent, making the UMA a relatively isolated sub region in Africa compared to the other sub regions. Infrastructure development at a Continental level could benefit this regional group by helping it to connect more easily with the rest of the Continent, because African Union Commission (2019:xiv, 122, 123) noted that the UMA continued to experience limited infrastructure links which have led to persistent high intra-Maghreb transport and communication costs.

The EAC, ECCAS and SADC have very strong trade linkages with each other while ECOWAS, ECCAS and SADC also have very strong trade linkages with each other. Improved and well-developed infrastructure would strengthen further these trade linkages. Furthermore, the linkages could be strengthened by unbundling some of the production from national boundaries and engaging in joint production. However, this would greatly depend on functioning logistics and operational transport infrastructure and foreign direct investment flows to locations with cost advantages; and thus, poor infrastructure would be a major deterrent. Involving the private sector and establishing innovative variants

of public-private partnerships would attract additional private capital and expertise for infrastructure development.

4.5 Implications of free movement of people and skills development

Free movement of people has implications for trading and transaction costs. African Union et al (2020:32) and the United Nations Economic Commission for Africa (2019:33) observed that free movement of people is essential for regional integration and expanding trade. This is because this allows businesses to access a wider pool of labour and thus make production more efficient; and encourages trans-national business activities which makes conducting business much easier. Table A-4 (Appendix 2) shows that while the EAC and ECOWAS have very high scores for the Free movement of people dimension of the African Regional Integration Index, Africa has an average score of 0.441 in 2019. African Union et al (2020:32) and the United Nations Economic Commission for Africa (2019:33) noted that there were great disparities in countries' scores on the free movement of people dimension, with many countries having a score below 0.1. Thus, barriers to the free movement of people continued to act as non-tariff barriers which increased transaction costs.

The ability of labour to move from less productive to more productive industries even across borders would reduce the skill-mismatch. African Union et al (2020:16) suggested that identifying skills gaps and developing cross-border skills enhancement programs would ensure that workers' competencies and capabilities matched current and future technology and production capacities and techniques. Well-skilled people would help countries and regional groups to (i) develop their industrial bases; (ii) develop, harness and benefit from regional value chains; as well as to (iii) benefit from global value chains.

Free movement of people to facilitate movement of labour from less productive to more productive industries and regions within the AfCFTA, would enable regional groups which currently have strong trade linkages (i.e., EAC-SADC-ECCAS; and SADC-ECCAS-ECOWAS) to utilise more fully these linkages as the regions explore to utilise more fully existing regional value chains and new opportunities that would emerge. Therefore, introducing and implementing policy measures to facilitate the free movement of people would help to strengthen and improve both stronger and weaker inter-regional trade linkages to foster intra-Africa trade and help integrate the Continent.

4.6 Implications of functioning financial markets

African Union et al (2020:30), the United Nations Economic Commission for Africa (2019:29) and the African Union Commission (2019:79) noted that without functioning financial markets, trade would be constrained, which maked financial integration an inherent part of trade and regional integration. Table A-4 (Appendix 2) shows that the regional groups have average (or moderate) scores for the Financial and macroeconomic integration dimension ($0.4 \leq$ score ≤ 0.68), except for the EAC which has a high score of 0.79 in 2019. However, African Union et al (2020:30) and African Union Commission (2019:79) also observed that the individual country scores varied greatly, and were mainly driven by exorbitant inflation in some countries. In some countries, the financial sector was stable and solid, but in others, there were low savings rates, underdeveloped bond markets and a limited investor base, the absence of a modernised payment system and the lack of cross-border supervision of financial transactions.

African Union et al (2020:30) recommended that the Continent should prioritise and implement coordinated fiscal and monetary policies to have a stable economic climate, which would in turn attract increased cross-border investment and enhance macroeconomic integration. The United Nations Economic Commission for Africa (2019:29) noted that ensuring functioning financial markets which are well integrated would facilitate less costly cross-border capital flows, help stabilise budget deficits, limit exchange rate volatility and control inflation in a region. Developing and strengthening both local and

regional capital markets would also help to raise funds for the efficient funding of infrastructure, as noted by the African Union Commission (2019:125).

Functioning and well-integrated financial markets would strengthen and facilitate current inter-regional trade linkages and thus the overall intra-Africa trade and trade integration. This is because for trade linkages to harnessing more fully existing trade opportunities and new ones which emerge with improved market access, would require financial and non-financial services of stable financial markets. Furthermore, for current inter-regional trade linkages to be strong enough to consolidate current regional value chains and to develop and harness new regional value chains, financial markets that facilitate monetary policies that promote a stable economic climate are key. This is because this would in turn attract increased cross-border investment to harness regional value chains and enhance macroeconomic integration.

Conclusion

The regional trade introversion indexes show that all regional groups (except the UMA) are highly inward looking when it comes to trade (intra-regional orientedness) with no sign of weakening. Protectionist trade policies in the rest of the world and structural problems that may limit the ability of individual countries to participate more in the international trade network contribute to high trade introversion. Trade creation and trade diversion effects of economic integration also foster increased inward-looking regional trade as member countries reciprocate preferential trade treatment to each other, thus making the regional groups' overall trade policies more inward looking. Trade linkages between the regional groups vary with some regions being more closely linked than others. AMU has positive trade linkages with both ECOWAS and the ECCAS while the EAC, ECCAS and SADC have very strong trade linkages with each other. Improved and well-developed adequate infrastructure would strengthen and facilitate the current inter-regional trade linkages between regional groups, and thus enhance regional integration as well as to improve inter-regional trade.

Furthermore, given the constraints of the small domestic markets in each regional group, the AfCFTA would create the benefits from economies of scale inherent in larger regional markets. This would help to improve intra-African trade as firms in the various regional groups would be motivated to produce more to benefit from the enlarged market. A wider variety of cheaper goods produced as countries develop new areas of comparative advantage and utilising economies of scale, would also help to improve intra-Africa trade as such varieties become more easily accessible due to the reduced trade barriers. Functioning, well-developed and integrated financial markets, free movement of people and skilled labour, and reducing communication and transport infrastructure bottlenecks would reduce trading and transaction costs, thereby facilitating intra-Africa trade.

From the time the AfCFTA entered into force in May 2019 to the present, the AfCFTA is barely 5 years old. Therefore, empirically judging the effectiveness of the AfCFTA and exact trade dynamics between countries in terms of, for example, trade creation, trade diversion, and the net effect of the AfCFTA is currently constrained by the limited timespan of the AfCFTA.

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Appendix 1

A. The Traditional and well-known Bilateral Trade Intensity index

$I_{ij} = (S_{ij})/(W_j) = (T_{ij}/T_{iw}))/(T_{Wj}/T_W)$

Where: T_{ij} = trade (exports + imports) between reporting country i & partner country j;
T_{iW} = trade between the world and country i; T_{Wj} = world trade with country j; and
T_W = total world trade (Hamanaka, 2015:2; Iapadre & Tajoli, 2013:S93; Iapadre & Tiron, 2009:8).

B. The homogeneous bilateral trade intensity (HI_{ij}) and the extra-regional homogeneous trade intensity (HE_{ij})

$(HI_{ij}) = (S_{ij})/(V_{ij}) = (T_{ij}/T_i)/(T_{oj}/T_{ow})$ and $(HE_{ij}) = (1\text{-}S_{ij})/(1\text{-}V_{ij}) = [1 - (T_{ij}/T_i)] /[1 - (T_{oj}/T_{ow})]$

Where: T = total trade (exports + imports); T_{ij} = exports of region *i* to region *j* + imports of region *j* from region *i* [*i.e.* trade between region *i* and region *j*]; T_i = total exports of region *i* to the world + total imports of region *i* from the world [*i.e.* trade between region *i* and the world]; T_{oj} = exports of world excluding region *i* (rest of the world) to region *j* + imports of world excluding region *i* (rest of the world) from region *j* [*i.e.* trade of region *j* with the rest of the world]; T_{ow} = total exports of world excluding region *i* + total imports of world excluding region *i*; $(1\text{-}S_{ij})$ = share of the rest of the world in the reporting country's total trade; $(1\text{-}V_{ij})$ = weight of total trade of other countries (regions) outside the reporting country (region) with rest of world in total trade of the *rest* of the world (Hamanaka, 2015:2; Iapadre & Tajoli, 2013:S93; Iapadre & Tiron, 2009:8).

C. HI_{ij} and HE_{ij} adjusted for Intra-regional trade intensity

$(HI_i) = (S_i)/(V_i) = (T_{ii}/T_i)/(T_{oi}/T_{ow})$ and $(HE_i) = (1\text{-}S_i)/(1\text{-}V_i) = [1 - (T_{ii}/T_i)] /[1 - (T_{oi}/T_{ow})]$

Where: T = total trade (exports + imports); T_i = exports of region *i* to the world + imports of region *i* to world [*i.e.* trade between region *i* and the world]; T_{ii} = total exports of region *i* to region *i* + total imports of region *i* from region *i*. T_{oi} = exports of world excluding region *i* (rest of the world) to region i + imports of world excluding region *i* (rest of the world) from region *i* [*i.e.* trade of region *i* with the rest of the world]; T_{ow} = total exports of world excluding region *i* + total imports of world excluding region *i* (Hamanaka, 2015:2; Iapadre & Luchetti, 2010:5; Iapadre, 2006:68, 69; Iapadre, 2004: 8, 9).

Appendix 2

Table A-1: Intra-regional trade intensity (intensity of regional trade introversion) within the five regional groups that are part of the African Continental Free Trade Area (AfCFTA)

	Period of years																	
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
The trade introversion index (TI_i) for the Arab Maghreb Union (UMA)																		
TI_i	0.635	0.647	0.591	0.543	0.524	0.555	0.540	0.535	0.567	0.521	0.599	0.556	0.638	0.684	0.682	0.682	0.634	0.648
HE_i	0.979	0.978	0.982	0.984	0.984	0.982	0.982	0.980	0.978	0.982	0.980	0.979	0.973	0.970	0.974	0.975	0.979	0.978
The trade introversion index (TI_i) for the East African Community (EAC)																		
TI_i	0.991	0.991	0.992	0.992	0.991	0.987	0.986	0.985	0.983	0.983	0.981	0.982	0.980	0.979	0.979	0.980	0.979	0.983
HE_i	0.868	0.870	0.861	0.859	0.867	0.894	0.894	0.887	0.885	0.887	0.894	0.883	0.895	0.892	0.890	0.893	0.896	0.887
The trade introversion index (TI_i) for the Economic Community for Central African States (ECCAS)																		
TI_i	0.783	0.786	0.765	0.718	0.688	0.678	0.723	0.619	0.738	0.746	0.768	0.699	0.729	0.614	0.809	0.834	0.832	0.791
HE_i	0.986	0.984	0.985	0.988	0.986	0.986	0.980	0.985	0.975	0.975	0.970	0.978	0.976	0.987	0.972	0.973	0.973	0.977
The trade introversion index (TI_i) for the Economic Community for West African States (ECOWAS)																		
TI_i	0.938	0.950	0.944	0.928	0.929	0.914	0.908	0.903	0.905	0.876	0.856	0.873	0.901	0.877	0.911	0.918	0.914	0.898
HE_i	0.899	0.887	0.891	0.902	0.896	0.907	0.913	0.907	0.907	0.922	0.925	0.919	0.903	0.918	0.909	0.911	0.914	0.920
The trade introversion index (TI_i) for the Southern Africa Development Community (SADC)																		
TI_i	0.936	0.943	0.936	0.927	0.911	0.902	0.899	0.904	0.915	0.927	0.917	0.925	0.926	0.928	0.942	0.947	0.942	0.942
HE_i	0.848	0.840	0.840	0.849	0.866	0.874	0.870	0.859	0.844	0.817	0.830	0.815	0.817	0.814	0.795	0.795	0.805	0.806
The trade introversion index (TI_i) for the African Continent																		
TI_i	0.741	0.765	0.752	0.720	0.683	0.670	0.658	0.634	0.698	0.699	0.690	0.683	0.708	0.716	0.757	0.767	0.753	0.752
HE_i	0.900	0.892	0.893	0.901	0.908	0.910	0.910	0.910	0.886	0.883	0.888	0.887	0.878	0.878	0.868	0.871	0.877	0.875

Source: Own Table and calculations using ITC trade data available at https://trademap.org

Notes: TI_i = Intra-regional trade index (The trade introversion index)

HE_i = The extra-regional homogeneous trade intensity (*i.e.* homogeneous intensity to the *rest* of the world excluding the region ***i*** itself)

Table A-2: Intra-regional trade intensity (intensity of regional trade introversion) within the five regional groups that are part of the African Continental Free Trade Area (AfCFTA))

	Period of years																	
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
The trade introversion index (TI_i) for the Arab Maghreb Union (UMA)																		
TI_i	0.635	0.647	0.591	0.543	0.524	0.555	0.540	0.535	0.567	0.521	0.599	0.556	0.638	0.684	0.682	0.682	0.634	0.648
S_i	0.027	0.028	0.025	0.023	0.024	0.025	0.026	0.029	0.030	0.026	0.027	0.029	0.035	0.036	0.032	0.031	0.027	0.028
V_i	0.006	0.006	0.006	0.007	0.007	0.007	0.008	0.009	0.008	0.008	0.007	0.008	0.008	0.007	0.006	0.006	0.006	0.006
The trade introversion index (TI_i) for the East African Community (EAC)																		
TI_i	0.991	0.991	0.992	0.992	0.991	0.987	0.986	0.985	0.983	0.983	0.981	0.982	0.980	0.979	0.979	0.980	0.979	0.983
S_i	0.133	0.130	0.140	0.141	0.134	0.106	0.107	0.113	0.116	0.113	0.107	0.118	0.106	0.109	0.111	0.109	0.105	0.114
V_i	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
The trade introversion index (TI_i) for the Economic Community for Central African States (ECCAS)																		
TI_i	0.783	0.786	0.765	0.718	0.688	0.678	0.723	0.619	0.738	0.746	0.768	0.699	0.729	0.614	0.809	0.834	0.832	0.791
S_i	0.016	0.018	0.017	0.015	0.017	0.017	0.023	0.020	0.030	0.030	0.034	0.027	0.029	0.019	0.031	0.030	0.030	0.026
V_i	0.002	0.002	0.002	0.002	0.003	0.003	0.004	0.005	0.005	0.004	0.005	0.005	0.005	0.005	0.003	0.003	0.003	0.003
The trade introversion index (TI_i) for the Economic Community for West African States (ECOWAS)																		
TI_i	0.938	0.950	0.944	0.928	0.929	0.914	0.908	0.903	0.905	0.876	0.856	0.873	0.901	0.877	0.911	0.918	0.914	0.898
S_i	0.104	0.116	0.113	0.102	0.108	0.097	0.092	0.097	0.098	0.084	0.081	0.087	0.102	0.088	0.096	0.093	0.090	0.085
V_i	0.004	0.003	0.004	0.004	0.004	0.005	0.005	0.005	0.005	0.006	0.007	0.006	0.006	0.006	0.005	0.004	0.004	0.005
The trade introversion index (TI_i) for the Southern Africa Development Community (SADC)																		
TI_i	0.936	0.943	0.936	0.927	0.911	0.902	0.899	0.904	0.915	0.927	0.917	0.925	0.926	0.928	0.942	0.947	0.942	0.942
S_i	0.157	0.165	0.165	0.157	0.141	0.133	0.137	0.149	0.163	0.190	0.178	0.193	0.191	0.193	0.211	0.211	0.201	0.200
V_i	0.006	0.006	0.006	0.007	0.008	0.008	0.008	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.008	0.007	0.007	0.007
The trade introversion index (TI_i) for the African Continent																		
TI_i	0.741	0.765	0.752	0.720	0.683	0.670	0.658	0.634	0.698	0.699	0.690	0.683	0.708	0.716	0.757	0.767	0.753	0.752
S_i	0.117	0.124	0.125	0.118	0.114	0.112	0.113	0.116	0.139	0.142	0.137	0.140	0.145	0.146	0.153	0.149	0.143	0.145
V_i	0.019	0.019	0.020	0.021	0.024	0.024	0.026	0.029	0.029	0.029	0.028	0.030	0.028	0.028	0.024	0.023	0.023	0.023

Source: Own Table and calculations using ITC trade data available at https://trademap.org

Notes: TI_i = Intra-regional trade index (The trade introversion index)
S_i = intra-regional trade share
V_i = The region's share in total trade with the rest of the world.

Table A-3: Inter-regional trade intensity between the five regional groups that are part of the African Continental Free Trade Area (AfCFTA)

	Period of years																	
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
The Revealed Trade Preference indexes (RTP_{ij}) between the Arab Maghreb Union (UMA) and the other regional groups																		
With EAC	-0.56	-0.17	-0.42	-0.62	-0.52	0.29	-0.67	-0.57	-0.62	-0.46	-0.06	-0.53	-0.39	-0.57	-0.57	-0.15	-0.06	-0.25
With ECCAS	0.53	0.53	0.51	0.47	0.35	0.42	0.14	0.10	0.26	0.32	0.14	-0.00	-0.07	0.18	0.42	0.51	0.30	0.20
With ECOWAS	0.45	0.51	0.39	0.70	0.67	0.38	0.42	0.21	0.45	0.42	0.62	0.35	0.30	0.37	0.57	0.56	0.52	0.47
With SADC	-0.02	0.01	-0.13	-0.26	-0.09	0.25	-0.27	-0.20	-0.25	-.036	-0.33	-0.37	-0.40	-0.35	-0.14	-0.24	-0.30	-0.31
With Africa	-0.03	0.03	0.01	-0.05	-0.09	-0.12	-0.03	-0.16	-0.05	-0.06	-0.07	-0.08	-0.06	-0.04	0.13	0.14	0.14	0.15
The Revealed Trade Preference indexes (RTP_{ij}) between the East African Community (EAC) and the other regional groups																		
With UMA	-0.56	-0.17	-0.42	-0.62	-0.52	0.29	-0.67	-0.57	-0.62	-0.46	-0.06	-0.53	-0.39	-0.57	-0.57	-0.15	-0.06	-0.25
With ECCAS	0.93	0	0.96	0.96	0.96	0.94	0.94	0.93	0.92	0.93	0.91	0.93	0.93	0.94	0.95	0.97	0.94	0.94
With ECOWAS	0.08	0.14	0.23	0.59	0.50	0.13	-0.03	0.11	-0.24	-0.42	-0.44	-0.40	0.01	-0.16	-0.11	-0.11	-0.19	0.08
With SADC	0.94	0.95	0.96	0.95	0.96	0.95	0.93	0.95	0.93	0.93	0.92	0.92	0.92	0.91	0.90	0.92	0.92	0.92
With Africa	0.70	0.75	0.74	0.73	0.72	0.71	0.67	0.66	0.66	0.65	0.65	0.61	0.60	0.55	0.59	0.65	0.66	0.66
The Revealed Trade Preference indexes (RTP_{ij}) between the Economic Community for Central African States (ECCAS) and other regional groups																		
With UMA	0.532	0.527	0.506	0.465	0.348	0.421	0.142	0.102	0.258	0.322	0.144	-0.00	-0.07	0.176	0.418	0.508	0.295	0.201
With EAC	0.934	0.951	0.960	0.962	0.962	0.939	0.937	0.927	0.922	0.934	0.912	0.925	0.925	0.937	0.949	0.966	0.941	0.936
With ECOWAS	0.91	0.93	0.93	0.96	0.98	0.93	0.89	0.84	0.96	0.95	0.88	0.84	0.89	0.89	0.89	0.85	0.84	0.62
With SADC	0.90	0.82	0.831	0.86	0.81	0.85	0.8	0.84	0.84	0.85	0.83	0.85	0.87	0.85	0.87	0.89	0.89	0.85
With Africa	0.58	0.61	0.62	0.56	0.52	0.49	0.52	0.47	0.63	0.58	0.52	0.49	0.50	0.54	0.61	0.58	0.63	0.64
The Revealed Trade Preference indexes (RTP_{ij}) between the Economic Community for West African States (ECOWAS) and other regional groups																		
With UMA	0.45	0.51	0.39	0.70	0.67	0.38	0.42	0.21	0.45	0.42	0.62	0.35	0.30	0.37	0.57	0.56	0.52	0.47

With EAC	0.08	0.14	0.21	0.59	0.50	0.13	-0.03	0.11	-0.24	-0.42	-0.44	-0.40	0.01	-0.16	-0.11	-0.11	-0.19	0.08
With ECCAS	0.93	0.93	0.93	0.96	0.98	0.93	0.89	0.84	0.96	0.95	0.88	0.84	0.89	0.89	0.89	0.85	0.84	0.62
With SADC	0.75	0.81	0.75	0.91	0.90	0.79	0.76	0.83	0.80	0.79	0.72	0.77	0.77	0.79	0.77	0.77	0.74	0.79
With Africa	0.36	0.40	0.37	0.40	0.35	0.40	0.40	0.33	0.55	0.49	0.40	0.37	0.40	0.47	0.41	0.43	0.39	0.45
The Revealed Trade Preference indexes (RTP_{ij}) between the Southern Africa Development Community (SADC) and other regional groups																		
With UMA	-0.02	0.01	-0.13	-0.26	-0.09	0.25	-0.27	-0.20	-0.25	-.036	-0.33	-0.37	-0.40	-0.35	-0.14	-0.24	-0.30	-0.31
With EAC	0.94	0.95	0.96	0.95	0.96	0.95	0.93	0.95	0.93	0.93	0.97	0.92	0.92	0.91	0.90	0.92	0.92	0.92
With ECCAS	0.90	0.82	0.83	0.86	0.81	0.85	0.83	0.84	0.84	0.85	0.83	0.85	0.87	0.85	0.87	0.89	0.89	0.85
With ECOWAS	0.75	0.81	0.748	0.91	0.90	0.79	0.76	0.83	080	0.79	0.72	0.77	0.77	0.79	0.77	0.77	0.74	0.79
With Africa	0.27	0.37	0.27	0.24	0.18	0.26	0.20	0.14	0.27	0.19	0.15	0.15	0.19	0.26	0.27	0.26	0.25	0.36

Source: Own Table and calculations using ITC trade data available at https://trademap.org

Table A-4: Overview of regional integration using scores of the five dimensions of regional integration that are the key socio-economic categories that are fundamental to Africa's integration (2016 and 2019*)

Selected regional groups	Overview of regional integration using the scores of the five dimensions of regional integration							Member states
	Trade integration		Regional infrastructure integration	Productive integration	Free movement of people	Financial and macroeconomic integration	Average score [Regional integration]	
Arab Maghreb Union (AMU)	2016	0.631	0.491	0.481	0.493	0.199	0.459	Morocco, Tunisia, Algeria, Libya, Mauritania
	2019	0.481	0.509	0.449	0.438	0.571	0.488	
East Africa Community (EAC)	2016	0.780	0.496	0.553	0.715	0.156	0.540	Burundi, Kenya, Rwanda, South Sudan, the United Republic of Tanzania, the Republic of Uganda
	2019	0.500	0.670	0.510	0.800	0.790	0.620	
Economic Community for	2016	0.526	0.451	0.293	0.400	0.599	0.454	Angola, Burundi, Cameroon, Central

Central African States (ECCAS)	2019	0.357	0.373	0.323	0.469	0.684	0.442	African Republic, Chad, Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Rwanda, Sao Tome and Principe
Economic Community for West African States (ECOWAS)	2016	0.442	0.426	0.265	0.800	0.611	0.509	Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo
	2019	0.438	0.298	0.220	0.733	0.469	0.425	
Southern Africa Development Community (SADC)	2016	0.508	0.502	0.350	0.530	0.397	0.457	Angola, Botswana, Comoros, Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia, Zimbabwe
	2019	0.360	0.220	0.250	0.460	0.410	0.340	
Africa	2016	0.540	0.461	0.384	0.517	0.381	0.540	All 55 countries
	2019	0.382	0.220	0.201	0.441	0.399	0.327	

Source: African Union et al (2020; 2019; 2016); United Nations Economic Commission for Africa (2019).

Notes: * = Membership is kept as at 2016 for the results for the two years to be comparable. Therefore, the 2019 scores were adjusted for the EAC and SADC to exclude South Sudan and the Comoros since in 2016, these were not members in the EAC and SADC, respectively. Scores are calculated on a scale of 0 (not integrated) to 1 (entirely integrated). Scores below 0.333 = low performance (less integrated); 0.334 ≤ scores ≤ 0.667 is moderate (average); and the scores above 0.668 = high performance/more integrated (African Union et al., 2020:22).

To assess regional integration, the Africa Regional Integration Index (ARII) uses five dimensions and indicators of regional integration that are the key socio-economic categories that are fundamental to Africa's integration. African Union et al (2020:20-22; 2019:15, 17-19; 2016:11) and United Nations Economic Commission for Africa (2019:16-34) explain these five dimensions and indicators as follows:

The trade integration dimension

Trade integration dimension of regional integration measures/assesses the extent to which a country trades with others in the region. It also estimates the potential for integration at a deeper level by noting whether countries have signed or ratified the agreement establishing the African Continental Free Trade Area (AfCFTA). The Africa Regional Integration Index (ARII) uses four indicators to assess trade integration, viz: (i) Share of intra-regional exports over; (ii) Share of intra-regional imports over GDP; (iii) The share of intra-regional trade which is defined as the sum of a country's exports and imports within the region as a proportion of all of the region's intra-regional trade; (iv) Average intra-regional import tariffs which seeks to capture the effect of policies that enhance or inhibit trade openness; and (iv) The AfCFTA indicator which reveals whether countries have signed or ratified the AfCFTA agreement. This is measured for countries, not for regional economic communities.

The productive integration dimension

The productive integration dimension assesses how well a country is integrated productively with others in the region. A country is well-integrated productively if its productive capacities complement those of other countries in the region; that is, if it specialises in those stages of production where it has a comparative advantage and can benefit from economies of scale. Three indicators are used to evaluate a country's involvement in regional supply and value chains, viz., (i) The share of intra-regional intermediate exports, which refers to a country's exports of intermediate (semi-finished) goods to the region as a percentage of all of that country's exports of goods to the region; (ii) The share of intra-regional intermediate imports, which refers to a country's imports of intermediate (semi-finished) goods from within the region as a percentage of all of that country's imports of goods from the region; (iii) The merchandise trade complementarity index, which compares a country's export profile to the export profile of the region.

The financial and macroeconomic integration dimension

This dimension assesses the degree to which a country is macroeconomically coherent with its neighbours and this helps investors to calculate the value and potential of their investments. The convergence and stabilisation of macroeconomic policies in a region create a healthy financial climate that attracts cross border investments. ARII uses three indicators to measure macroeconomic integration, viz., (i) The regional inflation differential, which measures the difference between a country's inflation rate and the inflation rate targeted by the region; (ii) The regional convertibility of currency indicator, which evaluates the ease with which foreigners and businesses can transact. Thus, the number of countries within the region with which a country shares a common currency or with whose currency its own currency is convertible, is considered; (iii) Regional foreign direct investment, and where comprehensive investment data is not available, the number of bilateral investment treaties in force is used as a proxy for the scope of cross-border capital flows. Thus, this number is net of treaties that have not been ratified and treaties that have been terminated.

Infrastructural integration dimension

ARII uses two indicators to measure the extent to which Africa's infrastructure is regionally integrated, i.e. (i) The AfDB Infrastructure Development Index which is a composite index of nine measures of the state of electricity, transport, information and communication technologies, and water and sanitation in an area; and (ii) Countries' proportion of intra-regional flight connections, i.e. the number of a country's flight connections to and from points within the region as a percentage of all intra-regional flight connections.

Free movement of people dimension

ARII uses three indicators to measure how well countries and regional economic communities cooperate on the freedom of movement, i.e. (i) The number of countries that may obtain a visa on arrival indicator counts the number of countries whose citizens may be granted visas on arrival by the other countries in the region; (ii) The number of countries that require a visa indicator counts the number of countries whose citizens strictly require a visa when travelling to each of the other countries in the region; and (iii) The Free Movement of Persons Protocol (Kigali) indicator which measures whether a country has ratified the Protocol to the Treaty Establishing the African Economic Community Relating to Free Movement of Persons, Right of Residence and Right of Establishment.