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# **Global Exposure of African Economies: Evidence from the African Continental Input–Output Table and Trade in Value Added Indicators**

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## Abstract

Trade in Value Added (TiVA) indicators complement gross trade statistics by tracing where value is generated, embodied, and absorbed across countries and sectors. Yet existing international input-output databases remain distant from the Supply and Use Tables and national accounts of many countries in Africa. To address this gap, the United Nations Economic Commission for Africa (ECA) developed the African Continental Input-Output Table (AfCIOT) and generated fifty-two derived TiVA indicators for the African countries included in the database, using an OECD-inspired methodology adapted to African data conditions and official national sources. This paper uses selected AfCIOT-based indicators to examine trade exposure, global value-chain participation, and regional value-chain linkages in the context of the African Continental Free Trade Area (AfCFTA). The analysis shows that these indicators reveal exposure channels that gross trade data cannot capture, including domestic and foreign value added embodied in exports, partner concentration, sectoral concentration, and regional value-chain linkages. The results indicate that exports of the 22 AfCIOT African countries are generally more domestically embedded than those of non-African comparators, but this domestic content is often concentrated in a limited number of sectors and partners. AfCIOT therefore provides a statistical basis for monitoring trade integration, value-added diversification, industrial structure, and external exposure in support of AfCFTA, the Sustainable Development Goals, and the African Union's Agenda 2063.

## 1 Introduction

One of the major problems undermining economic development in Africa is exposure to the outside world. For instance, United Nations Trade and Development (UNCTAD, 2025) showed that dependence on commodities, high debt, and weak infrastructure make economies in Africa more vulnerable, and that Africa's economic growth has been closely tied to commodity cycles, making it highly susceptible to market fluctuations. Over half of the countries in Africa rely on oil, gas or minerals for at least 60 per cent of export earnings. Over 50 per cent of the continent's imports and exports are tied to just five economies, all outside Africa (UNCTAD, 2025).

This global exposure limits Africa's development and decision-making potential. It can lead to social problems, such as inflation, shortages, and food insecurity. For instance, the African Development Bank Group (AfDB), the African Union Commission (AUC), the United Nations Development Programme (UNDP), and the United Nations Economic Commission for Africa (ECA) found that military escalation in the Middle East, in addition to driving up oil prices, could affect Africa's security, including humanitarian delivery costs (African Development Bank Group et al., 2026). A prolonged conflict in the Middle East could further inflate commodity prices, trigger a risk-off episode in global markets, and force abrupt fiscal adjustments in Sub-Saharan African countries with large refinancing needs (Selassie, 2026).

To address these forms of global exposure, particularly in Africa, and to strengthen economic integration across the continent, the African Union Commission introduced the African Continental Free Trade Area. One of the central objectives of the AfCFTA is to establish a continental common market that reduces the vulnerability of countries in Africa to external shocks and dependence on non-African markets.

Although several approaches exist for measuring global exposure, many focus primarily on direct effects and overlook indirect linkages. As a result, a country may initially appear to have limited exposure when only direct effects are considered, while in reality it may be highly exposed through indirect channels because its trading partners are themselves highly exposed. Conversely, a country

that appears highly exposed at the direct level may prove less exposed overall once broader indirect relationships are taken into account. Relying exclusively on direct effects can therefore lead to biased or incomplete analyses of economic exposure.

In this paper, exposure refers to the structural channels through which external or regional shocks can reach an economy, while vulnerability refers to the potential consequences of those channels once domestic resilience, diversification, and policy capacity are taken into account. AfCIOT primarily measures exposure channels; it provides inputs for vulnerability assessment rather than a complete measure of vulnerability itself.

The African Continental Input-Output Table (AfCIOT; United Nations Economic Commission for Africa, 2026), through its Trade in Value Added (TiVA) indicators, supports the monitoring of AfCFTA implementation and contributes to the achievement of the United Nations Sustainable Development Goals and the African Union’s Agenda 2063 vision for an integrated and prosperous Africa. It also enables the assessment of trade integration, the diversification of value-added sources and destinations, countries’ industrial value-added composition, and external exposure, taking into account both indirect and direct effects.

This paper uses AfCIOT and its TiVA indicators to assess trade exposure, value-chain participation, and regional integration for the 22 AfCIOT African countries currently covered in the database at the start of AfCFTA implementation. The analysis focuses on five dimensions: indirect exposure hidden by gross trade statistics, domestic and foreign value added embodied in exports, partner concentration, sectoral concentration, and intra-African value-chain integration.

Throughout the empirical analysis, “African countries” refers to the 22 AfCIOT African countries represented individually in the database. “Africa” refers to the continent as a whole or to the continental policy context.

The construction of the AfCIOT and TiVA indicators relied primarily on data from Supply and Use Tables, national accounts from the covered African countries, and international trade statistics obtained from the UN Comtrade Database for merchandise trade (United Nations Statistics Division, n.d.) and from the OECD–WTO Balanced Trade in Services (BaTIS) dataset for trade in services (Organisation for Economic Co-operation and Development & World Trade Organization, n.d.). These data sources were complemented by the Organisation for Economic Co-operation and Development Inter-Country Input-Output (ICIO) tables. The methodology used to compile the AfCIOT and generate the TiVA indicators was largely based on the OECD approach to constructing ICIO tables and TiVA indicators (Martins Guilhoto et al., 2022; Yamano et al., 2023), adapted to the specific realities of economies in Africa, and relied mainly on official national statistical sources. The OECD TiVA indicator guide and ICIO database documentation provide the main methodological reference points for the value-added decomposition and ICIO construction used here.

The methodology was further refined through direct collaboration with national accounts focal points across the covered African countries. One of its central features was the harmonisation of classifications, achieved by developing correspondence tables linking national industry and product classifications with those adopted in the AfCIOT framework, consistent with the classifications used by the OECD in compiling its ICIO table.<sup>1</sup> Applying this methodology to both national and international datasets enabled the construction of the AfCIOT as a continental framework covering 22 African countries and 67 non-African countries, representing a total of 89 countries worldwide. All remaining economies were grouped into a single aggregate category, referred to as the Rest of the

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<sup>1</sup>AfCIOT follows ICIO methodology with few adjustments. The methodology is summarised in Annex B.

World, to maintain overall balance within the system. The methodology also enabled the generation of fifty-two TiVA indicators for the 22 AfCIOT African countries, with results disaggregated by sector of activity, trading partner, or both.<sup>2</sup>

The remainder of this document is organised as follows. Section 2 explains the relevance of the AfCIOT for analysing the global exposure of African countries and discusses the limitations of conventional approaches. It also presents statistics on domestic and foreign value added for African countries. Section 3 provides an analysis of the global exposure of African countries using domestic and foreign value added by partner country and by industry. Section 4 examines regional integration by focusing on intra-African integration, the contribution of industries to African regional value added, and the state of readiness of African countries at the start of the African Continental Free Trade Area. Finally, Section 5 concludes the study.

## **2 The AfCIOT as a tool to analyse the global exposure of African countries**

Economies in Africa are increasingly exposed to external shocks through trade, production networks, imported intermediate inputs, foreign final demand, commodity markets, transport corridors and regional supply chains. For instance, the war in Ukraine affected countries in Africa through wheat disruption, higher food, fuel and fertiliser prices, even where direct trade links were limited (World Bank, 2022). The military escalation in the Middle East highlights the vulnerabilities of economies in Africa to energy and shipping shocks, particularly through oil markets and strategic maritime routes such as the Strait of Hormuz (UNCTAD, 2026). In the Sahel, terrorist attacks show that exposure is also regional and domestic, as insecurity disrupted transport corridors, cross-border trade, livestock movements, food supply chains and access to markets (Security Council Report, 2025).

However, these exposures are not always visible in traditional trade statistics. A country may appear weakly connected to a crisis-affected region, while its domestic industries may still depend indirectly on imported fuel, fertilisers, chemicals, machinery, food products, transport services or foreign demand transmitted through third countries.

The African Continental Input-Output Table, AfCIOT, provides a more appropriate statistical framework for capturing these hidden channels. It links countries, industries, intermediate demand, final demand, imports, exports and value added within a single accounting structure.

This section uses AfCIOT to show why exposure analysis should move beyond direct trade flows and consider how economies in Africa are connected to global and regional value chains.

### **2.1 Traditional approaches for vulnerability and exposure analysis**

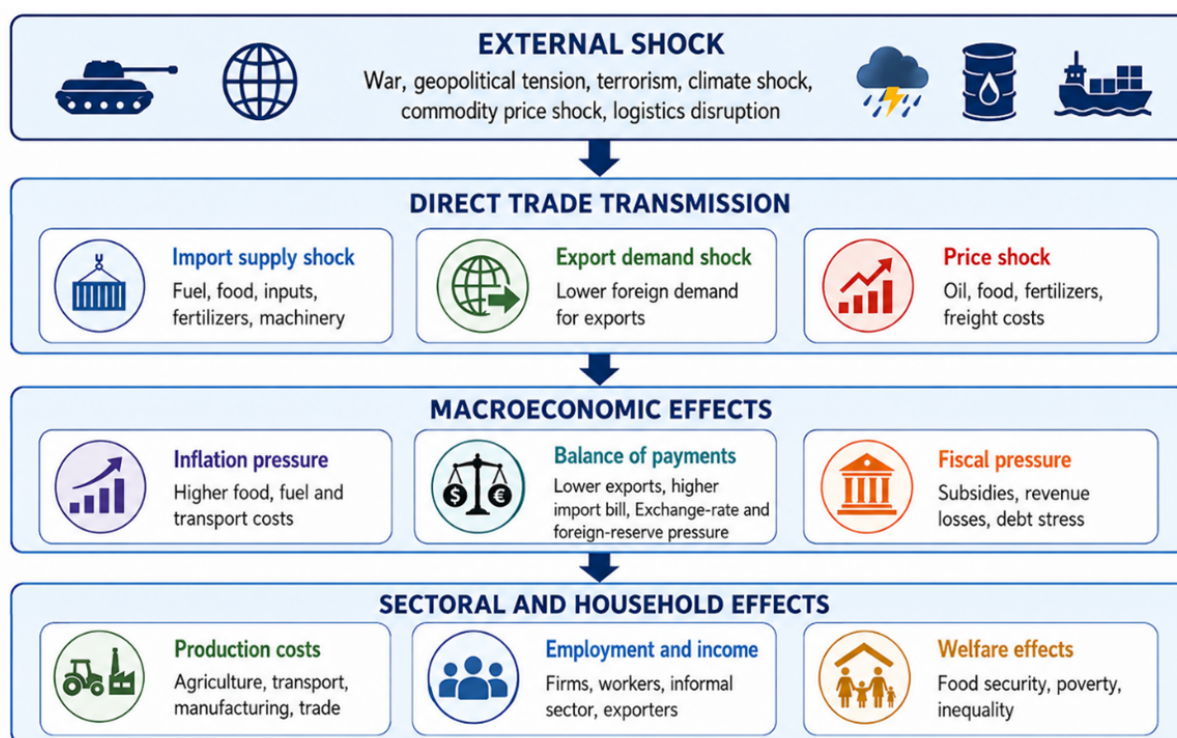
Traditional approaches to vulnerability and exposure analysis generally start from direct trade and macroeconomic indicators. They ask whether a country imports critical products from a crisis-affected region, whether it exports a large share of its products to vulnerable markets, or whether its macroeconomic position makes it sensitive to external shocks.

The most common approach is based on direct trade exposure. It includes the share of exports

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<sup>2</sup>Methodology for TiVA indicators is summarised in Annex C.





**Figure 1:** Traditional exposure framework: direct shock transmission channels

Source: Authors' illustration.

going to a given partner, the share of imports coming from a given partner, the concentration of export products, and the dependence on imported strategic goods. This approach provides a rapid picture of immediate trade dependence.

A second approach focuses on measuring exposure through the share of commodities in total exports, fiscal revenue, foreign exchange earnings and GDP. This approach, called commodity dependence, is important because many countries in Africa depend heavily on a narrow set of primary commodities, including oil, gas, minerals, cocoa, cotton, coffee, gold and other raw materials. Furthermore, a change in world prices can quickly affect the balance of payments, fiscal space and domestic inflation in most of these countries.

A third approach uses macroeconomic vulnerability indicators, such as the current account balance, external debt, fiscal deficit, exchange rate pressure, inflation, fuel subsidies, and food import bills, to assess whether an external shock can be absorbed or will put pressure on prices, public finances, and external reserves.

A fourth approach uses sectoral or household vulnerability analysis to identify sectors or groups most affected by higher import prices, lower export earnings, supply chain disruptions, or weaker foreign demand. This approach is often applied to food security, energy prices, poverty, employment and welfare.

## 2.2 Limitations of traditional approaches and contribution of the AfCIOT

The traditional approaches described above are useful, easy to communicate and provide an important initial diagnosis. They help identify direct import dependence, export concentration, commodity dependence, current account pressure, inflationary risks and fiscal exposure. However, when economies are linked through production networks, these approaches are not sufficient. They mainly describe what crosses the border directly, while many shocks are transmitted indirectly through imported inputs, third-country suppliers, sectoral linkages and value-added chains.

AfCIOT helps reveal these hidden channels. It shows that the African countries covered are exposed not only through direct imports and exports, but also through the foreign value added embodied in domestic final demand, the foreign content of exports, imported intermediate inputs used by domestic industries, and regional value-chain linkages.

### 2.2.1 Traditional trade data do not capture indirect exposure

Traditional trade statistics measure direct bilateral flows. They show whether a country imports directly from, or exports directly to, a specific partner. This approach can miss indirect exposure because a country may not import much directly from the country where a shock originates, yet it may still absorb value added from that country through imports from third countries.

Consider a tractor imported by Kenya from Türkiye for use by a farmer. Customs statistics record one tractor imported by Kenya from Türkiye. Yet the tractor may contain value added from several countries: Türkiye for assembly and final production, Germany for engine components, China for electronic parts, Saudi Arabia for energy used in production, and the United States of America for software or design services. While traditional trade statistics would usually record Türkiye as the immediate supplier, AfCIOT decomposes the tractor to identify the countries and industries that actually created the value embodied in it. The foreign value added from Germany, China, Saudi Arabia, the United States of America, and Türkiye embodied in Kenya's investment demand would be captured in Kenya's foreign value-added embodied in domestic final demand.

For the 22 AfCIOT African countries, direct final imports amounted to about 220.8 billion USD in 2020. This was the value of goods and services imported directly from foreign suppliers for household consumption, government consumption and investment. However, foreign value added embodied in domestic final demand amounted to about 348.2 billion USD. This second measure identifies the value created abroad and ultimately absorbed by final demand in the 22 AfCIOT African countries, regardless of the immediate exporting country. The foreign value-added measure was therefore about 1.58 times larger than direct final imports. This result indicated that final demand in these countries depended on both direct imports and foreign production embedded in goods and services supplied through third countries. Consequently, an analysis based only on direct final imports would significantly understate the foreign dependency and external shock exposure of the countries covered.

The same logic applies to shock-origin economies. For the Russian Federation, direct final imports by the 22 AfCIOT African countries amounted to about 3.3 billion in 2020, but value added from the Russian Federation embodied in domestic final demand in those countries reached about 8.0 billion. For Saudi Arabia, direct final imports amounted to about 2.9 billion, while Saudi value added embodied in final demand in those countries reached about 9.0 billion. For the United States of America, direct final imports amounted to about 16.4 billion, while value added from the United

**Table 1:** Direct and indirect foreign dependency of selected African countries, 2020

| Country       | Direct gross imports<br>(USD billions) | Direct final imports<br>(USD billions) | FVA in domestic final demand<br>(USD billions) | FVA/direct final imports |
|---------------|----------------------------------------|----------------------------------------|------------------------------------------------|--------------------------|
| Morocco       | 34.8                                   | 14.0                                   | 29.0                                           | 2.1                      |
| Kenya         | 17.3                                   | 8.5                                    | 16.4                                           | 1.9                      |
| South Africa  | 67.3                                   | 28.0                                   | 53.6                                           | 1.9                      |
| Uganda        | 7.5                                    | 4.0                                    | 7.2                                            | 1.8                      |
| Cameroon      | 7.5                                    | 4.0                                    | 6.9                                            | 1.7                      |
| Côte d’Ivoire | 12.0                                   | 6.4                                    | 11.0                                           | 1.7                      |
| Mali          | 6.4                                    | 3.3                                    | 5.7                                            | 1.7                      |
| Tunisia       | 20.8                                   | 9.1                                    | 15.4                                           | 1.7                      |
| Burkina Faso  | 5.8                                    | 3.2                                    | 4.8                                            | 1.5                      |
| Egypt         | 70.4                                   | 44.9                                   | 67.2                                           | 1.5                      |
| Nigeria       | 68.5                                   | 50.1                                   | 66.9                                           | 1.3                      |

*Source:* Authors’ calculations from AfCIOT base table and TiVA indicators.

*Notes:* (i) FVA means foreign value added. (ii) Direct gross imports from AfCIOT can differ from direct figures in national accounts statistics because trade-balancing adjustments identify pure re-exports separately from domestic exports. (iii) Direct final imports are imports from foreign suppliers for household consumption, government consumption and investment. (iv) TiVA indicators used are gross imports (IMGR), foreign value added embodied in final demand (DFD\_FVA), and gross imports for final demand (IMGR\_FNL).

States of America embodied in final demand in those countries reached about 31.3 billion. These results demonstrated that a shock in the Russian Federation, Saudi Arabia, or the United States of America may affect the countries covered through both direct imports and the value added from those economies embodied in products imported from other partners. Therefore, direct trade statistics highlight the first layer of dependency, while AfCIOT brings the deeper value-added layer.

### 2.2.2 Gross trade statistics may overstate or understate real domestic exposure

Gross trade statistics measure the total value of goods and services crossing borders, not the value created domestically. Gross exports include both domestic value added and foreign value added. Therefore, two countries may have similar export values but very different domestic income effects and very different levels of dependence on foreign inputs.

AfCIOT addresses this limitation by separating the domestic value added in exports from the external content of exports. Across the 22 AfCIOT African countries, gross exports totalled about 297.9 billion USD in 2020. Domestic value added embodied in exports amounted to about 257.3 billion USD. The difference, about 40.5 billion USD, represented the external content of exports, meaning that, on average, about 86.4 per cent of gross exports by the countries covered was domestic value added, while 13.6 per cent was external content. However, the average hid important country differences. Nigeria’s domestic value-added share in exports was about 96.0 per cent, while Tunisia’s was only 66.9 per cent. Morocco’s domestic value-added share was about 77.8 per cent, Namibia’s 76.9 per cent, and South Africa’s 84.1 per cent. These differences implied different forms of exposure.

This type of analysis, provided by AfCIOT, enables exposure analysis from the perspective of domestic value-added and the external content embodied in exports. Countries with high domestic

value-added shares are not necessarily less exposed. They are exposed to shocks differently than countries with high external content embodied in their exports. Section 3.1 discusses the different exposure types.

The limitation of gross trade statistics is reinforced by the issue of imported intermediates embodied in exports. Pure re-exports are goods recorded as exports when they leave a country without substantial domestic transformation. By contrast, re-exported imported intermediates in AfCIOT refer to imported inputs used in domestic production and then embodied in exported goods or services. AfCIOT makes this second channel visible through re-exported imported intermediates and expresses it as a share of total intermediate imports. Section 3.4 discusses this indicator.

### **2.2.3 Traditional approaches do not identify sectoral transmission chains**

Traditional approaches often stop at products or macroeconomic aggregates. They may show that a country imports fuel, fertilisers or machinery, but they do not show how these imports enter domestic production and how a shock propagates across sectors.

AfCIOT enables this type of analysis by linking imported inputs to domestic industries. An oil price shock, for example, does not affect only petroleum imports. It affects transport, electricity, construction, agriculture, food processing, mining, trade and services. Similarly, a fertiliser or chemical shock does not affect only chemical imports; it can affect agriculture, food production, exports, food prices and household welfare.

The AfCIOT base table shows that imported energy and refined petroleum inputs used by industries in the 22 AfCIOT African countries amounted to about 27.4 billion USD in 2020. Of this, about 16.9 billion USD came from coke and refined petroleum products, and about 10.5 billion USD from mining and energy extraction.

The receiving sectors showed the transmission chain. Imported energy and refined petroleum inputs were heavily used by refined petroleum activities, land transport, electricity, construction, wholesale and retail trade, food products and agriculture. This result implied that a fuel price shock could quickly become a transport-cost shock, an electricity-cost shock, a food-cost shock and a production-cost shock.

An analysis of the 2020 AfCIOT base table showed that imported chemical inputs used by industries in the 22 AfCIOT African countries amounted to about 15.0 billion USD. Agriculture alone used about 2.1 billion USD, while food products used about 0.7 billion USD. This showed how a chemical or fertiliser shock can be transmitted from import prices to agricultural production, food processing, food supply and household welfare.

These results illustrate the importance of sectoral transmission. A shock to oil, gas, shipping or fertilisers cannot be assessed only by looking at petroleum imports or fertiliser imports. It must be traced through the industries that use these inputs directly and indirectly. AfCIOT provides the structure needed for this tracing.

### **2.2.4 Macroeconomic indicators are often too aggregated**

Macroeconomic indicators are often too aggregated to guide targeted policy responses. Inflation, the current account deficit, fiscal pressure, and exchange-rate depreciation indicate that the economy is under stress, but they do not identify the sectors through which that stress is transmitted.

**Table 2:** Imported energy and refined petroleum inputs used by industries in African countries, 2020

| Receiving sector                           | Imported energy and refined petroleum inputs (USD billions) |
|--------------------------------------------|-------------------------------------------------------------|
| Coke and refined petroleum products        | 5.5                                                         |
| Land transport and transport via pipelines | 3.8                                                         |
| Electricity, gas and steam                 | 3.7                                                         |
| Construction                               | 1.5                                                         |
| Wholesale and retail trade                 | 1.3                                                         |
| Food products, beverages and tobacco       | 1.1                                                         |
| Agriculture, forestry and fishing          | 1.0                                                         |
| Mining and energy extraction               | 0.9                                                         |
| Other mining and quarrying                 | 0.8                                                         |
| Basic metals                               | 0.7                                                         |

*Source:* Authors' calculations based on the AfCIOT base table.

*Notes:* (i) African countries means the 22 AfCIOT African countries. (ii) The calculation includes imports from all foreign suppliers, including other AfCIOT African countries.

**Table 3:** Imported chemical inputs used by industries in African countries, 2020

| Receiving sector                      | Imported chemical inputs (USD billions) |
|---------------------------------------|-----------------------------------------|
| Agriculture, forestry and fishing     | 2.1                                     |
| Chemicals and chemical products       | 2.0                                     |
| Rubber and plastic products           | 1.1                                     |
| Textiles, wearing apparel and leather | 0.8                                     |
| Pharmaceutical products               | 0.8                                     |
| Construction                          | 0.7                                     |
| Food products, beverages and tobacco  | 0.7                                     |
| Other mining and quarrying            | 0.7                                     |
| Wholesale and retail trade            | 0.6                                     |

*Source:* Authors' calculations based on the AfCIOT base table.

*Note:* African countries means the 22 AfCIOT African countries.

For example, if inflation rises after an oil price shock, macroeconomic data may show the general price effect. However, they do not show whether the most exposed sectors are transport, construction, agriculture, electricity, food processing, manufacturing or trade. Similarly, if the current account worsens, macro indicators do not show which sectors are most dependent on foreign inputs.

AfCIOT can identify foreign-input dependence by sector. AfCIOT showed that foreign inputs accounted for 43.8 per cent of total intermediate inputs used by African computer, electronic and optical products in 2020. The foreign-input share was also high for electrical equipment, other transport equipment, motor vehicles, chemicals, water transport, machinery and equipment, pharmaceuticals, and textiles. These sectors were more exposed to external supply disruptions, import price increases, and exchange rate movements.

**Table 4:** Foreign-input dependence by African production sector, 2020

| <b>African production sector</b>             | <b>Foreign inputs as share of total intermediate inputs (%)</b> |
|----------------------------------------------|-----------------------------------------------------------------|
| Computer, electronic and optical products    | 43.8                                                            |
| Electrical equipment                         | 33.3                                                            |
| Other transport equipment                    | 32.1                                                            |
| Motor vehicles, trailers and semi-trailers   | 31.3                                                            |
| Chemicals and chemical products              | 26.8                                                            |
| Water transport                              | 26.0                                                            |
| Machinery and equipment                      | 25.5                                                            |
| Pharmaceutical products                      | 25.3                                                            |
| Textiles, wearing apparel and leather        | 25.1                                                            |
| Rubber and plastic products                  | 24.4                                                            |
| Other manufacturing; repair and installation | 23.6                                                            |
| Mining support service activities            | 23.5                                                            |
| Fabricated metal products                    | 23.4                                                            |

*Source:* Authors' calculations based on the AfCIOT base table.

*Note:* African countries means the 22 AfCIOT African countries.

This information demonstrates that the government's response to an external shock should not be based solely on aggregate inflation or trade balances. It should also identify which industries are highly dependent on imported inputs and whether those inputs are critical for food security, infrastructure, manufacturing, exports or household welfare. For example, if chemicals and agriculture are exposed, the response may involve fertiliser supply monitoring, regional procurement, targeted subsidies or support to farmers.

## 2.2.5 Traditional approaches often understate regional value-chain exposure

Traditional approaches often treat exposure mainly as a global issue. However, for countries in Africa, exposure is also regional. This is especially important in the context of the AfCFTA, which aims to deepen intra-African trade and regional production networks.

AfCIOT showed that, at the sample level of the 22 AfCIOT African countries, regional value chains remained relatively weak but important for specific countries and sectors. Only about 6.7 per cent of domestic value added embodied in their exports was absorbed by African partners in 2020. Similarly, only about 4.7 per cent of the foreign value added embodied in their domestic final demand originated from African partners. Imported intermediate inputs from African partner countries represented about 6.7 per cent of all foreign intermediate inputs used by industries in the 22 AfCIOT African countries. These averages suggested that the countries covered remained more exposed to extra-African value chains than intra-African ones. However, the country-level results showed that regional exposure was significant for several countries, particularly in West Africa and the Sahel.

Table 5 showed that about 45.2 per cent of Mali's domestic value added embodied in exports was absorbed by African partners in 2020, while about 23.0 per cent of its foreign intermediate inputs came from African partners. For Niger (the), the corresponding shares were 35.9 per cent and

**Table 5:** Regional value-chain exposure in selected African countries, 2020

| Country      | DVA in exports<br>absorbed by African<br>partners (%) | FVA in final<br>demand from African<br>partners (%) | Foreign intermediate<br>inputs from African<br>partners (%) |
|--------------|-------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------|
| Mali         | 45.2                                                  | 19.9                                                | 23.0                                                        |
| Niger (the)  | 35.9                                                  | 8.8                                                 | 17.5                                                        |
| Senegal      | 15.2                                                  | 9.7                                                 | 13.9                                                        |
| Burkina Faso | 4.9                                                   | 12.8                                                | 15.7                                                        |
| Chad         | 3.5                                                   | 10.1                                                | 12.1                                                        |
| Mauritania   | 6.1                                                   | 4.4                                                 | 4.8                                                         |

*Source:* Authors' calculations from AfCIOT base table and TiVA indicators.

*Notes:* (i) FVA means foreign value added and DVA means domestic value added embodied in gross exports. (ii) African partners means partner countries among the 22 AfCIOT African countries. (iii) TiVA indicators used are domestic value added embodied in gross exports (EXGR\_DVA), foreign value added embodied in final demand (DFD\_FVA), and gross imports for intermediate consumption (IMGR\_INT).

17.5 per cent. These findings meant that regional instability could affect these economies through both demand and supply channels. On the demand side, regional partners absorbed part of their domestic value added. On the supply side, domestic industries relied on inputs sourced from African partners.

This exposure analysis using AfCIOT showed that terrorist attacks and insecurity do not affect only the location where the attack occurs. They can disrupt corridors, transport services, livestock movements, food supply chains, cross-border trade, access to ports, input delivery and market access. Conventional trade indicators may capture some direct flows, but they do not fully show how insecurity can propagate across regional production networks.

The sectoral analysis showed that the main sectors whose domestic value added in exports was absorbed by African partners included food products, agriculture, mining and energy extraction, other mining and quarrying, pharmaceuticals, refined petroleum, chemicals, basic metals and textiles. The main sectors receiving intra-African intermediate inputs included construction, refined petroleum, food products, basic metals, wholesale and retail trade, agriculture and electricity.

This evidence showed that regional value-chain exposure should not be ignored. As AfCFTA implementation advances, regional production linkages are expected to increase. This will create opportunities for industrialisation and resilience, but it will also create new channels through which shocks can be transmitted across economies in Africa. AfCIOT is therefore useful for both measuring global exposure and for identifying regional vulnerabilities and opportunities to strengthen value chains in Africa.

**Table 6:** Main intra-African value-chain sectors, 2020

| Indicator                                  | Main sectors                         | Value<br>(USD billions) |
|--------------------------------------------|--------------------------------------|-------------------------|
| African DVA absorbed by African partners   | Food products, beverages and tobacco | 3.0                     |
|                                            | Agriculture, forestry and fishing    | 1.8                     |
|                                            | Mining and energy extraction         | 1.7                     |
|                                            | Other mining and quarrying           | 1.6                     |
|                                            | Pharmaceutical products              | 0.8                     |
| Intra-African intermediate inputs received | Construction                         | 1.5                     |
|                                            | Refined petroleum products           | 1.4                     |
|                                            | Food products, beverages and tobacco | 1.1                     |
|                                            | Basic metals                         | 0.7                     |
|                                            | Wholesale and retail trade           | 0.7                     |

*Source:* Authors' calculations from AfCIOT base table and TiVA indicators.

*Notes:* (i) DVA means domestic value added embodied in gross exports. (ii) African partners means partner countries among the 22 AfCIOT African countries. (iii) TiVA indicators used are domestic value added embodied in gross exports (EXGR\_DVA) and gross imports for intermediate consumption (IMGR\_INT).

### 3 Global exposure of African countries through export-related value added

This section assesses the exposure of the 22 AfCIOT African countries to global markets using AfCIOT-based TiVA indicators for 2020. The results showed that these countries were generally more domestically embedded in exports than non-African comparators, and their export-related value added was also more concentrated by exporting industry. This combination meant that lower reliance on foreign inputs did not necessarily imply lower exposure; rather, the main exposure channel differed across countries.

The analysis compares African countries with non-African economies and excludes the Rest of World (ROW)<sup>3</sup> aggregate from benchmark calculations and partner rankings. It uses the Domestic Value-Added embodied in gross exports (DVA) indicator, which captures the domestic value generated through exports, and the Foreign Value-Added embodied in gross exports (FVA), which captures value-added generated from imported content. Together, the measures distinguish exposure by value-added origin, partner channel, and sectoral base before Section 4 turns to regional exposure.

#### 3.1 Domestic and foreign value added embodied in gross exports

African countries' exports contained a larger domestic value-added component than those of non-African comparators. The median DVA share in gross exports was 89.6 per cent for African countries, compared with 77.2 per cent for non-African countries. Conversely, the median FVA share was 10.4 per cent for African countries and 22.8 per cent for non-African countries. This pattern

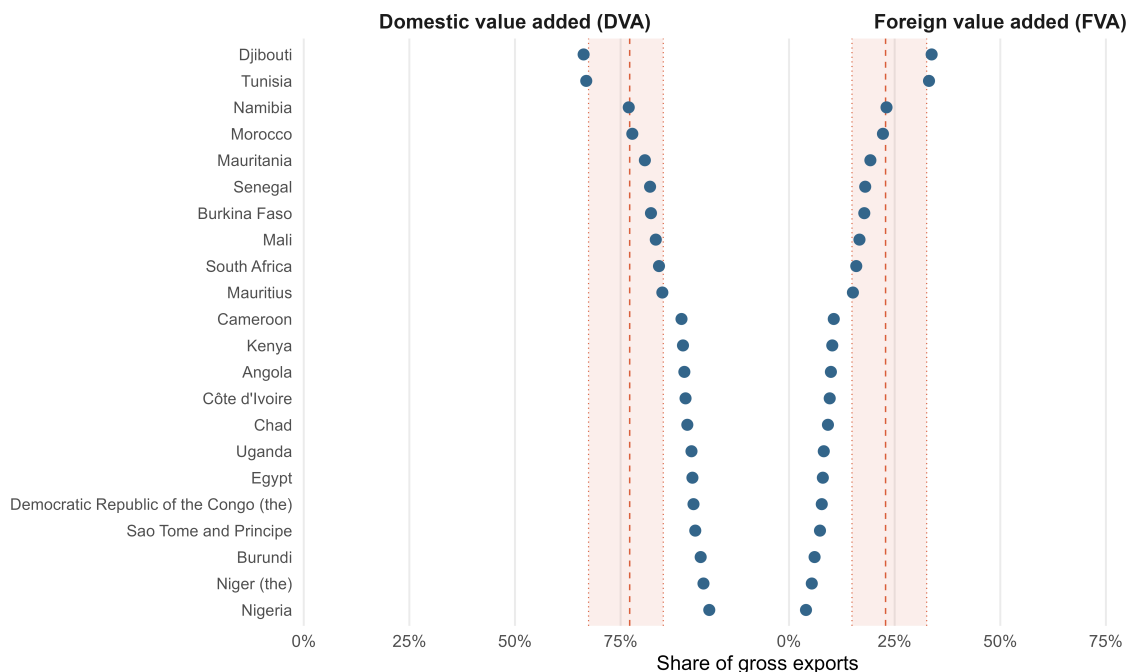
<sup>3</sup>Rest of the World (ROW) in the AfCIOT means all countries in the world not explicitly represented as individual countries in the base table. It is an accounting category used to ensure that the global input-output system remains complete and balanced.



indicated lower median dependence on imported intermediate inputs among the African countries in the sample. However, high domestic content should not be interpreted automatically as stronger integration or lower exposure, as it may reflect domestic value capture, but it may also indicate limited participation in backward global value chains.

Figure 2 showed that 12 of the 22 AfCIOT African countries were above the non-African 75th percentile for DVA and below the 25th percentile for FVA. This group included resource-intensive economies such as Angola and Nigeria, as well as more diversified exporters such as Kenya and Egypt. For these countries, the primary exposure channel was likely to run through foreign demand rather than through imported-input disruptions, although the dominant channel depended on the sectoral composition shown in Figure 4.

Djibouti and Tunisia formed the clearest opposite cases, with FVA above the non-African 75th percentile and DVA below the non-African 25th percentile. A further eight countries fell within the non-African interquartile range for both DVA and FVA. The results distinguished between domestically embedded exporters and foreign-input-intensive exporters without implying that either position was uniformly preferable.



**Figure 2:** Domestic and foreign value added embodied in gross exports, 2020

*Source:* Authors' calculations from AfCIOT base table and TiVA indicators.

*Notes:* (i) The shaded band shows the non-African interquartile range, excluding Rest of World (ROW). (ii) The dashed line shows the non-African median; dotted lines show the 25th and 75th percentiles. (iii) TiVA indicators used are gross exports (EXGR), domestic value added embodied in gross exports (EXGR\_DVA), and foreign value added embodied in gross exports (EXGR\_FVA).

Table 7 shifted the focus from export composition to export scale. South Africa had by far the largest gross exports among the listed AfCIOT countries, at USD 84.7 billion, of which USD 71.2 billion was domestic value added. Egypt and Nigeria also combined large export values with high domestic value-added levels, while Morocco and Tunisia had smaller export totals but larger foreign-content values in absolute terms than many higher-DVA economies. This distinction matters because Fig-

ure 2 identified the type of exposure, whereas Table 7 showed where that exposure was economically larger in dollar terms.

In several of these economies, high domestic content reflected dependence on primary commodities, natural resources or agricultural exports. These countries were less dependent on imported inputs, but they may have been exposed to world prices, external demand and commodity market volatility. The type of exposure differed for countries with higher external content in exports. They were more exposed to foreign-input disruptions, exchange rate depreciation, logistics costs and changes in the cost of imported intermediate goods. Their exports depended more directly on the availability and price of foreign inputs. These two exposure channels are examined in greater detail in the next two subsections through the channel of partner structure and sectoral composition.

**Table 7:** Gross exports, domestic value added of exports of the top 10 exporters, 2020

| Country                                | Gross exports<br>(USD billions) | DVA in exports<br>(USD billions) |
|----------------------------------------|---------------------------------|----------------------------------|
| South Africa                           | 84.7                            | 71.2                             |
| Egypt                                  | 39.2                            | 36.0                             |
| Nigeria                                | 38.2                            | 36.7                             |
| Morocco                                | 26.1                            | 20.3                             |
| Angola                                 | 20.9                            | 18.8                             |
| Tunisia                                | 16.3                            | 10.9                             |
| Democratic Republic of the Congo (the) | 13.8                            | 12.7                             |
| Côte d’Ivoire                          | 10.9                            | 9.8                              |
| Kenya                                  | 8.2                             | 7.3                              |
| Burkina Faso                           | 5.4                             | 4.5                              |

*Source:* Authors’ calculations from AfCIOT base table and TiVA indicators.

*Notes:* (i) DVA means domestic value added embodied in gross exports. (ii) TiVA indicators used are gross exports (EXGR) and domestic value added embodied in gross exports (EXGR\_DVA). (iii) External content is the part of gross exports generated outside the exporting country.

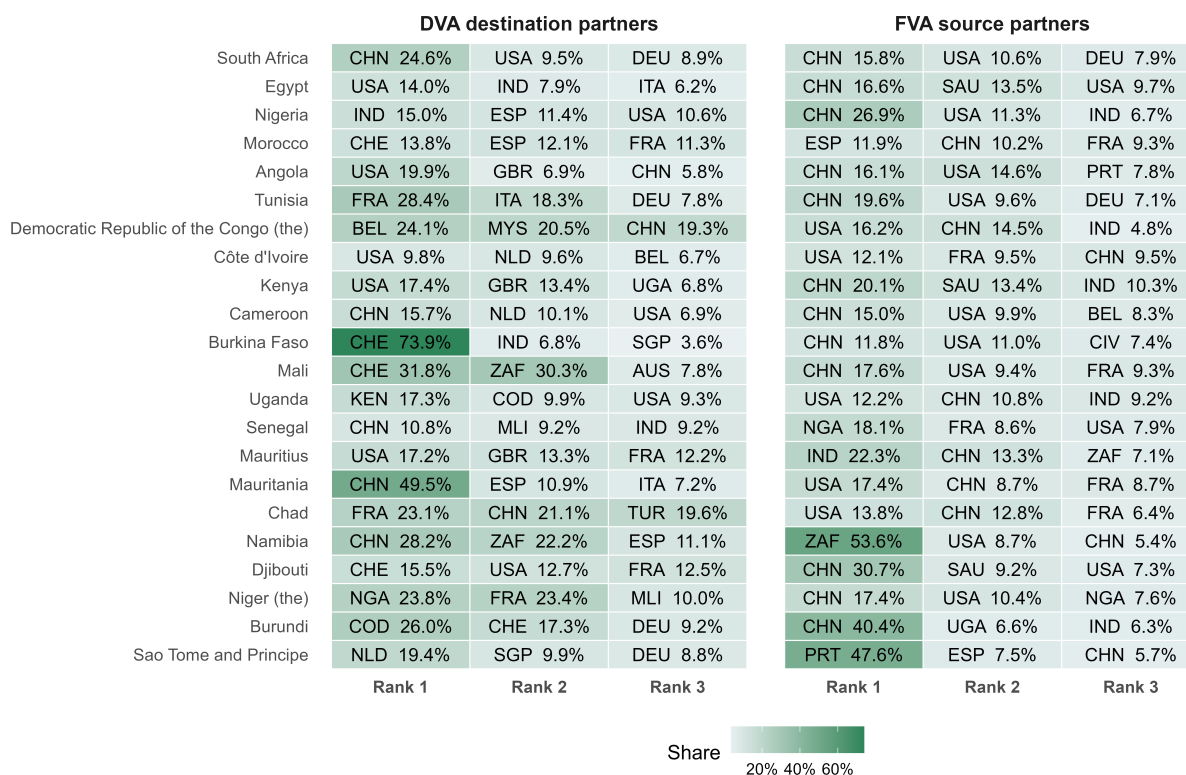
### 3.2 Partner concentration in global value-added exposure

Partner concentration shows whether export-related value added is linked to a narrow set of destination or supplier-origin countries. After excluding the Rest of World aggregate from the partner rankings and denominators, the median share of the top three destination partners for DVA was 41.7 per cent for African countries and 38.5 per cent for non-African comparators. For source partners of FVA, the African median was 35.9 per cent, compared with 41.1 per cent for non-African countries. African exposure through DVA destinations was therefore slightly more concentrated than the non-African benchmark, while exposure through FVA source partners was less concentrated at the median. The distinction separates market exposure, captured by where domestic value added is sold, from upstream supplier exposure, captured by where imported value added originates.

Figure 3 identified the partners behind these concentration measures. The strongest DVA destination concentration was observed in Burkina Faso, Mali, and Mauritania, while FVA source concentration was highest in Namibia, Sao Tome and Principe, and Burundi. The leading partners varied substantially across countries: China, the United States of America, European economies, and African partners all appeared among the main destination or source economies. This varia-

tion showed why aggregate DVA and FVA shares are not sufficient for assessing exposure; similar value-added structures can be tied to very different partner structures.

The partner evidence also motivates the regional analysis that follows in Section 4. Expanding African destination markets could reduce dependence on a narrow set of external demand partners, while developing regional suppliers of intermediate inputs could reduce exposure to non-African source partners for foreign value added. Section 4 therefore asks whether African markets and regional value chains provide a broader or more concentrated outlet for these economies.



**Figure 3:** Top three identifiable partner channels for value added embodied in gross exports, 2020

*Source:* Authors' calculations from AfCIOT base table and TiVA indicators.

*Notes:* (i) Reporting countries are shown with full names. (ii) Partner cells use three-letter country codes for readability. (iii) Rest of World (ROW) is excluded from partner rankings and denominators. (iv) Cells report the partner and its share of the identifiable partner total. (v) TiVA indicators used are EXGR\_DVA and EXGR\_BSCI, from which DVA destination shares and FVA source shares are derived.

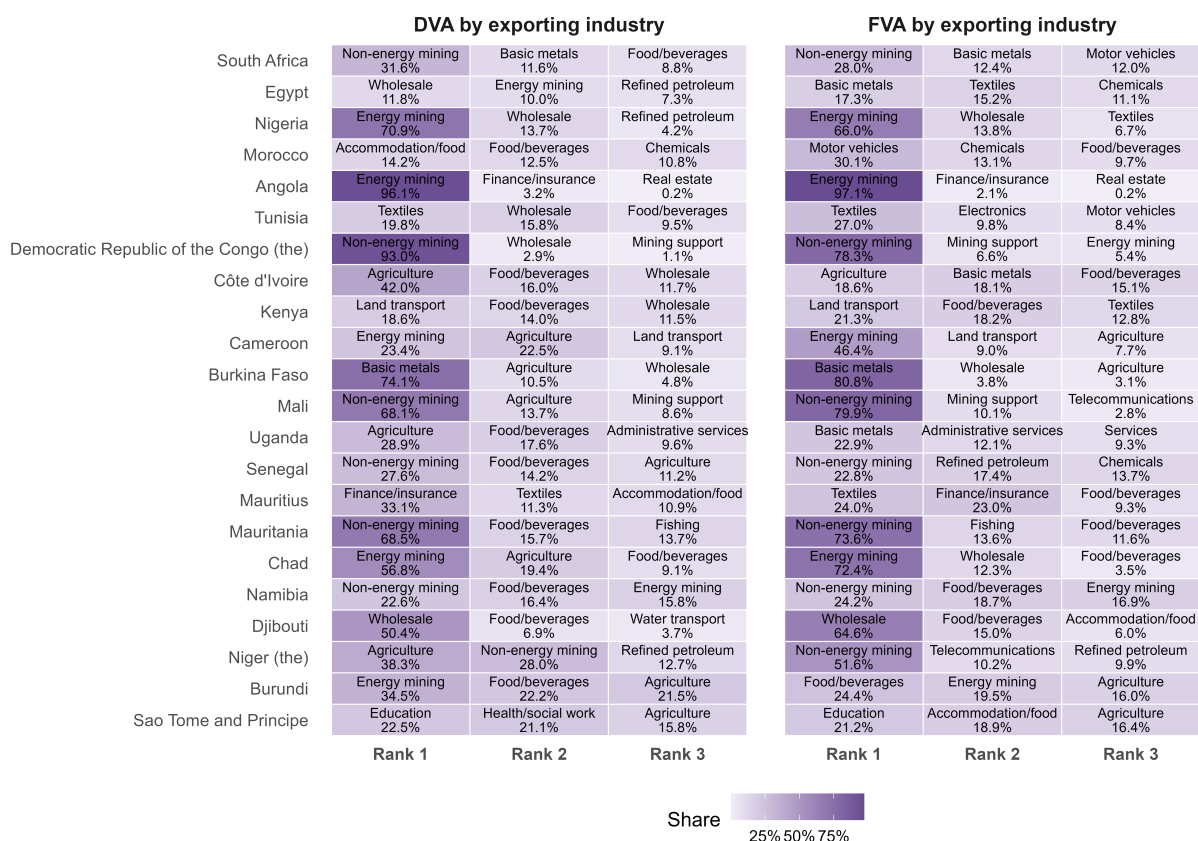
### 3.3 Industry concentration in global value-added exposure

Using the leading exporting industry as the comparison point, the median DVA concentration was 33.8 per cent for African countries, compared with 20.2 per cent for non-African countries. The corresponding leading-industry FVA concentration was 29.1 per cent for African countries and 21.2 per cent for non-African countries. Thus, African countries were not only more domestically embedded in export value added; they were also more concentrated in the industries through which that value added was generated.

At the leading-industry level, the highest DVA concentrations were observed in Angola, the Demo-

cratic Republic of the Congo, Burkina Faso, Nigeria, and Mauritania. The highest FVA concentrations were observed in Angola, Burkina Faso, Mali, the Democratic Republic of the Congo, and Mauritania. Figure 4 retains the top three industries for each country so that the reader can see whether exposure was dominated by a single industry or spread across several leading activities. Resource-based activities dominated several high-concentration cases, especially energy mining and non-energy mining, but the figure also highlighted non-resource channels such as food, wholesale and retail trade, transport, textiles, motor vehicles, finance and insurance, and accommodation and food services.

The sectoral evidence strengthened the interpretation of high DVA. A country can retain a large domestic share of export value added and still be highly exposed if that value added is concentrated in one extractive or service activity. Conversely, higher FVA does not necessarily imply greater fragility when imported input use is distributed across a broader set of industries and partners. The global results therefore pointed to a specific regional question: whether intra-African demand and regional value chains diversify these partner and industry channels or reproduce similar concentrations among African partners.



**Figure 4:** Top three exporting industries in value added embodied in gross exports, 2020

Source: Authors' calculations from AfCIOT base table and TiVA indicators.

Notes: (i) Reporting countries are shown with full names. (ii) Each cell reports an industry label and that industry's share of the country's total domestic or foreign value added embodied in gross exports. (iii) Full industry codes and labels are available in the supporting datasets. (iv) TiVA indicators used are EXGR\_DVA and EXGR\_FVA, aggregated by exporting industry.

### 3.4 Re-exports and imported intermediates embodied in exports

Imported intermediates embodied in exports are an important dimension of African countries' participation in international production and trade networks. In the AfCIOT framework, this dimension is captured through REII, which measures re-exported imported intermediates. REII refers to imported intermediate inputs that are embodied in goods and services subsequently exported by the importing country, rather than pure re-exports without domestic transformation. It provides information on the extent to which export production depends on foreign-sourced inputs.

For the 22 AfCIOT African countries, re-exported imported intermediates amounted to about 67.2 billion USD in 2020. This represented 22.6 per cent of gross exports and 39.9 per cent of imported intermediate inputs. These results showed that imported inputs played a significant role in supporting export production in the countries covered. In other words, part of their export capacity depended on both domestic resources and production factors and on the availability, price and reliability of foreign intermediate inputs.

**Table 8:** Top 14 African sectors using re-exported imported intermediates, 2020

| Country                                | Sector                                           | REII<br>(USD billions) |
|----------------------------------------|--------------------------------------------------|------------------------|
| Nigeria                                | Mining and energy extraction                     | 9.2                    |
| South Africa                           | Other mining and quarrying                       | 7.4                    |
| Democratic Republic of the Congo (the) | Other mining and quarrying                       | 4.7                    |
| Angola                                 | Mining and energy extraction                     | 4.6                    |
| South Africa                           | Basic metals                                     | 2.8                    |
| Burkina Faso                           | Basic metals                                     | 2.3                    |
| Mali                                   | Other mining and quarrying                       | 1.5                    |
| Nigeria                                | Wholesale and retail trade                       | 1.5                    |
| Egypt                                  | Mining and energy extraction                     | 1.4                    |
| Egypt                                  | Warehousing and support activities for transport | 1.3                    |
| Morocco                                | Chemicals and chemical products                  | 1.2                    |
| Egypt                                  | Basic metals                                     | 1.1                    |
| Côte d'Ivoire                          | Agriculture, forestry and fishing                | 1.0                    |
| South Africa                           | Motor vehicles                                   | 1.0                    |

*Source:* Authors' calculations from AfCIOT base table and TiVA indicators.

*Note:* The TiVA indicator used is re-exported imported intermediates (REII).

The sectoral distribution showed that re-exported imported intermediates were concentrated in strategic sectors. In Nigeria and Angola, the largest values were recorded in mining and energy extraction, suggesting that export activity in these sectors relied partly on imported intermediate inputs. In South Africa and the Democratic Republic of the Congo, large values were observed in other mining and quarrying, while South Africa also recorded significant re-exported imported intermediates in basic metals and motor vehicles. These patterns reflected the role of imported equipment, energy-related inputs, industrial services, components and other intermediate goods in supporting export-oriented production.

The results also showed that re-exported imported intermediates, in addition to manufacturing, were significant in natural resource sectors, agriculture, trade, transport-related activities, and

industrial processing. For example, Côte d'Ivoire recorded about 1.0 billion USD of re-exported imported intermediates in agriculture, forestry and fishing, while Egypt recorded significant values in warehousing and support activities for transport and basic metals.

For the same 22 countries, foreign value added accounted for 13.6 per cent of gross exports. Countries such as Tunisia, Djibouti, Morocco, Namibia, Senegal, Burkina Faso, Mali and South Africa showed relatively high foreign content in exports. At the same time, Burkina Faso, Mali, the Democratic Republic of the Congo, Nigeria, Angola and South Africa showed high levels of re-exported imported intermediates relative to gross exports or imported intermediate inputs. These two indicators showed that export performance was linked to domestic production capacity and foreign demand, as well as to imported inputs used in export production.

This analysis implies that strengthening export resilience requires attention to both export markets and input supply chains. Countries with high levels of re-exported imported intermediates may be sensitive to disruptions in their input supply. If these inputs become more expensive or less available, export production may be affected even when external demand remains unchanged.

## 4 Analysis of the regional exposure of African countries

The previous sections highlighted that African countries were exposed to global markets through export-related value-added, regardless of whether it originated domestically or from foreign sources. This section shifts the focus to a regional perspective by examining regional value chains. Its objective is to assess the value added that the 22 AfCIOT African countries generated through trade among themselves. In addition, the section evaluates their state of readiness at the start of the AfCFTA.

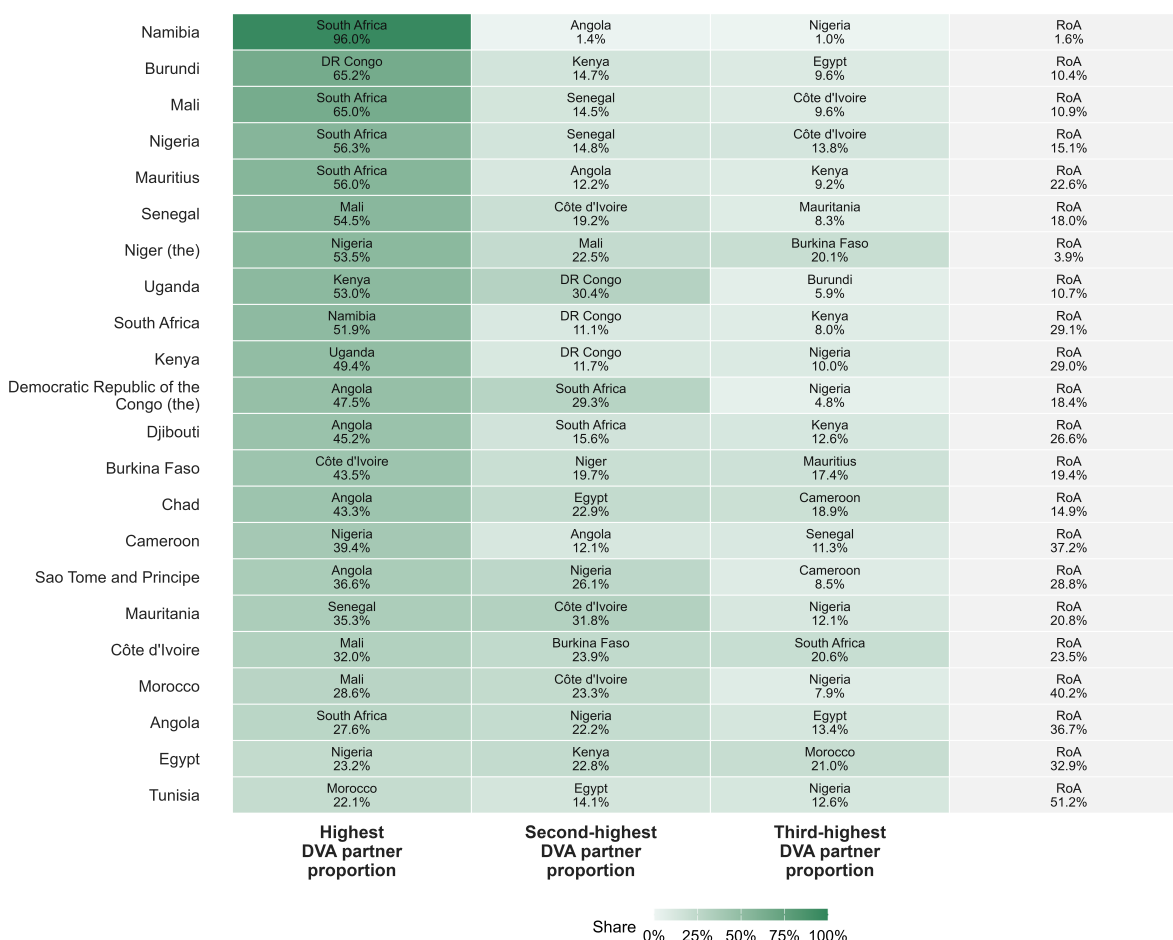
### 4.1 Intra-African integration – Regional Value Chains by partner countries

Figure 5 illustrates the domestic value added generated by African countries through exports to African partners in 2020, disaggregated by partner country. The analysis focuses on the three main trading partners from which each country derived the highest value added in exports of domestically produced goods and services.

The analysis of Figure 5 highlighted three main groups of the 22 AfCIOT African countries based on the regional concentration of their DVA. The first group included countries for which more than half of the domestic value added embodied in exports to other AfCIOT African countries<sup>4</sup> was generated through exports to a single African partner in 2020. This category included nine of the 22 AfCIOT African countries examined: Burundi, Mali, Mauritius, Namibia, Niger (the), Nigeria, Senegal, South Africa, and Uganda. The findings showed that almost two-thirds of Burundi's DVA embodied in its exports to the 21 other AfCIOT African countries was to the Democratic Republic of the Congo, while South Africa represented two-thirds of that of Mali. The results further pointed to a particularly strong regional dependence between Namibia and South Africa. In Namibia's case, an exceptional 96.0 per cent of its domestic value added embodied in exports to African partners was linked to its exports to South Africa. At the same time, South Africa itself derived more than half of its domestic value added embodied in exports to African partners from its exports to Namibia, accounting for 51.9 per cent. These findings reflected a high degree of economic interdependence

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<sup>4</sup>Other AfCIOT African countries refer to the 21 other countries in  $\mathcal{A}$ .



**Figure 5:** Domestic Value Added embodied in exports to the 22 AfCIOT African countries, by partner country, 2020

*Source:* Authors' calculations from AfCIOT base table and TiVA indicators.

*Notes:* (i) RoA is Rest of Africa and refers to the remaining 18 AfCIOT African countries after excluding the top three DVA-based African partners and the exporting country. (ii) TiVA indicator used is domestic value added embodied in gross exports (EXGR\_DVA), restricted to African destination partners.

between the two Southern African economies.

The second group consisted of countries that were not dependent on a single partner for more than half of their regional domestic value added, but where at least 60 per cent of the domestic value added embodied in exports to African partners in 2020 was generated through trade with two African partners. This group included seven of the 22 countries analysed: Burkina Faso, Chad, the Democratic Republic of the Congo, Djibouti, Kenya, Mauritania, and Sao Tome and Principe. Among the countries closest to the first group were Kenya and the Democratic Republic of the Congo. For instance, 49.4 per cent of Kenya's DVA embodied in exports to African partners were to Uganda and a further 11.7 per cent to the Democratic Republic of the Congo. Similarly, 47.5 per cent of the Democratic Republic of the Congo's DVA embodied in exports to African partners were to Angola and 29.3 per cent to South Africa in 2020.

The third group included countries with a lower regional dependence in their DVA embodied in

exports to African partners. These were countries that did not belong to either of the first two groups and whose three largest African trading partners together accounted for less than 75 per cent of their DVA embodied in exports to African partners. This group included Angola, Cameroon, Egypt, Morocco, and Tunisia. The findings indicated, for example, that Angola (with 36.7 per cent), Cameroon (with 37.2 per cent), Morocco (with 40.2 per cent), and Tunisia (with 51.2 per cent) generated more than one-third of their domestic value added embodied in exports to African partners through exports with AfCIOT African countries outside their three main partners. The analysis further showed that Tunisia was the least regionally dependent country in terms of intra-African domestic value added. Although Tunisia derived most of its domestic value added embodied in exports to African partners in 2020 from exports to Morocco (22.1 per cent), Egypt (14.1 per cent), and Nigeria (12.6 per cent), more than half of its domestic value added originated from exports to other African partners. Côte d'Ivoire did not fall clearly into any of the three groups, although it was relatively close to the third category. In its case, the share of domestic value added embodied in exports to African partners generated through exports with its three main African partners reached 76.5 per cent.

## 4.2 Regional exposure and industry exposure

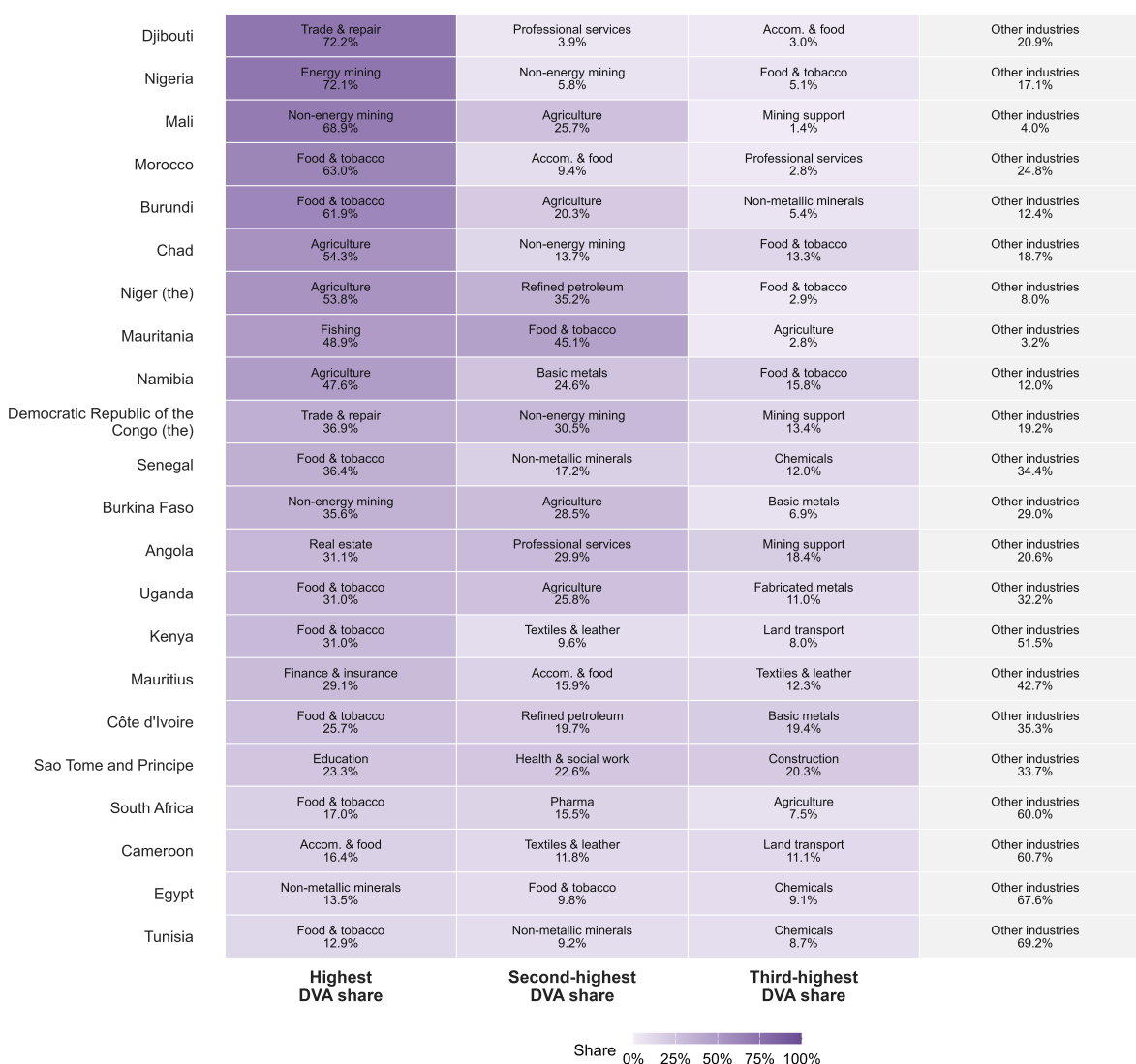
While the previous subsection examined regional exposure from the perspective of trading partners, this subsection approaches the issue from the standpoint of sectoral exposure. Figure 6 illustrates the domestic value added of African countries embodied in exports to African partners by industry in 2020. The discussion in this section focuses primarily on the major sectors of economic activity.

The analysis presented in Figure 6 identified four main groups of African countries based on the degree of sectoral concentration of their domestic value added embodied in exports to African partners. The first group included countries where more than 50 per cent of the domestic value added embodied in exports to African partners was concentrated in a single sector of activity. Among the 22 countries examined, seven fell into this category: Burundi, Chad, Djibouti, Mali, Morocco, Niger (the), and Nigeria. In the cases of Djibouti and Nigeria, more than 72 per cent of the domestic value added embodied in exports to African partners was concentrated in wholesale and retail trade and repair of motor vehicles and motorcycles, and in mining and quarrying, energy-producing products, respectively.

The second group consisted of countries where domestic value added embodied in exports to African partners was concentrated in two sectors that together accounted for more than 60 per cent, although these countries did not belong to the first group. This category included Angola, Burkina Faso, the Democratic Republic of the Congo, Mauritania, and Namibia. Among these countries, Mauritania and Namibia were particularly close to the first group, as their leading industries — fishing and aquaculture in Mauritania, and crop and animal production, hunting, and related service activities in Namibia — accounted for 48.9 per cent and 47.6 per cent of their domestic value added embodied in exports to African partners, respectively. In Mauritania, the manufacture of food products represented an additional 45.0 per cent, meaning that the country's two leading industries together accounted for nearly 95 per cent of the domestic value added embodied in its exports to African partners.

The third group included countries where more than 50 per cent of the domestic value added embodied in exports to African partners was concentrated in three sectors of activity. This category comprised Côte d'Ivoire, Mauritius, Senegal, Sao Tome and Principe, and Uganda. Compared with the first two groups, these countries displayed a lower degree of sectoral concentration, as their





**Figure 6:** Domestic Value Added embodied in exports to African partners, by industry, in 2020

*Source:* Authors' calculations from AfCIOT base table and TiVA indicators.

*Notes:* (i) TiVA indicator used is domestic value added embodied in gross exports (EXGR\_DVA), restricted to exports to African partners and aggregated by exporting industry. (ii) African countries means the 22 AfCIOT African countries.

domestic value added embodied in exports to African partners was distributed across three major sectors that together accounted for around half of the total, while the remaining sectors contributed the other half.

The fourth group consisted of five African countries with the most diversified structure of domestic value added embodied in exports to African partners: Cameroon, Egypt, Kenya, Tunisia, and South Africa. Among them, Tunisia appeared to have the most diversified distribution of domestic value added embodied in exports to African partners, followed by Egypt. In both countries, the three leading sectors together accounted for less than one-third of total domestic value added embodied in exports to African partners.

This section also examines foreign value added embodied in exports to African partners, which revealed a different pattern from that observed for domestic value added. Figure 7 presents the foreign value added embodied in exports to African partners by industry in 2020. The analysis identified two broad groups: countries in which foreign value added embodied in exports to African partners was highly concentrated in a single sector, and countries in which it was more diversified across sectors.

The first group included nine countries: Angola, Burkina Faso, Chad, the Democratic Republic of the Congo, Djibouti, Mali, Mauritania, Niger (the), and Nigeria. The most distinctive case was Angola, where 97.1 per cent of foreign value added embodied in its exports to African partners was concentrated in a single sector, namely mining and quarrying, energy-producing products. In Burkina Faso, the Democratic Republic of the Congo, and Mali, approximately 80 per cent of foreign value added embodied in their exports to African partners were from one dominant sector. In Burkina Faso, this was the manufacture of basic metals sector, while in the Democratic Republic of the Congo and Mali, it was mining of metal ores.

The second group comprised countries in which the three leading sectors together accounted for less than 60 per cent of foreign value added embodied in exports to African partners, indicating a more diversified structure. This category included Burundi, Côte d'Ivoire, Egypt, Kenya, Morocco, Mauritius, Namibia, Senegal, Sao Tome and Principe, South Africa, Tunisia, and Uganda.

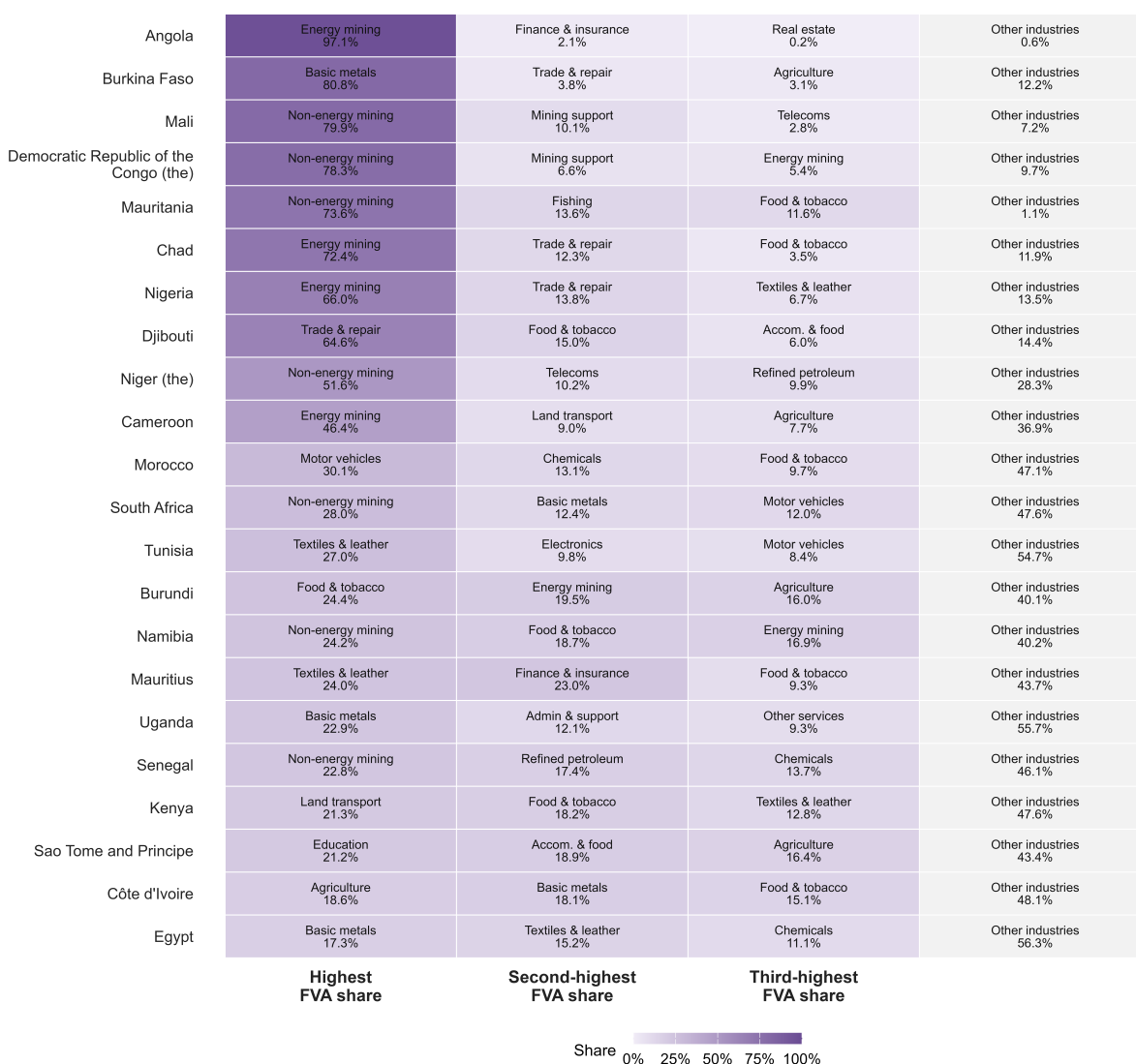
Only Cameroon did not fit clearly into either category. In Cameroon, mining and quarrying, energy-producing products accounted for 46.4 per cent of foreign value added embodied in exports to African partners, while the country's three leading sectors together represented 63.1 per cent of total foreign value added embodied in exports to African partners.

### **4.3 Analysis of the state of readiness of African countries at the start of the AfCFTA**

The AfCFTA aims to boost intra-African trade and foster economic integration across the continent by creating an integrated market that can serve as a catalyst for investment and industrial transformation. The potential impact of such an agreement depends partly on the initial economic conditions of participating countries. This paper assesses baseline conditions relevant to AfCFTA readiness among the 22 AfCIOT African countries by analysing patterns of production, demand, trade partnerships, and value-chain linkages.

#### **4.3.1 Value-added content of total output**

AfCIOT data suggested that the 22 AfCIOT African countries had relatively high value-added shares in total output, ranging from 50 to 71 per cent. This indicated that domestic production was a major contributor to economic output. However, high value-added shares did not necessarily reflect diversified industrial structures. In many countries, production was concentrated in primary sectors such as agriculture and extractives. Countries with lower value-added shares tended to be more integrated into global value chains, reflecting more complex production systems. Overall, while the domestic base was strong, limited diversification may constrain early gains from trade liberalisation under AfCFTA.



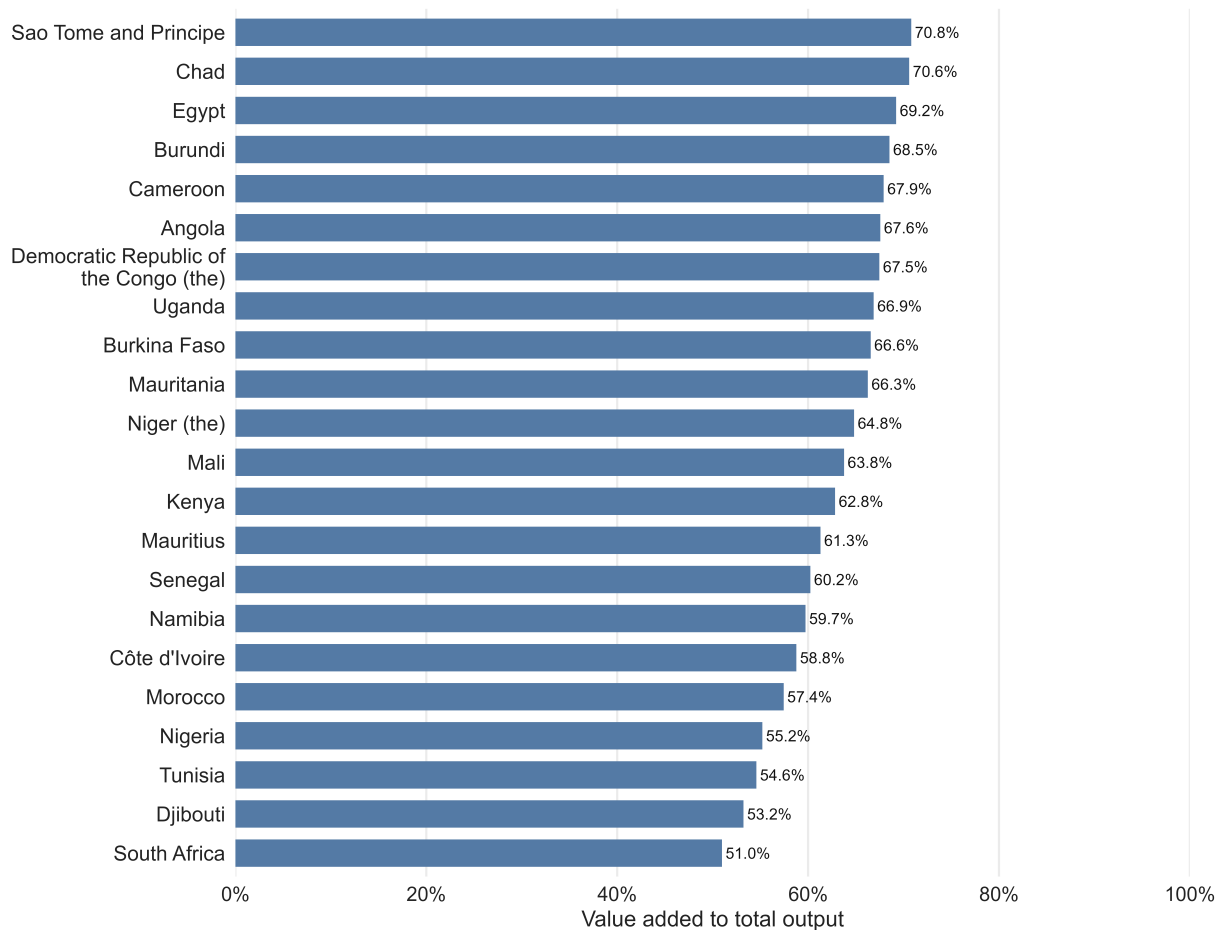
**Figure 7:** Foreign Value Added embodied in exports to African partners, by industry, in 2020

*Source:* Authors' calculations from AfCIOT base table and TiVA indicators.

*Notes:* (i) TiVA indicator used is foreign value added embodied in gross exports (EXGR\_FVA), restricted to exports to African partners and aggregated by exporting industry. (ii) African countries means the 22 AfCIOT African countries.

### 4.3.2 Sources of supply to final demand

The 22 AfCIOT African countries relied heavily on domestic sources to satisfy final demand, often accounting for over 80 per cent. In contrast, intra-African supply was minimal, typically below two per cent, while supplies from non-African partners and the ROW aggregate made up a significant share of final demand. Only a handful of countries sourced part of their final-demand supplies from other AfCIOT African countries. This pattern indicated weak regional integration and suggested that most countries operated in relatively closed economic structures. The low reliance on African partners highlighted the limited development of regional supply chains, which may constrain larger AfCFTA gains.



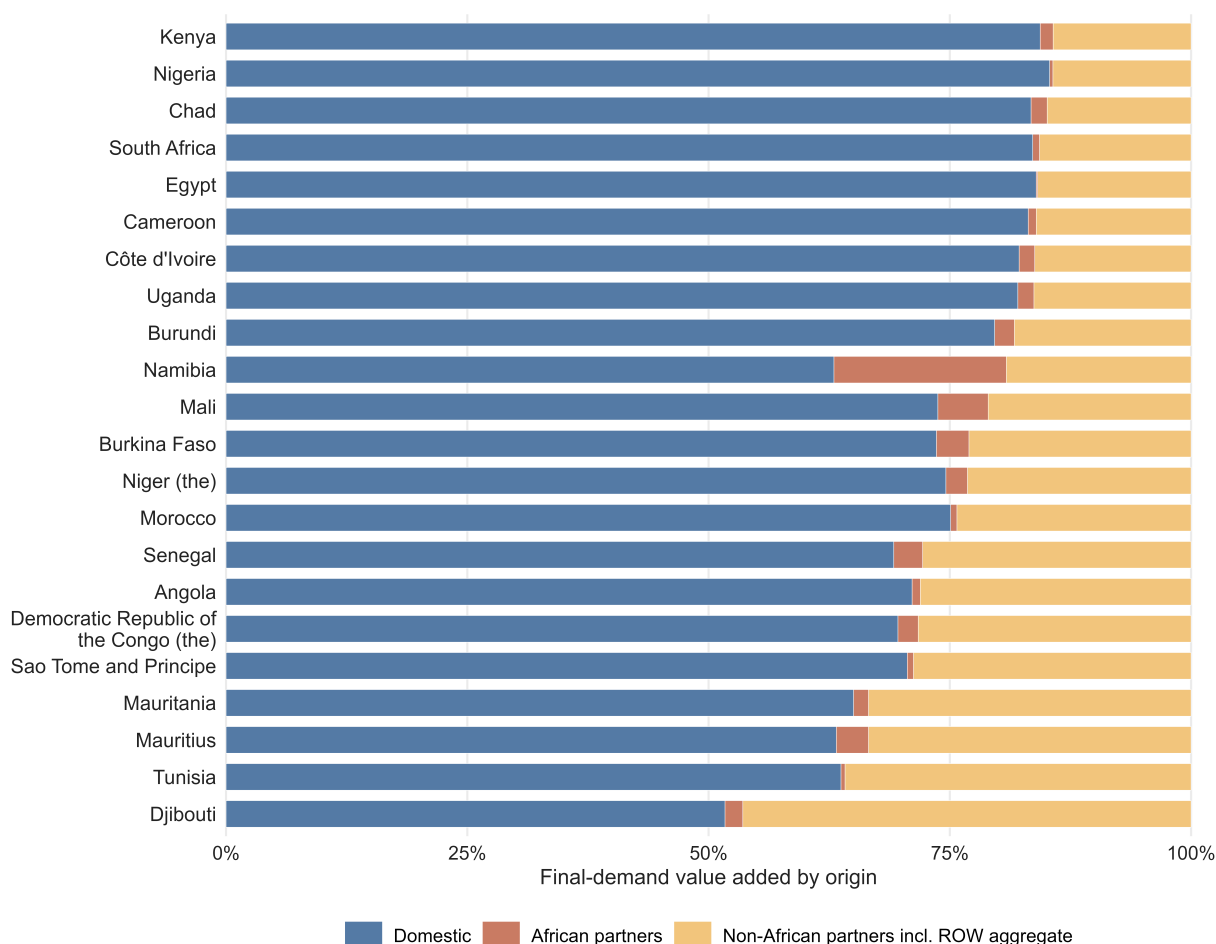
**Figure 8:** Domestic value-added content of output, 2020

*Source:* Authors' calculations from AfCIOT base table and TiVA indicators.

*Note:* Indicator used is production value-added intensity (PROD\_VASH), derived from AfCIOT gross value added (VALU) and gross output (PROD).

Namibia stood out with a much larger African-partner share in final demand than most economies, while Djibouti, Tunisia, Mauritius, and Mauritania showed strong dependence on suppliers outside the AfCIOT African-country set. Large economies such as Nigeria, Egypt, Kenya, and South Africa combined high domestic sourcing with very limited African-partner sourcing, indicating that market size by itself did not automatically produce regional integration.

For AfCFTA implementation, the policy challenge is to increase the share of African-partner suppliers in domestic final demand without undermining domestic productive capacity. In practice, this requires complementarity rather than displacement: regional sourcing should reduce costs, widen product variety, and strengthen domestic industrialisation by allowing firms to scale for a larger continental market.



**Figure 9:** Structure of suppliers to the final demand of African countries, 2020

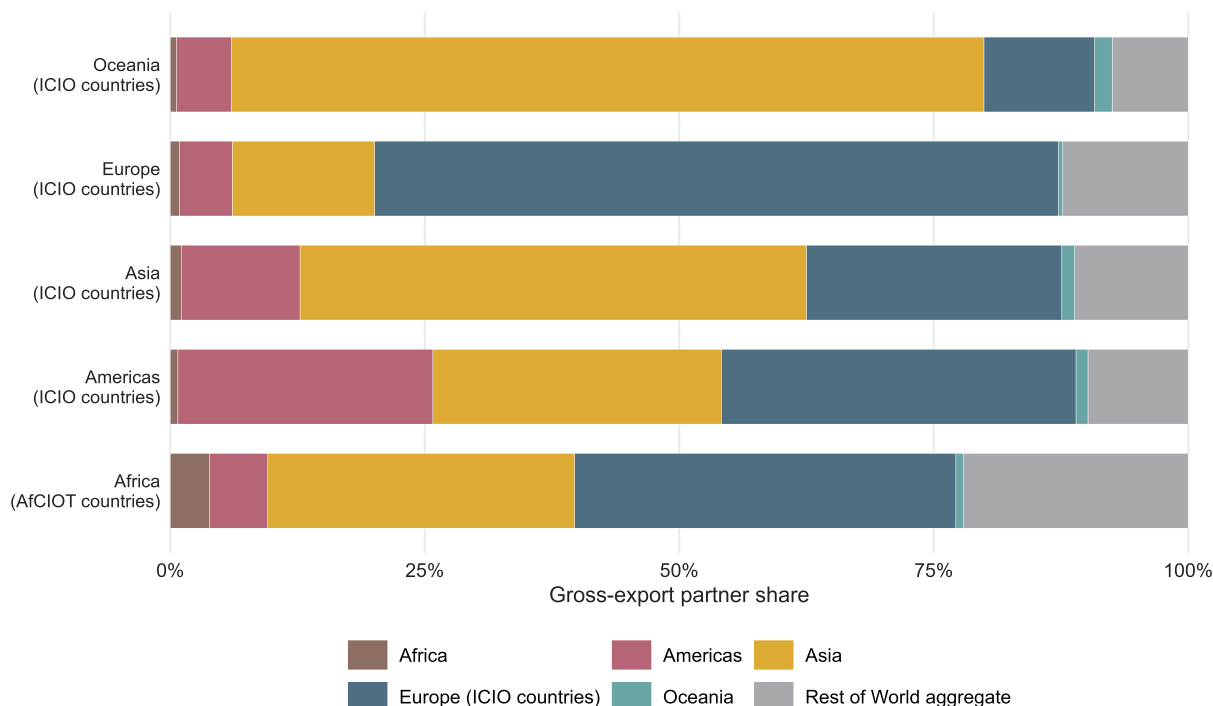
*Source:* Authors' calculations from AfCIOT base table and TiVA indicators.

*Notes:* (i) African countries means the 22 AfCIOT African countries, and African partners means other countries within that same set. (ii) TiVA indicators used are final-demand value added by origin (FD\_VA) and final-demand value-added shares (FD\_VASH), derived from value added embodied in final demand (VAFD). (iii) The non-African component includes individually represented non-African economies and the ROW aggregate.

### 4.3.3 Trade partner orientation

The structure of trade revealed that exports by the 22 AfCIOT African countries were predominantly directed outside the continent. Europe and Asia accounted for the largest shares, while intra-African exports remained very limited. This reflected longstanding historical and structural factors, including patterns of commodity exports and limited industrial complementarity between AfCIOT African countries. As a result, the countries covered remained externally oriented, which may limit the immediate impact of AfCFTA unless significant structural changes occur.

According to the AfCIOT data, exports by the 22 AfCIOT African countries to other AfCIOT African countries, at 3.9 per cent in 2020, were very modest compared with their exports to Asia at 30.1 per cent and European ICIO countries at 37.5 per cent. By contrast, Asia sent 49.7 per cent of its exports within Asia, and Europe sent 67.2 per cent of its exports within Europe, illustrating the much denser intra-regional trade systems found elsewhere.



**Figure 10:** Gross export partner share by destination region, 2020

*Source:* Authors' calculations from AfCIOT base table and TiVA indicators.

*Notes:* (i) TiVA indicator used is gross-export partner share (EXGRpSH), aggregated by regional destination group. (ii) The Africa region is represented by the 22 AfCIOT African countries; Europe refers to European ICIO countries included in the ICIO/AfCIOT country coverage; the Americas and Asia refer to countries included in the ICIO/AfCIOT country coverage; ROW is retained as a separate destination component.

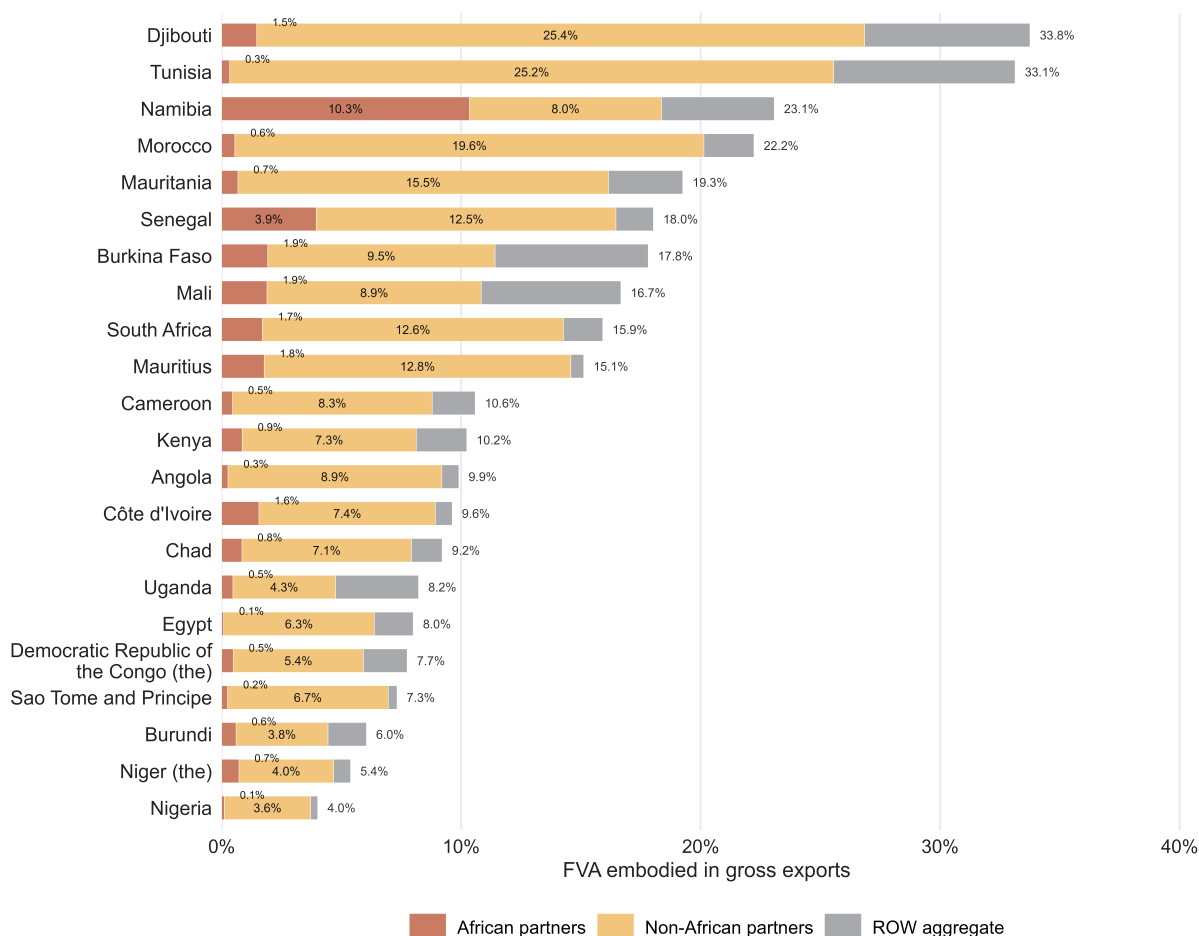
This comparison is central to the concept of readiness. The countries covered entered AfCFTA without the dense regional trade base enjoyed by more integrated blocs. That is a constraint because firms lacked established continental distribution and sourcing networks, but it is also an opportunity because even moderate increases in intra-African market share could support structural change.

#### 4.3.4 Backward and forward linkages: integration in regional and global value chains

Backward linkages indicate the extent to which countries rely on imported inputs in their exports, while forward linkages measure how much domestic production is used in other countries' exports.

In AfCIOT data, the African-partner component of foreign value added was small, averaging only 1.5 per cent in 2020, while the non-African-partner and ROW-aggregate components together averaged 11.9 per cent. Average total backward linkage was 13.4 per cent. These facts imply that when the 22 AfCIOT African countries exported, the imported inputs embodied in those exports were sourced mainly from outside the AfCIOT African-country set. In other words, before AfCFTA implementation, production networks were externally anchored. This provides evidence of limited regional readiness: trade occurred, but the supply chains behind that trade were weakly Africa-centred.

On the other side of the Global Value Chain (GVC) and Regional Value Chain (RVC) analysis, forward linkages capture the extent to which a country's value added is used in other countries' exports. Here too, the regional component was weak. African-partner forward participation averaged only 1.4 per cent in 2020, compared with 21.2 per cent for non-African partner exports and the ROW aggregate together, while total forward participation averaged 22.6 per cent. This indicated that the 22 AfCIOT African countries were linked into international production systems mainly as suppliers to extra-African value chains rather than to continental ones. In many cases, commodities and upstream products from countries in Africa were feeding processing and export systems located outside the continent. Such a pattern is consistent with long-standing concerns that economies in Africa remain integrated into global trade largely as suppliers of raw materials and low-processed exports.



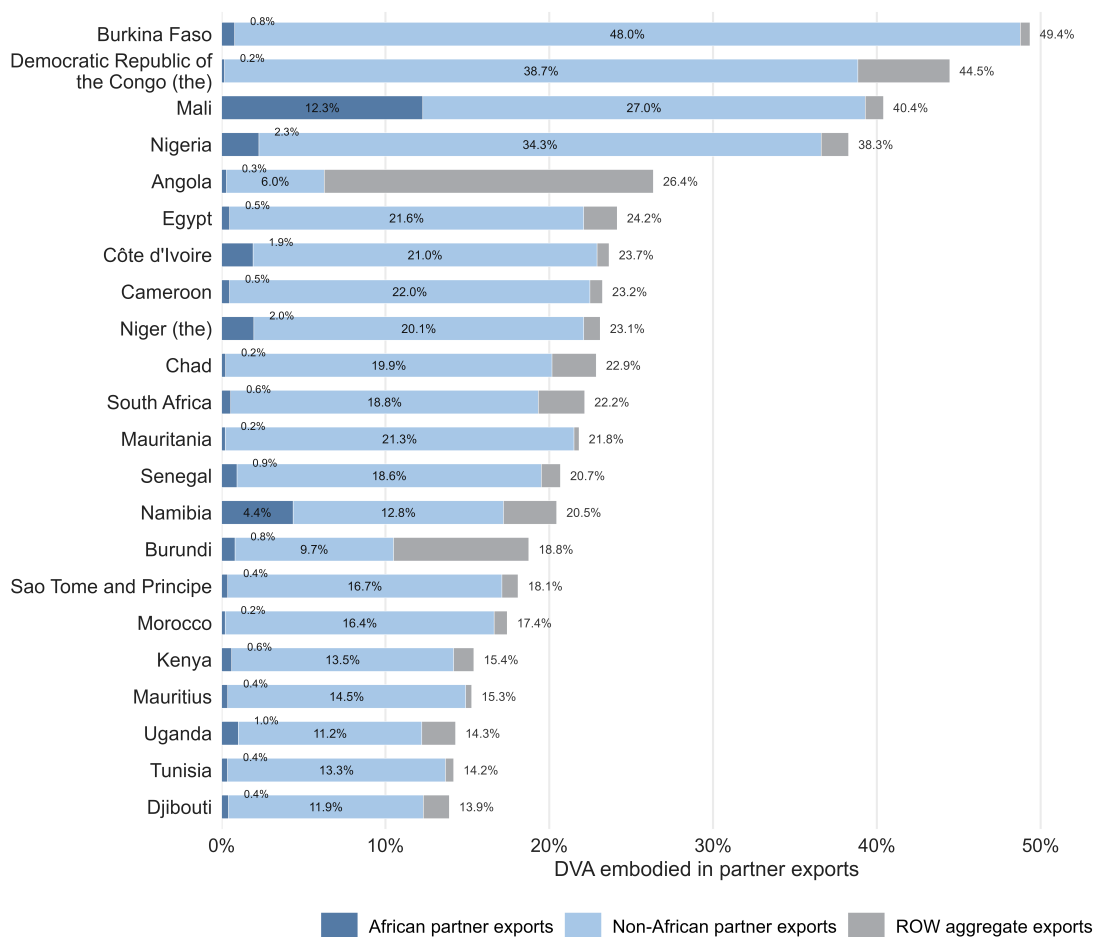
**Figure 11: Backward linkages of African countries, 2020**

*Source:* Authors' calculations from AfCIOT base table and TiVA indicators.

*Notes:* (i) African countries means the 22 AfCIOT African countries, and African partners means other countries within that same set. (ii) TiVA indicator used is foreign-value-added source shares in gross exports (DEXF-VApSH), reported as backward-linkage exposure by source region. (iii) Bars show foreign value added from each source region as a share of each reporting country's gross exports; the full bar is the total backward-linkage share, with ROW shown separately from individually represented non-African partners.

The leading countries by African-partner content in gross exports included Namibia, Senegal, Burk-

ina Faso, Mali, and Mauritius, but even in these cases the non-African-partner and ROW components were often comparable or larger. Djibouti and Tunisia recorded very high total backward linkages, yet these depended overwhelmingly on non-African value added, suggesting that openness alone does not guarantee regional embeddedness. For AfCFTA, strengthening backward linkages means making intermediate producers in Africa more competitive relative to suppliers from Europe, Asia, and elsewhere. That requires trade facilitation, industrial clusters, standards convergence, and major investments in transport and energy. Without these complementary measures, tariff preferences alone are unlikely to redirect input sourcing decisively toward the continent.



**Figure 12:** Forward linkages of African countries, 2020

*Source:* Authors' calculations from AfCIOT base table and TiVA indicators.

*Notes:* (i) African countries means the 22 AfCIOT African countries, and African partners means other countries within that same set. (ii) TiVA indicator used is domestic value added embodied in partner exports (FEXD-VApSH), reported as forward-linkage exposure by partner-export region. (iii) Bars show the reporting country's domestic value added embodied in partner exports as a share of the reporting country's gross exports; the full bar is the total forward-linkage share, with ROW shown separately from individually represented non-African partners.

Mali and Namibia showed relatively higher African-partner forward participation than most countries in the sample, but the broader pattern remained strongly external. Burkina Faso, the Democratic Republic of the Congo, Nigeria, and Angola displayed high total forward participation, yet most of it was directed toward non-African partner exports and the ROW aggregate rather than to-



ward African partners. This confirmed that strong participation in value chains did not necessarily mean participation in regional value chains.

The AfCFTA challenge in this dimension is to retain and transform more African value added within the continent before final export. That could involve regional agro-processing, mineral beneficiation, assembly activities, and cross-border industrial hubs that convert upstream African supply into downstream African manufactures and services.

The 22 AfCIOT African countries entered AfCFTA with low levels of regional integration and weak intra-African value-chain connections. Although domestic production capacity existed, the lack of diversification and limited intra-African trade reduced the potential gains from trade liberalisation. On the other hand, these gaps also presented opportunities for growth and transformation.

While AfCFTA represents a major step toward economic integration in Africa, the scale of its gains depends partly on addressing structural weaknesses. Policymakers need to promote industrialisation, improve infrastructure, and strengthen regional supply chains, while at the same time addressing institutional barriers to trade among the countries of the region. By doing so, countries in Africa would be better positioned to benefit from the opportunities created by AfCFTA and move toward a more integrated and resilient economic system.

## 5 Conclusion

This paper shows that traditional approaches are insufficient for a comprehensive assessment of countries' exposure to external shocks. Direct trade statistics miss indirect exposure transmitted through domestic sectoral linkages and third-country value-added channels. Gross exports do not reveal the value created domestically. Product-level trade data cannot trace sectoral transmission chains. Macroeconomic indicators are too aggregated to identify exposed industries. Finally, conventional approaches often understate regional value-chain exposure, which is increasingly important under the AfCFTA. AfCIOT addresses these gaps by linking countries, sectors, intermediate inputs, final demand, and value added in one consistent framework. It therefore provides a stronger basis for identifying exposed countries, exposed sectors, and policy responses.

The 22 AfCIOT African countries had higher domestic value added and lower foreign value added in exports than non-African comparators, indicating less reliance on imported inputs in export production. However, their export-related value added was more concentrated across destination partners and exporting industries, so exposure was shaped less by upstream input dependence and more by where domestic value added was sold and which sectors generated it.

In the regional value chain, the countries covered remained exposed to market- and industry-based concentration. In most cases, for example, the domestic value added embodied in exports to African partners was generated through exports to a single or two African partners in 2020. Domestic and foreign value added embodied in exports to African partners were also concentrated in a single or two sectors of activity in many cases.

The 2020 evidence indicated that the 22 AfCIOT African countries entered AfCFTA with high domestic value-added content but limited regional economic integration. Domestic production dominated final demand, intra-African trade remained small relative to trade with Europe and Asia, and both backward and forward linkages were primarily extra-African. These patterns pointed to a low-integration starting point for AfCFTA implementation.

The main limitation of this analysis is the restricted country coverage. The study includes 22 AfCIOT African countries, a subset of the continent's 54 economies. Although this sample captures resource-dependent economies, diversified economies, and emerging industrial hubs, it does not fully represent the diversity of the African continent. Several small economies, fragile states, and landlocked countries, which often face important structural constraints, are not yet included. As a result, the analysis may overstate or understate regional integration performance, particularly in relation to intra-African trade, supply-chain linkages, and value-chain participation. The way forward is therefore to expand AfCIOT coverage to additional countries in Africa, strengthen the representation of subregional dynamics such as ECOWAS, EAC, and SADC, and update the database over time so that future work can move from a 2020 baseline assessment toward dynamic monitoring of AfCFTA implementation.

The findings also carry policy implications for AfCFTA implementation and exposure management. They suggest that strengthening regional integration requires more than tariff reduction: countries need to expand productive capacity, diversify export sectors, deepen intra-African input sourcing, and build regional value chains that can absorb and transform more African value added within the continent. Annex D discusses these policy implications in greater detail.

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# Annexes

## Annex A Coverage and Notation

The AfCIOT is a 2020 current-US-dollar country-industry input-output system. It covers 89 individual economies and one Rest of World aggregate (ROW). Let  $c, p, r, s \in \mathcal{C}$  index countries or regions,  $i, j, h \in \mathcal{I}$  index industries, and  $f \in \mathcal{F}$  index final-demand categories. The AfCIOT African-country set is

$$\begin{aligned} \mathcal{A} = \{ & \text{Angola, Burkina Faso, Burundi, Côte d'Ivoire, Cameroon,} \\ & \text{Democratic Republic of the Congo (the), Djibouti, Egypt, Kenya, Morocco,} \\ & \text{Mali, Mauritania, Mauritius, Namibia, Niger (the), Nigeria,} \\ & \text{Senegal, Sao Tome and Principe, Chad, Tunisia, Uganda, South Africa} \}. \end{aligned} \quad (\text{A.1})$$

Here  $\mathcal{C}$  contains the 89 economies and ROW,  $\mathcal{I}$  contains the 45 industries, and  $\mathcal{F}$  contains the six final-demand categories listed in Table 9. The same table also defines the main mathematical objects used below, including intermediate inputs, final-demand objects, accounting controls, and Leontief-based matrices. ROW is retained for accounting closure and world totals, but excluded from partner rankings and AfCIOT African-country/non-African benchmark distributions. Final demand is retained by category in the AfCIOT; TiVA indicators aggregate over  $f$  only where the formulas explicitly sum across  $\mathcal{F}$ .

**Table 9:** Core notation, industry coverage, and final-demand objects used in the AfCIOT/TiVA system

| Code                                                            | Description                                                                                                                                                   |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Index and AfCIOT objects</i>                                 |                                                                                                                                                               |
| $\mathcal{C}, \mathcal{A}, \mathcal{N}$                         | Country sets: all AfCIOT economies including ROW; the AfCIOT African-country set; and the non-African benchmark set excluding $\mathcal{A}$ and ROW.          |
| $\mathcal{G}, \Gamma_R$                                         | Regional groups used in Section 4 partner-share indicators and the set of countries or aggregate assigned to region $R \in \mathcal{G}$ .                     |
| $\mathcal{I}; c, p, r, s; i, j, h$                              | Industry set and indices used throughout: $c, p, r, s$ index countries or regions; $i, j, h$ index exporting, receiving, or value-added source industries.    |
| $Z = [z_{ij}^{rs}]$                                             | Intermediate-use matrix; $z_{ij}^{rs}$ is the flow from source country-industry $(r, i)$ to using country-industry $(s, j)$ .                                 |
| $x_i^r, \text{TLS}_i^r, w_i^r, v_i^r, \hat{v}$                  | Gross output, taxes less subsidies, gross value added, direct value-added coefficient $v_i^r = w_i^r/x_i^r$ , and the diagonal coefficient matrix $\hat{v}$ . |
| $S^c, U_x^c, U_f^c$                                             | Harmonised supply, intermediate-use, and final-use tables for AfCIOT African country $c$ before conversion to IOT blocks.                                     |
| $q^c, m^c, \tau^c, \theta^c, m_x^c, \tau_x^c$                   | SUT balance and valuation controls: product output, imports, net taxes, trade-and-transport margins, and their industry-use allocations.                      |
| $U_{x,bp}^c, U_{x,m}^c, U_{f,m}^c, U_{x,d}^c, U_{f,d}^c, \Pi^c$ | Basic-price intermediate use, import-use and domestic-use blocks, and the product-sales-share matrix used to form national IOT blocks.                        |
| $E_{i,p}^c, M_{i,p}^c$                                          | Bilateral export and import controls by country, partner, and industry.                                                                                       |
| $T_g, \hat{T}_g, R_g$                                           | Residual-account control, amount already allocated, and ROW residual used for global closure.                                                                 |
| $A, A^d, A^m, B, B^d, G$                                        | Technical-coefficient, imported-coefficient, Leontief, and value-added requirements matrices used in the TiVA decomposition.                                  |
| <i>Final-demand objects</i>                                     |                                                                                                                                                               |
| $\mathcal{F}$                                                   | Set of six final-demand categories used as final-demand columns in AfCIOT.                                                                                    |
| $f$                                                             | Final-demand category index.                                                                                                                                  |
| $y_{if}^{rs}$                                                   | Final demand in country $s$ , category $f$ , for output from industry $i$ in source country $r$ .                                                             |
| $Y$                                                             | Full final-demand matrix with rows indexed by source country-industry $(r, i)$ and columns by destination country-category $(s, f)$ .                         |
| $(s, f)$                                                        | Final-demand column object combining destination country $s$ and final-demand category $f$ .                                                                  |
| $VAFD$                                                          | Value added embodied in final demand, computed as $VAFD = \hat{v}BY = GY$ .                                                                                   |
| <i>Industry codes</i>                                           |                                                                                                                                                               |

| Code                               | Description                                                                                                                |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| D01T02                             | Agriculture, hunting, forestry                                                                                             |
| D03                                | Fishing and aquaculture                                                                                                    |
| D05T06                             | Mining and quarrying, energy producing products                                                                            |
| D07T08                             | Mining and quarrying, non-energy producing products                                                                        |
| D09                                | Mining support service activities                                                                                          |
| D10T12                             | Food products, beverages and tobacco                                                                                       |
| D13T15                             | Textiles, textile products, leather and footwear                                                                           |
| D16                                | Wood and products of wood and cork                                                                                         |
| D17T18                             | Paper products and printing                                                                                                |
| D19                                | Coke and refined petroleum products                                                                                        |
| D20                                | Chemical and chemical products                                                                                             |
| D21                                | Pharmaceuticals, medicinal chemical and botanical products                                                                 |
| D22                                | Rubber and plastics products                                                                                               |
| D23                                | Other non-metallic mineral products                                                                                        |
| D24                                | Basic metals                                                                                                               |
| D25                                | Fabricated metal products                                                                                                  |
| D26                                | Computer, electronic and optical equipment                                                                                 |
| D27                                | Electrical equipment                                                                                                       |
| D28                                | Machinery and equipment, nec                                                                                               |
| D29                                | Motor vehicles, trailers and semi-trailers                                                                                 |
| D30                                | Other transport equipment                                                                                                  |
| D31T33                             | Manufacturing nec; repair and installation of machinery and equipment                                                      |
| D35                                | Electricity, gas, steam and air conditioning supply                                                                        |
| D36T39                             | Water supply; sewerage, waste management and remediation activities                                                        |
| D41T43                             | Construction                                                                                                               |
| D45T47                             | Wholesale and retail trade; repair of motor vehicles                                                                       |
| D49                                | Land transport and transport via pipelines                                                                                 |
| D50                                | Water transport                                                                                                            |
| D51                                | Air transport                                                                                                              |
| D52                                | Warehousing and support activities for transportation                                                                      |
| D53                                | Postal and courier activities                                                                                              |
| D55T56                             | Accommodation and food service activities                                                                                  |
| D58T60                             | Publishing, audiovisual and broadcasting activities                                                                        |
| D61                                | Telecommunications                                                                                                         |
| D62T63                             | IT and other information services                                                                                          |
| D64T66                             | Financial and insurance activities                                                                                         |
| D68                                | Real estate activities                                                                                                     |
| D69T75                             | Professional, scientific and technical activities                                                                          |
| D77T82                             | Administrative and support services                                                                                        |
| D84                                | Public administration and defence; compulsory social security                                                              |
| D85                                | Education                                                                                                                  |
| D86T88                             | Human health and social work activities                                                                                    |
| D90T93                             | Arts, entertainment and recreation                                                                                         |
| D94T96                             | Other service activities                                                                                                   |
| D97T98                             | Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use |
| <i>Final-demand category codes</i> |                                                                                                                            |
| P31S14                             | Final consumption expenditure by households                                                                                |
| P31S15                             | Final consumption expenditure by non-profit institutions serving households                                                |
| P3S13                              | Final consumption expenditure by general government                                                                        |
| P51                                | Gross fixed capital formation                                                                                              |
| P52P53                             | Changes in inventories and acquisitions less disposals of valuables                                                        |
| P33                                | Direct purchases abroad by residents and purchases by non-residents on the domestic territory                              |

## Annex B AfCIOT Construction

### B.1 Supply-use processing and national IOT preparation

Each AfCIOT African-country block starts from a harmonised supply-use table (SUT) system in which products, industries, and final-demand categories are mapped to the common AfCIOT classification. The first requirement is accounting for all SUT equality requirements: product supply at purchasers' prices must equal product use, and industry output must be consistent with intermediate inputs, imports, taxes less subsidies, and value added. In compact form, the balanced SUT satisfies

$$\begin{aligned} q^c + m^c + \tau^c + \theta^c &= U_x^c \mathbf{1} + U_f^c \mathbf{1}, \\ x^c &= (S^c)' \mathbf{1}, \\ x^c &= (U_{x,bp}^c)' \mathbf{1} + m_x^c + \tau_x^c + w^c. \end{aligned} \tag{B.1}$$

Here  $q^c$  is product output at basic prices,  $q^c + m^c + \tau^c + \theta^c$  is product supply at purchasers' prices,  $x^c$  is industry gross output,  $m^c$  is imports,  $\tau^c$  is net taxes on products,  $\theta^c$  is trade-and-transport margins,  $m_x^c$  is imports allocated to using industries,  $\tau_x^c$  is taxes less subsidies allocated to using industries, and  $w^c$  is gross value added. This notation reserves  $q$  for product-output objects and  $x$  for industry gross output throughout the annex.

When observed SUT entries are not from the benchmark year 2020, national account data is used to balance the observed SUT to the column boundary imposed by the national account (NA) data in 2020. Balancing aims to adjust the cells as little as possible while imposing the row and column restrictions:

$$\min_{\tilde{S}^c, \tilde{U}_x^c, \tilde{U}_f^c} \mathcal{D} \left( (\tilde{S}^c, \tilde{U}_x^c, \tilde{U}_f^c), (S^c, U_x^c, U_f^c) \right) \quad \text{subject to SUT and NA accounting controls and admissible signs.} \tag{B.2}$$

Here  $\mathcal{D}(\cdot)$  is a non-negative distance between the adjusted and observed SUT cells; admissible signs require non-negative production and use cells except where the NA category permits a negative entry, such as changes in inventories. The balancing module implemented is a combination of GRAS, SUT-RAS, and a method partially inspired by KRAS. Details are omitted here.

After balancing, valuation layers are removed from purchasers'-price uses, domestic and import uses are separated, and product uses are allocated to industries through the product-sales-share matrix  $\Pi^c$ . The resulting domestic and import input-output blocks prepared for AfCIOT construction are

$$\begin{aligned} Z^{cc} &= \Pi^c U_{x,d}^c, & Y^{cc} &= \Pi^c U_{f,d}^c, \\ Z_m^c &= \Pi^c U_{x,m}^c, & Y_m^c &= \Pi^c U_{f,m}^c. \end{aligned} \tag{B.3}$$

Thus the SUT-to-IOT stage is used primarily to deliver balanced national building blocks: domestic intermediate use, domestic final demand, import-use blocks, value added, taxes less subsidies, output controls, and import totals by product or industry.

### B.2 Block construction

AfCIOT construction is a block-replacement and residual-closure procedure applied to an OECD-style ICIO frame. National supply-use tables, national accounts, UN Comtrade merchandise trade, OECD-WTO Balanced Trade in Services (BaTIS), exchange rates, and the OECD-ICIO system enter as accounting controls.

For each AfCIOT African country  $c$ , the domestic blocks  $Z^{cc}$  and  $Y^{cc}$  from equation (B.3) are combined with partner import allocations and export controls. Gross output, taxes less subsidies, and value added for industry  $i$  in country  $c$  are denoted by  $x_i^c$ ,  $\text{TLS}_i^c$ , and  $w_i^c$ . In the assembled table, these variables satisfy the country-industry accounting identities

$$x_i^c = \sum_{s \in \mathcal{C}} \sum_{j \in \mathcal{I}} z_{ij}^{cs} + \sum_{s \in \mathcal{C}} \sum_{f \in \mathcal{F}} y_{if}^{cs}, \quad w_i^c = x_i^c - \sum_{s \in \mathcal{C}} \sum_{j \in \mathcal{I}} z_{ji}^{sc} - \text{TLS}_i^c. \tag{B.4}$$

Bilateral trade boundaries allocate exports and imports by partner and industry. For partner  $p \neq c$ , export controls  $E_{i,p}^c$  denote shipments from industry  $i$  in country  $c$  to partner  $p$ , and import controls  $M_{i,p}^c$  denote imports by country  $c$  from industry  $i$  in partner  $p$ . These controls determine off-diagonal intermediate and final-demand blocks:

$$\begin{aligned} E_{i,p}^c &= \sum_{j \in \mathcal{I}} z_{ij}^{cp} + \sum_{f \in \mathcal{F}} y_{if}^{cp}, & p \neq c, \\ M_{i,p}^c &= \sum_{j \in \mathcal{I}} z_{ij}^{pc} + \sum_{f \in \mathcal{F}} y_{if}^{pc}, & p \neq c. \end{aligned} \quad (\text{B.5})$$

Since partner-use detail is incomplete, partner totals are distributed across intermediate and final uses using import-use profiles and the receiving country's use structure.

Explicit AfCIOT African-country blocks are inserted into the global ICIO frame. African-to-non-African row blocks are controlled by AfCIOT African export totals, non-African-to-African column blocks are controlled by AfCIOT African import totals and the non-African ICIO import structure, and African-to-African blocks are scaled to bilateral export controls. For any residual account  $g$ , let  $T_g$  be the relevant country-industry control total and let  $\hat{T}_g$  be the amount already allocated to explicit country partners. Unidentified source and destination flows are assigned to ROW as

$$R_g = T_g - \hat{T}_g, \quad (\text{B.6})$$

where  $R_g$  is the residual flow. The ROW domestic block is the residual required to close the global table after all explicit blocks are inserted.

### B.3 Core matrices

The final AfCIOT intermediate-use and final-demand matrices are

$$Z = [z_{ij}^{rs}]_{(r,i),(s,j)}, \quad Y = [y_{if}^{rs}]_{(r,i),(s,f)}, \quad (\text{B.7})$$

where  $z_{ij}^{rs}$  is the flow from industry  $i$  in country  $r$  to industry  $j$  in country  $s$ , and  $y_{if}^{rs}$  is final-demand category  $f$  in country  $s$  for output from industry  $i$  in country  $r$ .

Gross output, taxes less subsidies, value added, value-added coefficients, technical coefficients, and Leontief-based matrices are defined in sequence as

$$\begin{aligned} x_i^r &= \sum_{s \in \mathcal{C}} \sum_{j \in \mathcal{I}} z_{ij}^{rs} + \sum_{s \in \mathcal{C}} \sum_{f \in \mathcal{F}} y_{if}^{rs}, \\ w_i^r &= x_i^r - \sum_{s \in \mathcal{C}} \sum_{j \in \mathcal{I}} z_{ji}^{sr} - \text{TLS}_i^r, \\ v_i^r &= \frac{w_i^r}{x_i^r}, \quad \hat{v} = \text{diag}(v), \\ a_{ij}^{rs} &= \frac{z_{ij}^{rs}}{x_j^s}, \\ A &= [a_{ij}^{rs}]_{(r,i),(s,j)}, \\ A^d &= [a_{ij}^{rs} \mathbf{1}\{r=s\}]_{(r,i),(s,j)}, \\ B &= (I - A)^{-1}, \\ B^d &= (I - A^d)^{-1}, \\ G &= \hat{v}B. \end{aligned} \quad (\text{B.8})$$

Here  $\text{TLS}_i^r$  is the taxes-less-subsidies vector carried into the country-industry account,  $v$  stacks the coefficients  $v_i^r$ ,  $\hat{v}$  is the diagonal matrix formed from that vector, and  $I$  is a conformable identity matrix. The matrix  $A^d$  keeps only domestic blocks of  $A$ ,  $B$  and  $B^d$  are the global and domestic Leontief inverses, and  $G$  is the value-added requirements matrix. The element  $G_{(r,h),(c,i)}$  gives value added generated in source country-industry  $(r, h)$  per unit of gross output in using country-industry  $(c, i)$ .

## Annex C TiVA and Exposure Indicators

The TiVA construction follows the OECD 2021 TiVA indicator guide, with formulas adapted to the country, industry, and final-demand coverage of the AfCIOT. Unless otherwise stated, level indicators are expressed in current 2020 US dollars and share indicators are reported in percent. In addition to the DVA and FVA objects used in Section 3, Section 4 uses production value-added intensity (PROD\_VASH, derived from VALU and PROD), final-demand value added by origin and its shares (FD\_VA and FD\_VASH), gross-export partner shares (EXGRpSH), foreign-value-added source shares in gross exports (DEXFVApSH), domestic value added embodied in partner exports (FEXDVApSH), and re-exported imported intermediates (REII). The appendix also defines several paper-specific AfCIOT exposure objects that are not standard OECD TiVA-list indicators: selected imported inputs (IMPINT), foreign intermediate-input shares (FINTSH), intra-African intermediate inputs (AINT), and final-demand dependency ratios ( $R^{DFD}$ ).

### C.1 Gross trade and base-table exposure indicators

This subsection defines two objects used before the value-added decomposition: gross trade flows from the TiVA output and direct input-exposure measures from the AfCIOT base table. For exporter  $c$ , partner  $p \neq c$ , and exporting industry  $i$ , gross exports (EXGR) are split into intermediate exports (EXGR\_INT) and final-demand exports (EXGR\_FNL):

$$\begin{aligned} EXGR\_INT_{c,i,p} &= \sum_{j \in \mathcal{I}} z_{ij}^{cp}, \\ EXGR\_FNL_{c,i,p} &= \sum_{f \in \mathcal{F}} y_{if}^{cp}, \\ EXGR_{c,i,p} &= EXGR\_INT_{c,i,p} + EXGR\_FNL_{c,i,p}. \end{aligned} \tag{C.1}$$

Gross imports are the mirror image of partner exports. For importer  $c$ , source partner  $p \neq c$ , and source industry  $i$ ,

$$\begin{aligned} IMGR\_INT_{c,i,p} &= EXGR\_INT_{p,i,c}, \\ IMGR\_FNL_{c,i,p} &= EXGR\_FNL_{p,i,c}, \\ IMGR_{c,i,p} &= EXGR_{p,i,c}. \end{aligned} \tag{C.2}$$

Country totals used as denominators in the article are

$$\begin{aligned} EXGR_c &= \sum_{p \neq c} \sum_{i \in \mathcal{I}} EXGR_{c,i,p}, \\ IMGR_c &= \sum_{p \neq c} \sum_{i \in \mathcal{I}} IMGR_{c,i,p}, \\ IMGR\_FNL_c &= \sum_{p \neq c} \sum_{i \in \mathcal{I}} IMGR\_FNL_{c,i,p}. \end{aligned} \tag{C.3}$$

The paper also uses direct input-exposure measures calculated from the base-table intermediate-use matrix  $Z$ , rather than from the OECD TiVA indicator list. These objects aggregate across AfCIOT African receiving countries and are reported by receiving industry  $j$ . For a selected source-industry set  $\mathcal{S} \subseteq \mathcal{I}$ ,

$$\begin{aligned} IMPINT_{\mathcal{S},j}^{AFR} &= \sum_{c \in \mathcal{A}} \sum_{r \in \mathcal{C} \setminus \{c\}} \sum_{i \in \mathcal{S}} z_{ij}^{rc}, \\ FINTSH_j^{AFR} &= 100 \frac{\sum_{c \in \mathcal{A}} \sum_{r \in \mathcal{C} \setminus \{c\}} \sum_{i \in \mathcal{I}} z_{ij}^{rc}}{\sum_{c \in \mathcal{A}} \sum_{r \in \mathcal{C}} \sum_{i \in \mathcal{I}} z_{ij}^{rc}}, \\ AINT_j^{AFR} &= \sum_{c \in \mathcal{A}} \sum_{r \in \mathcal{A} \setminus \{c\}} \sum_{i \in \mathcal{I}} z_{ij}^{rc}. \end{aligned} \tag{C.4}$$

IMPINT measures imported intermediate inputs from selected source industries, FINTSH measures all foreign



intermediate inputs as a share of total intermediate inputs, and AINT measures intra-African intermediate-input sourcing. In the article, energy and refined-petroleum inputs use  $\mathcal{S} = \{\text{D05T06}, \text{D19}\}$ , while chemical inputs use  $\mathcal{S} = \{\text{D20}\}$ .

## C.2 Value added in exports

For exports of industry  $i$  in country  $c$ , the domestic value-added coefficient  $\alpha_{c,i}^{DVA}$  and the source-country foreign value-added coefficient  $\beta_{r,c,i}^{FVA}$  are calculated from the value-added requirements matrix  $G$ . The intermediate component  $G_{(r,h),(c,i)}$  is the element of  $G = \hat{v}B$  giving value added from source industry  $h$  in country  $r$  per unit of output in industry  $i$  in country  $c$ :

$$\begin{aligned}\alpha_{c,i}^{DVA} &= \sum_{h \in \mathcal{I}} G_{(c,h),(c,i)}, \\ \beta_{r,c,i}^{FVA} &= \sum_{h \in \mathcal{I}} G_{(r,h),(c,i)}, \quad r \neq c, \\ \alpha_{c,i}^{FVA} &= \sum_{r \in \mathcal{C}, r \neq c} \beta_{r,c,i}^{FVA}.\end{aligned}\tag{C.5}$$

The main export value-added TiVA objects are domestic value added embodied in gross exports (**EXGR\_DVA**), the bilateral source-country and source-industry decomposition of value added embodied in gross exports (**EXGR\_BSCI**), and foreign value added embodied in gross exports (**EXGR\_FVA**):

$$\begin{aligned}EXGR\_DVA_{c,i,p} &= \alpha_{c,i}^{DVA} EXGR_{c,i,p}, \\ EXGR\_DVA_{c,i} &= \sum_{p \neq c} EXGR\_DVA_{c,i,p}, \\ EXGR\_BSCI_{r,h,c,i} &= G_{(r,h),(c,i)} \sum_{p \neq c} EXGR_{c,i,p}, \quad r \neq c, \\ EXGR\_FVA_{c,i,p} &= \alpha_{c,i}^{FVA} EXGR_{c,i,p}, \\ EXGR\_FVA_{c,i} &= \sum_{p \neq c} EXGR\_FVA_{c,i,p} = \sum_{r \neq c} \sum_{h \in \mathcal{I}} EXGR\_BSCI_{r,h,c,i}.\end{aligned}\tag{C.6}$$

The OECD domestic-content components of **EXGR\_DVA** are direct domestic content absorbed abroad (**EXGR\_DDC**), indirect domestic content embodied in onward exports or third-country absorption (**EXGR\_IDC**), and returned domestic value added (**EXGR\_RIM**). At the exporter-industry level they add to total domestic value added in gross exports:

$$EXGR\_DVA_{c,i} = EXGR\_DDC_{c,i} + EXGR\_IDC_{c,i} + EXGR\_RIM_{c,i}.\tag{C.7}$$

The associated value-added intensity TiVA objects used in the paper are the domestic value-added share of gross exports (**EXGR\_DVASH**) and the foreign value-added share of gross exports (**EXGR\_FVASH**):

$$EXGR\_DVASH_{c,i} = 100 \frac{EXGR\_DVA_{c,i}}{\sum_{p \neq c} EXGR_{c,i,p}}, \quad EXGR\_FVASH_{c,i} = 100 \frac{EXGR\_FVA_{c,i}}{\sum_{p \neq c} EXGR_{c,i,p}}.\tag{C.8}$$

The industry-concentration comparisons in Section 3 use value-added totals, not gross exports, as denominators. For each country, the DVA and FVA shares of exporting industry  $i$  are

$$\begin{aligned}H_{c,i}^{DVA} &= 100 \frac{EXGR\_DVA_{c,i}}{\sum_{i' \in \mathcal{I}} EXGR\_DVA_{c,i'}}, & H_{c,i}^{FVA} &= 100 \frac{EXGR\_FVA_{c,i}}{\sum_{i' \in \mathcal{I}} EXGR\_FVA_{c,i'}}, \\ \mathcal{T}_{c,k}^{DVA} &= \text{Top}_k\{i \in \mathcal{I} : H_{c,i}^{DVA}\}, & \mathcal{T}_{c,k}^{FVA} &= \text{Top}_k\{i \in \mathcal{I} : H_{c,i}^{FVA}\}, \\ C_c^{DVA,k} &= \sum_{i \in \mathcal{T}_{c,k}^{DVA}} H_{c,i}^{DVA}, & C_c^{FVA,k} &= \sum_{i \in \mathcal{T}_{c,k}^{FVA}} H_{c,i}^{FVA}.\end{aligned}\tag{C.9}$$

Here  $\text{Top}_k$  returns the set of the  $k$  largest industries by share. The paper uses  $k = 1$  for leading-industry comparisons and  $k = 3$  for the top-three industry figures.

For partner concentration, ROW is excluded from the identifiable partner set  $\mathcal{P}_c = \mathcal{C} \setminus \{c, \text{ROW}\}$ . For  $p, r, q \in \mathcal{P}_c$ , destination shares in domestic value added (DVA partner share) and source shares in foreign value added (FVA partner share) are

$$\begin{aligned} S_{c,p}^{DVA} &= 100 \frac{\sum_i EXGR\_DVA_{c,i,p}}{\sum_{q \in \mathcal{P}_c} \sum_i EXGR\_DVA_{c,i,q}}, \\ S_{c,r}^{FVA} &= 100 \frac{\sum_i \sum_h EXGR\_BSCI_{r,h,c,i}}{\sum_{q \in \mathcal{P}_c} \sum_i \sum_h EXGR\_BSCI_{q,h,c,i}}. \end{aligned} \quad (\text{C.10})$$

Top-three concentration is the sum of the three largest identifiable shares.

### C.3 Value added in final demand and re-exported intermediates

The final-demand value-added object is value added embodied in final demand (VAFD). It is computed from the same value-added requirements matrix and the final-demand matrix:

$$VAFD = \hat{v}BY = GY. \quad (\text{C.11})$$

The element  $VAFD_{(r,h),(s,f)}$  is value added generated by source country-industry  $(r, h)$  and embodied in final-demand category  $f$  of country  $s$ . Foreign value added embodied in domestic final demand (DFD\_FVA) is the object used in the analysis to compare direct final imports with value-added exposure through third countries. Its ratio to direct final-demand imports,  $R^{DFD}$ , is an AfCIOT-derived diagnostic rather than a standard TiVA-list object:

$$\begin{aligned} DFD\_FVA_{c,h,p} &= \sum_{f \in \mathcal{F}} VAFD_{(p,h),(c,f)}, \quad p \neq c, \\ DFD\_FVA_c &= \sum_{p \neq c} \sum_{h \in \mathcal{I}} DFD\_FVA_{c,h,p}, \\ R_c^{DFD} &= DFD\_FVA_c / IMGR\_FNL_c. \end{aligned} \quad (\text{C.12})$$

For source-economy comparisons across final demand in  $\mathcal{A}$ , the source aggregates used in the analysis are gross imports by AfCIOT African countries by source (IMGR), final-demand imports by AfCIOT African countries by source (IMGR\_FNL), AfCIOT African-country DFD\_FVA by source, and the corresponding DFD\_FVA-to-final-import ratio:

$$\begin{aligned} IMGR_p^{AFR} &= \sum_{c \in \mathcal{A}, c \neq p} \sum_{i \in \mathcal{I}} IMGR_{c,i,p}, \\ IMGR\_FNL_p^{AFR} &= \sum_{c \in \mathcal{A}, c \neq p} \sum_{i \in \mathcal{I}} IMGR\_FNL_{c,i,p}, \\ DFD\_FVA_p^{AFR} &= \sum_{c \in \mathcal{A}, c \neq p} \sum_{h \in \mathcal{I}} DFD\_FVA_{c,h,p}, \\ R_p^{DFD,AFR} &= DFD\_FVA_p^{AFR} / IMGR\_FNL_p^{AFR}. \end{aligned} \quad (\text{C.13})$$

Let  $A^m = A - A^d$  be the imported technical-coefficient matrix, let  $x$  stack gross output by country-industry, and let  $e$  be the vector of gross exports by country-industry with  $e_{c,i} = \sum_{p \neq c} EXGR_{c,i,p}$ . Define  $d^e = B^d e$  as the domestic output required to produce exports and  $\mu' = \mathbf{1}' A^m$  as the row vector of imported-intermediate coefficients by using country-industry. Here  $\mathbf{1}$  is a conformable column vector with one entry for each source country-industry row of  $A^m$ , so  $\mu_{c,i}$  is the total imported-input coefficient of using industry  $(c, i)$  after summing over all foreign source country-industries. The re-exported-intermediate objects used in the analysis are re-exported imported intermediates (REII), direct intermediate-import use by receiving country-industry

(IMGRINT), and the re-exported share of direct intermediate-import use (IMGRINT\_REII):

$$\begin{aligned}
d^e &= B^d e, & \mu_{c,i} &= [\mathbf{1}' A^m]_{(c,i)}, \\
REII_{c,i} &= \mu_{c,i} d_{c,i}^e, \\
IMGRINT_{c,i} &= \mu_{c,i} x_{c,i}, \\
IMGRINT\_REII_{c,i} &= 100 \frac{REII_{c,i}}{IMGRINT_{c,i}}.
\end{aligned} \tag{C.14}$$

With this convention, REII is indexed by the exporting or using country-industry  $(c, i)$ . It measures the imported-intermediate content required by that country-industry's exported production, rather than assigning the value to the foreign source country-industry from which the input originated.

#### C.4 Production, final-demand, and partner-share indicators

The production-side object used in Section 4 is value added relative to gross output (PROD\_VASH). In the TiVA output, PROD is gross output and VALU is value added. At the industry level and at the country aggregate used in Figure 8,

$$\begin{aligned}
PROD\_VASH_{c,i} &= 100 \frac{w_i^c}{x_i^c}, \\
PROD\_VASH_c &= 100 \frac{\sum_{i \in \mathcal{I}} w_i^c}{\sum_{i \in \mathcal{I}} x_i^c}.
\end{aligned} \tag{C.15}$$

This object is calculated from the accounting totals of the AfCIOT rather than from a Leontief decomposition.

Final-demand value added by origin (FD\_VA) uses the same VAFD matrix in equation (C.11). Figure 9 reports origin shares derived from FD\_VA, corresponding to an aggregate FD\_VASH presentation. For an African final-demand country  $c \in \mathcal{A}$ , total value added embodied in its final demand and the three origin components are

$$\begin{aligned}
FD\_VA_c &= \sum_{r \in \mathcal{C}} \sum_{h \in \mathcal{I}} \sum_{f \in \mathcal{F}} VAFD_{(r,h),(c,f)}, \\
FD\_VASH_c^{DOM} &= 100 \frac{\sum_h \sum_f VAFD_{(c,h),(c,f)}}{FD\_VA_c}, \\
FD\_VASH_c^{AFR} &= 100 \frac{\sum_{r \in \mathcal{A} \setminus \{c\}} \sum_h \sum_f VAFD_{(r,h),(c,f)}}{FD\_VA_c}, \\
FD\_VASH_c^{NONAFR+ROW} &= 100 \frac{\sum_{r \in \mathcal{C} \setminus \mathcal{A}} \sum_h \sum_f VAFD_{(r,h),(c,f)}}{FD\_VA_c}.
\end{aligned} \tag{C.16}$$

The three reported components are labelled as domestic, African partners, and non-African partners including the ROW aggregate.

Using the regional partition  $\mathcal{G}$  and mapping  $\Gamma_R$  defined in Table 9, gross-export partner shares (EXGRpSH) are calculated by exporting region  $R$  and destination region  $D$  as

$$EXGRpSH_{R,D} = 100 \frac{\sum_{c \in \Gamma_R} \sum_{p \in \Gamma_D, p \neq c} \sum_i EXGR_{c,i,p}}{\sum_{D' \in \mathcal{G}} \sum_{c \in \Gamma_R} \sum_{p \in \Gamma_{D'}, p \neq c} \sum_i EXGR_{c,i,p}}. \tag{C.17}$$

In the figure, ROW is not shown as an exporting region, but exports to the ROW aggregate remain part of the destination-region decomposition.

Foreign-value-added source shares in gross exports (DEXFVapSH) measure backward participation in GVCs. They express FVA from each source region as a share of the reporting country's gross exports, not as a composition of total FVA. Using the country total  $EXGR_c$  from equation (C.3), for  $c \in \mathcal{A}$ , source country

$r \neq c$ , and region  $R$ ,

$$\begin{aligned} DEXFVA_{c,r} &= \sum_{i \in \mathcal{I}} \sum_{h \in \mathcal{I}} EXGR\_BSCI_{r,h,c,i}, \\ DEXFVApSH_{c,R} &= 100 \frac{\sum_{r \in \Gamma_R, r \neq c} DEXFVA_{c,r}}{EXGR_c}. \end{aligned} \quad (C.18)$$

Thus DEXFVApSH is the regional source contribution to FVA embodied in gross exports. The ROW aggregate appears as a numerator component when  $R = \text{ROW}$ , but the denominator remains total gross exports of country  $c$ .

Domestic value added embodied in partner exports (FEXDVApSH) is a forward-linkage measure. It starts from the domestic value added generated in AfCIOT African country  $c$  that is embodied in the gross exports of partner exporter  $p$ :

$$FEXDVA_{c,p} = \sum_{i \in \mathcal{I}} \sum_{h \in \mathcal{I}} G_{(c,h),(p,i)} \sum_{q \neq p} EXGR_{p,i,q}, \quad p \neq c. \quad (C.19)$$

The partner-export regional share used in the figure follows the OECD forward-participation denominator, namely total gross exports of the value-added source country  $c$ :

$$FEXDVApSH_{c,R} = 100 \frac{\sum_{p \in \Gamma_R, p \neq c} FEXDVA_{c,p}}{EXGR_c}. \quad (C.20)$$

This object differs from EXGR\_DVA: EXGR\_DVA measures domestic value added in a country's own exports, whereas FEXDVApSH measures domestic value added from country  $c$  embodied in foreign partners' exports as a share of country  $c$ 's gross exports. The ROW aggregate appears as a numerator component where available.

## C.5 Regional indicators and benchmarks

The regional value-chain indicators used in the paper are AfCIOT-derived regional shares rather than separate OECD TiVA-list objects. They are the intra-African share of domestic value added in exports (AFR\_DVA\_SH), intra-African share of foreign value added embodied in final demand (AFR\_DFD\_FVA\_SH), and intra-African intermediate-import sourcing share (AFR\_IMGR\_INT\_SH):

$$\begin{aligned} AFR\_DVA\_SH_c &= 100 \frac{\sum_{p \in \mathcal{A} \setminus \{c\}} \sum_i EXGR\_DVA_{c,i,p}}{\sum_{p \neq c} \sum_i EXGR\_DVA_{c,i,p}}, \\ AFR\_DFD\_FVA\_SH_c &= 100 \frac{\sum_{p \in \mathcal{A} \setminus \{c\}} \sum_h DFD\_FVA_{c,h,p}}{\sum_{p \neq c} \sum_h DFD\_FVA_{c,h,p}}, \\ AFR\_IMGR\_INT\_SH_c &= 100 \frac{\sum_{p \in \mathcal{A} \setminus \{c\}} \sum_i IMGR\_INT_{c,i,p}}{\sum_{p \neq c} \sum_i IMGR\_INT_{c,i,p}}. \end{aligned} \quad (C.21)$$

Figures 5–7 further decompose intra-African export value added by partner and industry. For African DVA destination partners, the partner shares and the residual Rest of Africa component are

$$\begin{aligned} S_{c,p}^{DVA,AFR} &= 100 \frac{\sum_i EXGR\_DVA_{c,i,p}}{\sum_{q \in \mathcal{A} \setminus \{c\}} \sum_i EXGR\_DVA_{c,i,q}}, \quad p \in \mathcal{A} \setminus \{c\}, \\ S_{c,k}^{DVA,RoA} &= 100 - \sum_{p \in \mathcal{T}_{c,k}^{DVA,AFR}} S_{c,p}^{DVA,AFR}. \end{aligned} \quad (C.22)$$

Here  $\mathcal{T}_{c,k}^{DVA,AFR}$  is the set of the  $k$  largest African destination partners by  $S_{c,p}^{DVA,AFR}$ ; Figure 5 uses  $k = 3$ .

For the industry panels, DVA and FVA are first restricted to exports from country  $c$  to African partners and

then normalised by the corresponding intra-African value-added total:

$$\begin{aligned} X_{c,i}^{DVA,AFR} &= \sum_{p \in \mathcal{A} \setminus \{c\}} EXGR\_DVA_{c,i,p}, & X_{c,i}^{FVA,AFR} &= \sum_{p \in \mathcal{A} \setminus \{c\}} EXGR\_FVA_{c,i,p}, \\ H_{c,i}^{DVA,AFR} &= 100 \frac{X_{c,i}^{DVA,AFR}}{\sum_{i'} X_{c,i'}^{DVA,AFR}}, & H_{c,i}^{FVA,AFR} &= 100 \frac{X_{c,i}^{FVA,AFR}}{\sum_{i'} X_{c,i'}^{FVA,AFR}}. \end{aligned} \quad (\text{C.23})$$

Figures 6 and 7 report the three largest industries by  $H_{c,i}^{DVA,AFR}$  and  $H_{c,i}^{FVA,AFR}$ , respectively, plus the residual other-industry share.

The non-African benchmark set excludes  $\mathcal{A}$  and ROW:

$$\mathcal{N} = \mathcal{C} \setminus (\mathcal{A} \cup \{\text{ROW}\}). \quad (\text{C.24})$$

For any country-level indicator  $Q_c$ , benchmark medians and interquartile bands are unweighted empirical statistics:

$$\text{median}_{\mathcal{N}}(Q) = \text{median}\{Q_c : c \in \mathcal{N}\}. \quad (\text{C.25})$$

## Annex D Policy Implications

This annex draws policy implications from the paper’s AfCIOT-based analysis of the global and regional exposure of African countries. The results showed that input-output tools can reveal indirect channels that are not visible in conventional trade statistics, while also identifying the partner and sectoral structures through which exposure is concentrated.

The AfCFTA represents the prevailing continental initiative to address the challenges posed by Africa’s exposure to external markets and weak regional production links. Building on the findings, while recognising the limitations of a 2020 baseline analysis, several policy implications follow for improving integration within global value chains for countries in Africa, strengthening the implementation environment for AfCFTA, and supporting Africa’s transition toward deeper economic integration.

First, countries in Africa should strengthen domestic productive capacity and diversification. A key priority for increasing AfCFTA gains is the enhancement of domestic production capabilities, particularly in manufacturing and value-added sectors. Governments should promote industrialisation strategies focused on value addition in agriculture, mining, and natural resources; support small and medium-sized enterprises through financing, training, and market access; and encourage innovation and technology adoption to increase productivity. Strengthening domestic production can help countries take advantage of regional markets, reduce dependence on imports, and improve participation in regional value chains.

Second, countries in Africa should promote intra-African trade and market integration. Given the low levels of intra-African trade, deliberate efforts are needed to stimulate regional demand and supply linkages. This implies reducing non-tariff barriers such as customs delays, regulatory inconsistencies, and poor logistics; investing in transport and trade infrastructure, including roads, ports, and digital platforms; and facilitating cross-border payment systems to ease transactions between economies in Africa. Governments should also implement targeted incentives to encourage firms to source inputs from within Africa rather than from global markets.

Third, policy efforts should strengthen awareness raising and private-sector engagement. Larger AfCFTA gains depend partly on the participation of the private sector, but awareness of AfCFTA opportunities remains uneven across countries and sectors. Policy efforts should focus on:

- Conducting awareness campaigns to inform businesses about AfCFTA provisions, rules of origin, and market opportunities;
- Supporting business networks and trade associations to foster regional partnerships;
- Enhancing trade facilitation services, including export promotion agencies and information platforms.

Fourth, countries in Africa should promote the development of regional value chains. To improve backward and forward linkages, countries should identify strategic sectors, such as agro-processing, textiles, automotive activities, and pharmaceuticals; align industrial strategies and policies at the regional level; and encourage cross-border investment and joint ventures.

Fifth, AfCFTA monitoring and evaluation mechanisms should be strengthened. Enhanced monitoring and analytical frameworks are critical for tracking progress and supporting evidence-based policymaking. This includes expanding future studies to cover all countries in Africa, ensuring comprehensive continental representation, and updating the analysis with multi-year data to allow time-series evaluation of AfCFTA impacts.

Finally, AfCFTA implementation requires stronger institutional and policy coordination at national, regional, and continental levels. Countries should harmonise trade policies, standards, and regulations; regional economic communities should strengthen their role as building blocks for continental integration; and institutions should ensure effective implementation of rules of origin and dispute-resolution mechanisms. Such coordination will reduce fragmentation and support the emergence of a unified African market.