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Technological Trade Composition and Performance in African Countries

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Abstract

A number of studies have found that spillovers or other externalities associated with trade are sector specific. Yet trade linkages are typically analysed at the macroeconomic aggregates. We analyse Africa's trade composition spanning 1980-2015, using a disaggregated and detailed classification by technological levels. We find that Africa is a net importer of capital goods and its technological export composition has remained highly concentrated in primary goods, which has contributed to a decline in Africa's share of global exports. We also find that regions within Africa have similar technological export composition structures. A few notable countries that have managed to transform their export composition into more semi-processed and relatively high technology exports are the leading importers of capital goods, are better financially developed and better endowed with human capital, infrastructure, and institutions than other African countries.

JEL classification: F10; F19; F60

Keywords: Exports, imports, trade composition

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1 Introduction

Studies have analysed Africa's trade at a macroeconomic aggregate and mostly focusing on exports, and export lead growth dominate the literature. In this paper, we provide a comprehensive analysis of Africa's technological trade composition (both exports and imports), with the primary purpose of assessing the technological trade composition performance. We decompose Africa's trade into five categories: primary goods, resource based manufactured goods, low technology, medium technology and high technology manufactured goods. We then establish economic variables that are correlated with that trade composition performance. This is motivated by literature that link economic performance or development to the composition of trade, and that link Africa's trade performance to other key determinants of growth.

Exports generate income and create employment while imports of relatively cheaper intermediate and capital goods that embody new technology can enhance growth opportunities - boosting productivity and innovation in both primary and manufacturing sectors. Aboal et al. (2017); Hausmann et al. (2007); Sheu (2014) suggest that countries become what they produce. All else equal, countries that specialise in the production of capital goods are more likely to grow faster than countries that specialise in primary or natural resource based goods. Capital goods tends to have elastic demand in global markets (Hausmann et al., 2007). So countries can export them in large quantities without significant adverse terms-of-trade effects. Capital goods also tend to have greater spillover effects, they create new demand and substitute older goods faster (Hausmann et al., 2007; Lall, 2000; Newman et al., 2016).[1] On the other hand, Eaton and Kortum (2001); Krueger (1983); Lee (1995); Rodrik (1999) associate different productivity levels with different compositions of imports, such as capital goods as opposed to primary goods. An increase in capital goods imports would increase the gross domestic product (GDP) growth and an increase in intermediate and primary imports would positively affect output and employment (Krueger, 1983). Hence, growth rate is higher in countries that use imported capital goods relatively more than domestically produced inputs (Krueger, 1983; Lee, 1995).

According to Carmody (2011), colonial rule had profound impacts on Africa's trade. African countries were structured to meet the demands of industrialising Europe by supplying raw materials. The structure has remained largely unchanged in the post-colonial era - exportation

[1] However, research and development (R&D) in capital goods is highly concentrated in a few advanced countries (Eaton and Kortum, 2001; Mutreja et al., 2018). Therefore, the benefits of new technology embodied in capital goods can be spread around the world through trade.

of primary goods and importation of manufactured goods. Stiglitz (2018) also argues that colonial rule failed to leave a legacy of either physical or human capital which could have enabled Africa to prosper. Africa is still characterised by inadequate human capital (Mamman et al., 2018), underdeveloped financial markets (Andrianova et al., 2015; Ibrahim and Sare, 2018), poor quality institutions (Birdsall, 2007) and its infrastructure is lagged behind other developing regions. This inhibits the continent from realising its full potential, yet the continent's potential is widely acknowledged (see Kamoche et al., 2015; Kamuganga, 2012; UNECA, 2015).

Our finding reveals that Africa is a net importer of capital goods (medium and high technology manufactured goods), while its export composition has remained skewed towards primary goods. More than 60% of Africa's exports are primary goods and in 38 African countries, just three primary goods accounted for over 50% of their nation's total exports in period 2010-2015. Primary goods are characterised by very volatile prices and lack both technological dynamism and economic linkages. Manufactured exports remained stagnated, low and less diversified, highly concentrated in resource based manufactured goods.

A few notable countries such as South Africa, Morocco, Egypt and Tunisia that have incorporated some semi-processed and relatively high technology manufactured goods into their export composition are also the leading importers of capital goods. They account for the bulk of Africa's manufactured exports. They are better financially developed, better endowed with human capital, infrastructure and institutions than other African countries.

Our finding also reveals that Africa has lost its global market shares in both primary and manufactured merchandised exports. In 2015, Africa's total exports accounted for just 3.1% of global exports, a decline in market share from 6.3% in 1980. Manufactured exports accounted for just 1.4% of global manufactured exports, a decline in market share by 0.4% when compared to 1980. While primary exports accounted for 10.2% of global primary exports, a decline in market share from 15.8% in 1980. The continent export performance was worse than that of other world regions over the past four decades. In fact, individual countries such as China, United States, Germany, Japan, France and Korea had bigger market shares than all of Africa in period 2010-2015.[2]

Although Africa is a net importer of capital goods, primary goods form a substantial share of

[2]In period 2010-2015, China was the global leading exporter (12.0% of global total exports), followed by the United States (8.7% of global total exports), Germany (8.5% of global total exports), Japan (4.8% of global total exports), and France (3.5% of global total exports). No African country was among the top 30 global merchandised exporters during the period.

Africa total imports, despite it's abundant and diverse physical and human resources. Primary imports accounted for 15.1% of Africa's total imports and 3.3% of global primary imports in 2015, an increase from a global share of 2.1% in 2000.

2 Data

Following Lall (2000), we decompose Africa's annual trade data (both export and imports) into five trade categories: primary goods, resource based manufactured (RBM) goods, low technology manufactured (LTM) goods, medium technology manufactured (MTM) goods and high technology manufactured (HTM) goods, for a sample of 54 African countries covering period 1980-2015. The 54 countries are composed into five regions (Central Africa, East Africa, North Africa, Southern Africa, and West Africa) as defined by the African Union. We analysed the patterns within the established trade categories and regions with an effort to bring out the stylised facts that might be revealed. We combined the detailed technological trade composition data with other key determinants of economic growth (financial development, human capital, infrastructure and institution score data) and empirical estimate the correlations using the ordinary least-squares (OLS) estimator. At this stage, we do not worry about the causality.

2.1 *Data Sources*

Trade data used in this analysis was sourced from the United Nation Comtrade database, recorded at 3-digit Standard International Trade Classification (SITC) revision 2. Financial development and infrastructure data was sourced from the World's Bank's World Development Indicators (WDI) database. We proxy financial development by measuring private credit (by banks) and other financial institutions both as a percentage of GDP. Infrastructure is measured by telephone density, which is defined as fixed telephone subscriptions per 100 people. Foreign direct investment inflows are from the United Nation Conference on Trade and Development. The human capital data is an index from the Penn World Tables, version 9.1, based on the average years of schooling and an assumed rate of return to education.

Institutions score data is from the Center for Systemic Peace, Polity IV Project based on *POLITY2* score scale computed by subtracting the institutional autocracy score points from the the institutional democracy score points. Institutional democracy score is computed based on three essential interdependent elements. First is the presence of institutions and

procedures through which citizens can express effective preference about alternative policies and leaders. Second is the existence of institutionalised constraints on the exercise of power by the executive. Third is the guarantee of civil liberties to all citizens in their daily lives and in acts of political participation and other aspects of plural democracy e.g. the rule of law, freedom of the press. Whilst institutional autocracy is derived from coding of the competitiveness of political participation; the regulation of participation; the openness and competitiveness of executive recruitment and constraints on the chief executives.

2.2 *Summary Statistics*

Combining these variable generates an unbalanced panel data set that covers the period 1980-2015. Table 1 reports summary statistics for our baseline sample between the 1980 and 2015. The margin between the minimum and maximum values is smaller for primary exports but larger for medium and high technology manufactured (MTM & HTM) exports. These contrasts reflect in part the fact that increasingly more countries have exported primary goods, while few countries have continued to dominate the bulk of MTM and HTM exports.

Table 1: Summary statistics, 1980-2015

Variable	Obs.	Mean	Std. Dev	Min	Max
Export composition					
ln(Primary exports)$_t$	1,806	12.67	2.25	6.27	18.61
ln(RBM exports)$_t$	1,804	11.40	2.55	2.48	17.28
ln(LTM exports)$_t$	1,806	9.39	2.74	1.65	15.77
ln(MTM exports)$_t$	1,805	9.72	2.65	1.99	17.25
ln(HTM exports)$_t$	1,805	8.56	2.38	-0.20	15.18
Import composition					
ln(Primary imports)	1,806	11.61	1.89	3.01	16.89
ln(RBM imports)$_t$	1,806	12.24	1.49	6.97	16.27
ln(LTM imports)$_t$	1,806	11.83	1.63	6.52	16.08
ln(MTM imports)$_t$	1,806	12.74	1.77	7.88	17.20
ln(HTM imports)$_t$	1,806	11.52	1.72	6.21	16.47
Financial development$_t$	1,574	19.53	20.63	0.22	150.21
Human capital$_t$	1,383	1.58	0.39	1.01	2.83
Infrastructure$_t$	1,770	2.52	4.73	0.00	31.07
Institutions$_t$	1,733	-1.18	5.82	-9.00	10.00

Note: No RBM exports data for Comoros in 1982 and for Chad in 1983. No MTM and HTM exports data for Eritrea in 1993. RBM = resource based manufactures; LTM = low technology manufactures; MTM = Medium technology manufacturing; HTM = High technology manufactures.

For the import composition, the margin between minimum and maximum is smaller for all manufactured imports, but larger for primary imports. Thus suggesting the fact that increasingly more countries have imported manufactured goods, while some countries have continued to dominate in primary imports. The margins are very large for financial development, infrastructure and institution score variable, however, relatively smaller for human capital.

In Figure 1, we show the trends in our trade composition data for the period 1980-2015.

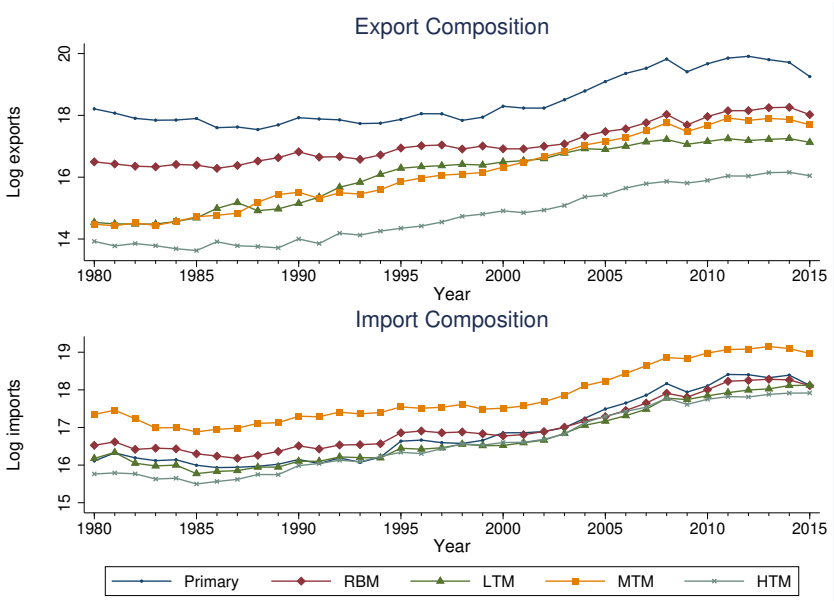

Figure 1: Trends in our key trade variables for Africa to and from the world, 1980-2015. The data is in log US$ values. The key variables are primary goods trade, resource based manufactured (RBM), low technology manufactured (LTM), medium technology manufactured (MTM) and high technology manufactured (HTM) goods.

As can be seen, there are observable differences between the export composition and import composition trends over the period. The continent exports more of homogenous goods and import more of heterogeneous goods. Despite the observable differences, we observe an overall increase in trends for both the export composition and the import composition. It is possible that the increase in primary imports between 2004 and 2015 is associated with a series of droughts. Which could have led to imports of consumable goods to increasingly become of importance in ensuring food security.

3 A Description of the Export Composition

Africa's merchandised export composition has remained skewed towards primary goods (Figure 2). Which are characterised by very volatile prices and lack both technological dynamism and local economic linkages. Hence, the over dependence on primary goods can only support limited growth. In Hausmann et al. (2007), primary goods are defined as poor country goods. Countries that continue to produce poor country goods remain poor. In period 2010-15, primary exports accounted for 62.0% of total exports. However, a decline in concentration from 75.4% of total exports in period 1980-85, while the market shares of LTM, MTM and HTM were very slowly increasing over time.

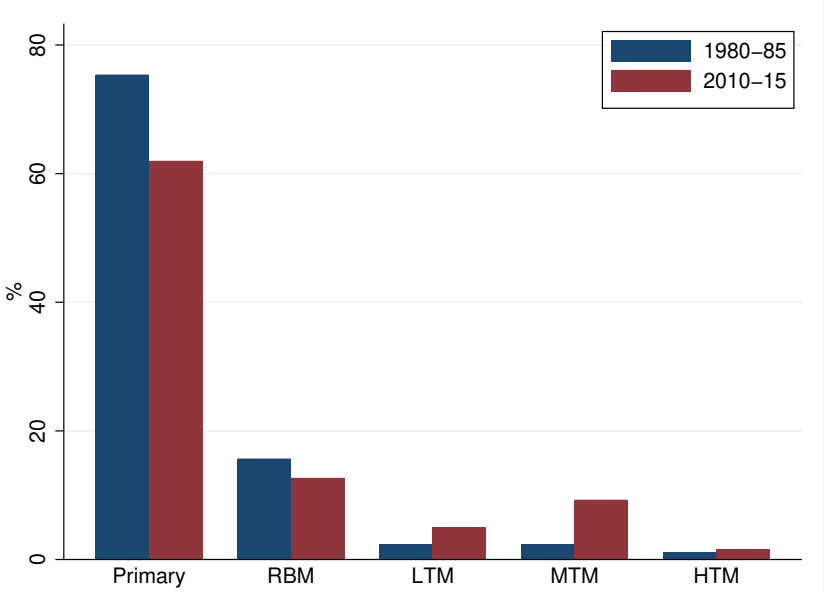

Figure 2: Africa export composition concentration, 1980-85 vs 2010-15. Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

The continent export composition is very slowly moving away from primary and RBM goods towards LTM, MTM and HTM exports. Within the manufacturing sector, the technological export composition is concentrated in RBM goods. In period 2010-15, RBM exports accounted for 12.7% of total exports (a decline in market share by 3.0% when compared to period 1980-85), and accounted for 72.4% of all manufactured exports. MTM exports accounted for 9.3% of total exports, an increase from 2.4% in period 1980-85. While HTM export accounted for just 1.6% of total exports, and increase by just 0.5% compared to period 1980-85. The continent technological export composition is mostly distorted by poor diversification mostly from large oil and natural gas exporting countries like Algeria, Angola, Chad, Equatorial Guinea, Libya and South Sudan whose few primary goods account for over 95% of their total exports, and in 38 African countries, just three products accounted for over 50% of their total exports (see Table A2).

For the period 1980-2015, these merchandised exports were mostly destined to the European Union (EU) and this is mainly due to the strong historical ties between the two. However, although the EU remains the biggest destination for Africa's exports on average (52.4%), it share has fallen from 57.5% in 1980 to 36.4% in 2015. While Africa's intra-trade has risen steadily from 2.3% in 1980 to 14.8% in 2015.

3.0.1 *Africa's Global Performance*

At the global level, Africa's participation remained marginal, although its export values have increased, its shares in global exports has declined in both primary and manufactured merchandised exports. In 2015, Africa's total exports accounted for just 3.1% of global total exports, a decline in market share from 6.3% in 1980 (see Table 2). Primary exports accounted for 10.2% of global primary exports, a decline in market share from 15.8% in 1980. Manufactured exports accounted for just 1.4% of global manufactured exports, a decline in market share by 0.4% when compared to 1980.

Table 2: Africa global market shares of exports (% World)

	All products	Primary	All Manufactures	RBM	LTM	MTM	HTM
	Shares of products in world export category (%)						
1980	6.34	15.77	1.82	4.75	1.04	0.44	0.80
1980-1989	4.37	13.26	1.50	4.17	1.10	0.49	0.45
1990	3.28	11.84	1.33	3.97	0.94	0.57	0.28
1990-1999	2.57	9.87	1.20	3.28	1.57	0.55	0.24
2000	2.62	10.41	1.15	3.05	1.79	0.71	0.24
2000-2009	3.43	12.63	1.35	3.26	1.77	1.02	0.30
2010	4.05	13.67	1.52	3.52	1.69	1.25	0.33
2010-2015	3.99	12.18	1.53	3.67	1.55	1.24	0.36
2015	3.13	10.30	1.41	3.61	1.43	1.11	0.35

Notes: "Other" transaction are not shown here, and account for the difference.
RBM = resource based manufactures; LTM = Low technology manufactures; MTM = Medium technology manufacturing; HTM = High technology manufactures.
Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

The continent's performance was worse than that of other world regions. In fact, individual countries such as China, United States, Germany, Japan, France and Korea had bigger market shares than all of Africa in period 2010-2015.[3]

Majority of African countries are failing to add value to their primary and natural resource based goods. For example, countries like Ghana and Cote d'Ivoire produce about 53% of the world's cocoa, but their respective markets are stacked with chocolates imported from Switzerland and the United Kingdom (UNCTAD, 2013). Such poor and volatile integration into the global export market poses particular concern for the developmental perspective of the continent. Especially when trade is regarded as the most promising route to growth. For the continent to achieve sustained growth, countries within need to develop processing industries around their primary and resource based goods.

[3]China was the global leading exporter (12.0% of global total exports), followed by the United States (8.7%), Germany (8.5%), Japan (4.8%), and France (3.5%). No African country was among the top 30 global merchandised exporters during the period.

3.1 *Regional Trends*

Africa's export composition is not just concentrated in primary goods at continent level but also at regional level, and in all regions within Africa. For instance, in period 2010-2015, Central Africa primary exports accounted for 79.8% of its total exports, 54.0% of the Eastern Africa's total exports, 63.9% of the Northern Africa's total exports, 44.4% of the Southern Africa's total exports and 81.5% of the Western Africa's total exports.

Table 3: Regions market shares of exports in Africa's export composition.

	All products	Primary	All Manufactures	RBM	LTM	MTM	HTM
Shares of products in Africa export category 1980 (%)							
Central Africa	7.58	6.89	8.31	10.07	0.94	0.76	11.95
East Africa	4.06	3.31	7.59	7.82	10.76	4.61	3.82
North Africa	41.36	45.99	28.63	28.56	48.00	22.07	5.17
Southern Africa	16.19	10.26	32.63	29.10	33.67	55.19	37.70
West Africa	30.81	33.56	22.85	24.45	6.63	17.36	41.36
Shares of products in Africa export category 1980-1989 (%)							
Central Africa	8.72	9.20	7.56	9.82	1.37	1.24	9.51
East Africa	4.74	4.47	5.97	5.47	12.64	3.01	3.34
North Africa	41.60	43.64	40.07	41.80	52.32	28.76	14.15
Southern Africa	19.98	14.33	28.38	23.80	28.70	46.87	41.02
West Africa	24.97	28.35	18.03	19.10	4.97	20.11	31.98
Shares of products in Africa export category 1990-1999 (%)							
Central Africa	7.76	8.57	7.37	13.22	0.49	0.73	3.25
East Africa	5.73	5.33	6.79	5.35	12.92	3.01	5.68
North Africa	36.82	35.77	39.59	34.25	58.68	29.12	41.57
Southern Africa	27.56	21.13	32.60	28.73	23.81	54.98	34.31
West Africa	22.12	29.19	13.64	18.45	4.10	12.16	15.19
Shares of products in Africa export category 2000-2009 (%)							
Central Africa	7.53	9.13	5.11	10.46	0.40	2.17	1.65
East Africa	5.41	5.01	5.83	5.63	10.47	2.27	7.05
North Africa	33.03	35.56	31.08	18.64	55.81	27.50	37.49
Southern Africa	33.33	23.21	49.86	54.93	29.25	59.58	46.88
West Africa	23.17	30.61	8.13	9.81	5.32	7.03	9.95
Shares of products in Africa export category 2010-2015 (%)							
Central Africa	8.16	10.53	5.21	8.05	0.74	4.30	1.70
East Africa	5.48	4.77	5.84	6.39	10.46	2.41	6.94
North Africa	26.54	27.86	30.40	18.35	57.17	31.16	38.70
Southern Africa	36.65	26.24	50.42	57.40	26.31	55.09	42.71
West Africa	20.70	27.09	8.12	10.34	4.07	8.48	6.93
Shares of products in Africa export category 2015 (%)							
Central Africa	7.65	11.08	4.40	8.43	1.40	1.16	1.01
East Africa	7.36	6.85	7.13	7.68	12.65	2.47	11.13
North Africa	24.65	23.46	32.56	18.66	57.36	35.93	42.35
Southern Africa	39.06	28.99	49.29	55.86	24.72	56.65	35.92
West Africa	21.28	29.61	6.62	9.37	3.86	3.79	9.60

Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

The Northern Africa dominate the bulk of Africa primary exports in period 2010-2015, accounted for 27.9% of Africa primary exports, followed by West Africa region with 27.1% of Africa primary exports (Table 3). While the Southern Africa dominate the bulk of Africa manufactured exports. The Southern Africa's market share in Africa manufactured exports increased from 28.4% in period 1980-1989 to 50.4% in 2010-2015. The Southern Africa gained its dominance in manufactured exports since the early 2000s. This is mostly due to re-emerging of South Africa, as the country was mostly closed to the world markets until 1994. Since then,

the Northern Africa region became the second biggest exporter of manufactured goods. This happened as the Northern Africa region weathered a series of anti-government protests and armed rebellions.

However, the exclusion of South Africa (the outliers in the Southern Africa region) has a huge impact in the region's manufactured exports market share in Africa. The market share of the Southern Africa region without South Africa decline from 50.4% to 11.3% of Africa manufactured exports in period 2010-2015 (see Table A3). During the period 2010-2015, South Africa by itself account for 77.6% of the Southern Africa total manufactured exports and 39.1% of the continent's total manufactured exports. South Africa manufactured exports are driven by its automotive sector and the activities of multi-national corporations (MNCs) in its special economic zones.

3.2 *Country Trends*

The bulk of Africa's exports is concentrated on a small group of countries that export a few number of primary goods such as crude petroleum, ores, precious stones, cotton, cocoa, spices, etc. Only a few countries that export the bulk of Africa's manufactured exports (see Figure 3). Therefore, the growth performance of Africa's manufactured export composition depend more on the performance of individual countries.

Figure 3 indicates that South Africa, Egypt, Morocco, and Tunisia are the only non-oil dependent African countries that have significantly industrialise or diversify their export composition into more of manufactured exports. With Tunisia having the highest diversified export export composition -more manufactured exports relative to primary exports, followed by Morocco and South Africa (see Table A4). In period 2010-2015, 84.0% of Tunisia's total exports were manufactured goods, an increase from 54.5% in period 1980-1985. While in Morocco, 76.2% were manufactured goods and in South Africa 51.4% were manufactured goods. However, South Africa the continent's most industrialised country accounted for the bulk of Africa manufactured exports and has maintained dominance in all categories. In period 2010-2015, South Africa manufactured exports accounted for 39% of Africa manufactured exports. With the leading five exporters accounted for about 62% and the leading 10 countries accounted for about 78% of total manufactured exports.

However, comparing period 1980-85 and period 2010-2015, it show that the concentration levels tend to decline over time, although the concentration is still very high. This suggests that

entry barriers are declining with growing trade and trade liberalisation. The ability to compete is slowly growing in response to trade liberalisation.

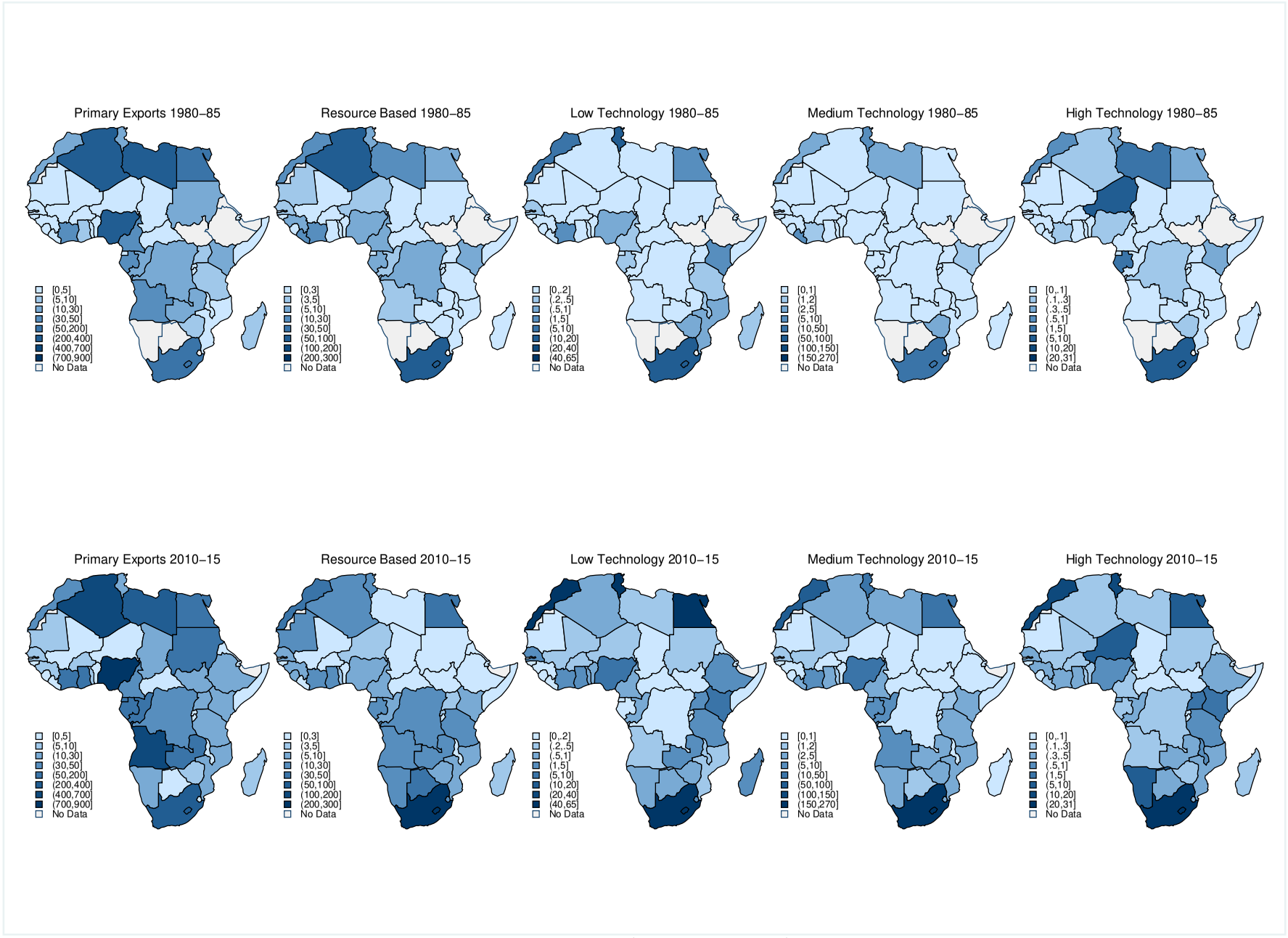

Figure 3: Manufactured exports composition, 1980-1985 vs. 2010-2015 (real US$ million). Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

3.3 *Determinants of Africa's Export Composition*

According to the traditional theories that draws from Solow (1956) neoclassical model, a country's output (export) growth is determined largely by available resources such as capital and factor endowments. Part of the leading African exporters growth and diversification was based on specific strategies and on exploiting existing advantages. For example, South Africa and Botswana and have been using their natural wealth to force industrialisation by restricting the export of minerals in raw form.

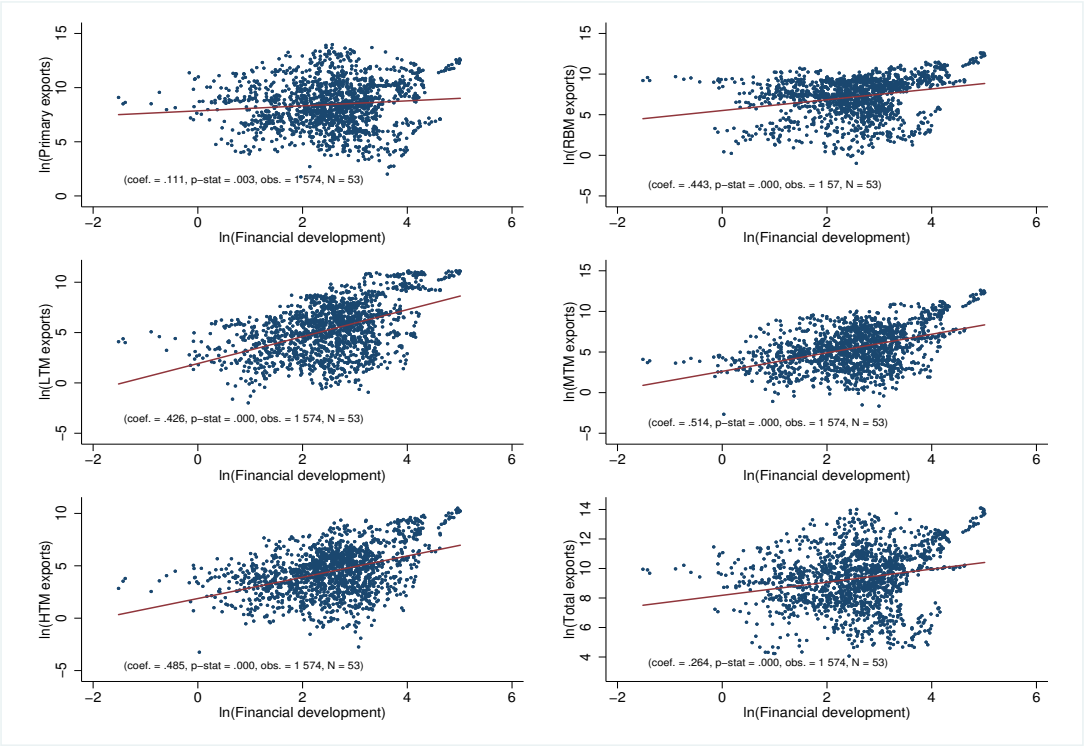

Figure 4: Relationship between export composition and financial development in African countries, 1980-2015.

African leading exporters are better financially developed compared to other African countries. South Africa and Morocco are the leading exporters of manufactured goods and are the most financially developed country in Africa. South Africa is ranked 28 in global financial development rankings, and Morocco ranked second in Africa and ranked at 52 in global financial development rankings (see Svirydzenka, 2016, global country rankings of financial development). Access to finance is important for export development, reason being that firms find it easier to finance working capital needs and investments in technology upgrading and new innovative activities. In a continent like Africa, with financial market imperfections and credit constraints, firms cannot borrow more than a multiple of their current profits, thereby affecting firms ability to export.

Figure 4 shows a positive and significant correlation between export values (real US$) and financial development among 53 African countries during the period 1980-2015. The slope of the fitted line in the graphs show the correlation between the two variables. The positive correlation coefficients between financial development and export composition varies across the technological categories.

The leading exporters are also better endowed with human capital. Empirically, Biggs et al. (1996); Hausmann et al. (2007) have shown that low human capital in low-income countries hamper export growth and diversification. Figure 5 shows a positive and significant correlation between exports and human capital among 41 African countries, with the correlation coefficients varying across categories. This is in line with the human capital theory that human capital accumulation fosters growth and stimulates exports.

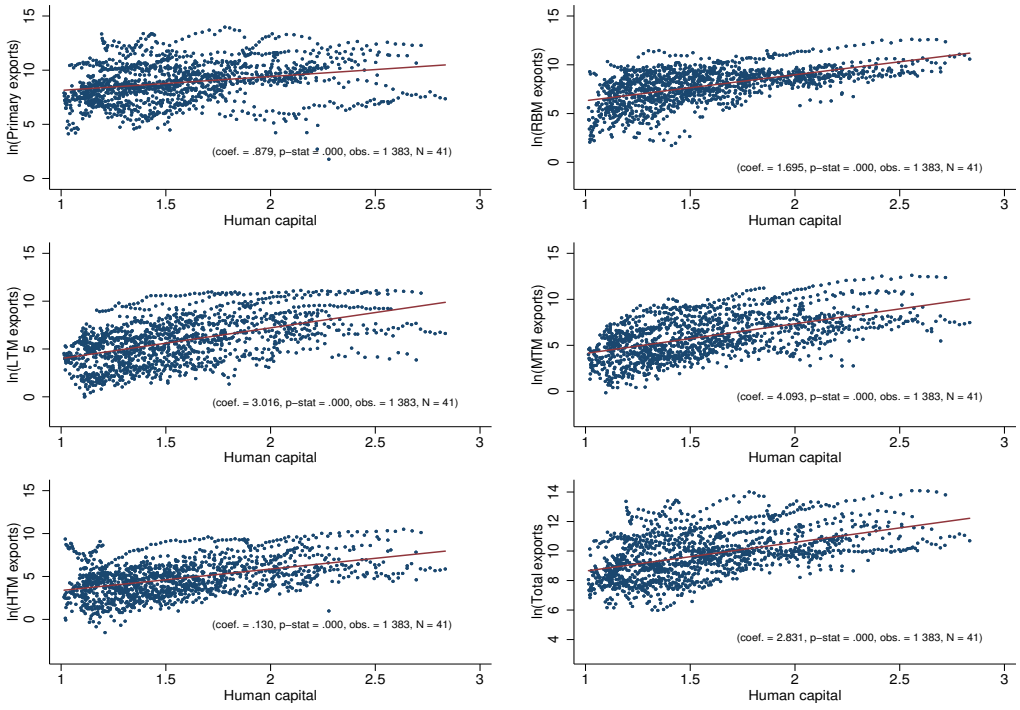

Figure 5: Relationship between export composition and human capital in African countries, 1980-2015.

Although institutions do not really change over time, African leading exporters are also endowed with better institutions. In studying institutions and economic performance, Yıldırım and Gökalp (2016) linked export performance patterns to institutional developments. Strong institutions influence a country's macroeconomic performance through affecting transaction costs, reducing uncertainty, building trust, enhancing cooperation and directing economic activities to productive areas. Yıldırım and Gökalp (2016) found that institutional variable such as in-

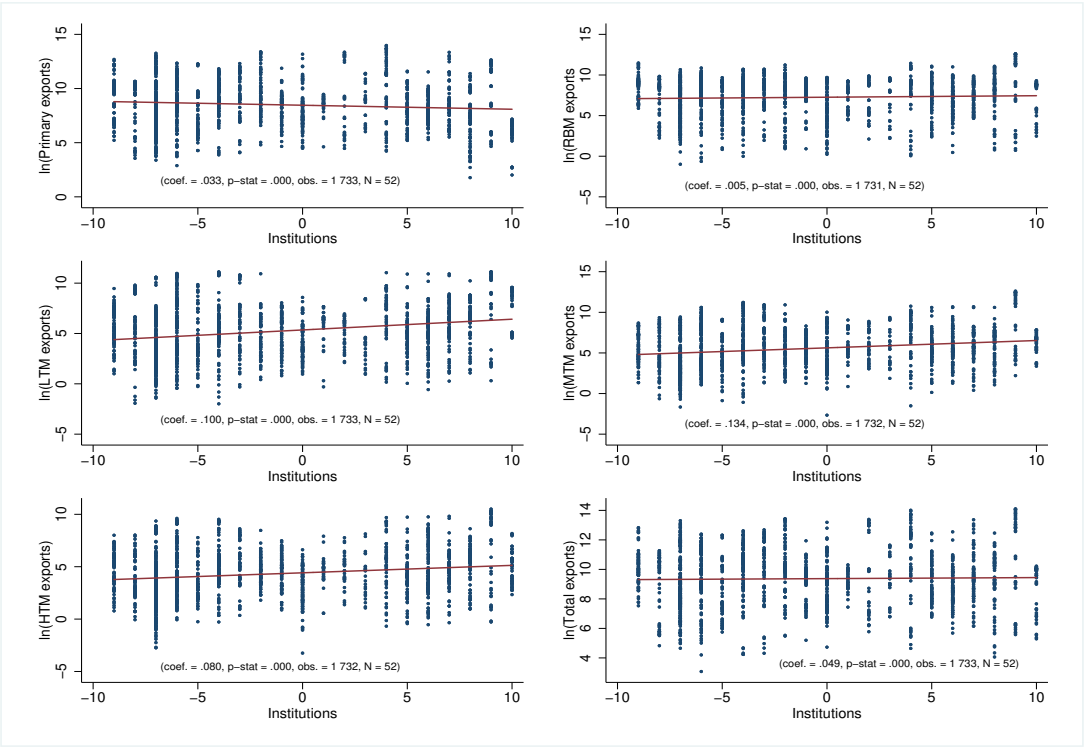

Figure 6: Relationship between export composition and institutional development in African countries, 1980-2015.

tegrity of the law system have a positive effect on the macroeconomic performance of developing countries. Figure 6, shows a significant positive correlation between exports and institutional variable among 52 African countries over period 1980-2015.

4 A Description of the Import Composition

Africa's merchandised import composition is skewed towards manufactured goods. In period 2010-15, manufactured imports accounted for 76.1% of total imports in period 2010-2015, a decrease from 83.2% in period 1980-85, as the share of primary imports increase (Figure 7). The increase in primary imports comes as the continent weathered a series of droughts. Which led to imports of consumable goods to increasingly become of importance in ensuring food security. Some mineral and oil exporting countries such as Botswana and Libya import food products like fruits and vegetables as it more beneficial to import than produce domestically (Rakotoarisoa et al., 2011).

In the manufacturing sector, imports are highly concentrated in medium technology manufactured imports (e.g. automotive, railway vehicles, ships, tractors, boilers, fertilizers, war firearms, etc.). In period 2010-15, MTM export accounted for 36.8% of total imports, a decline

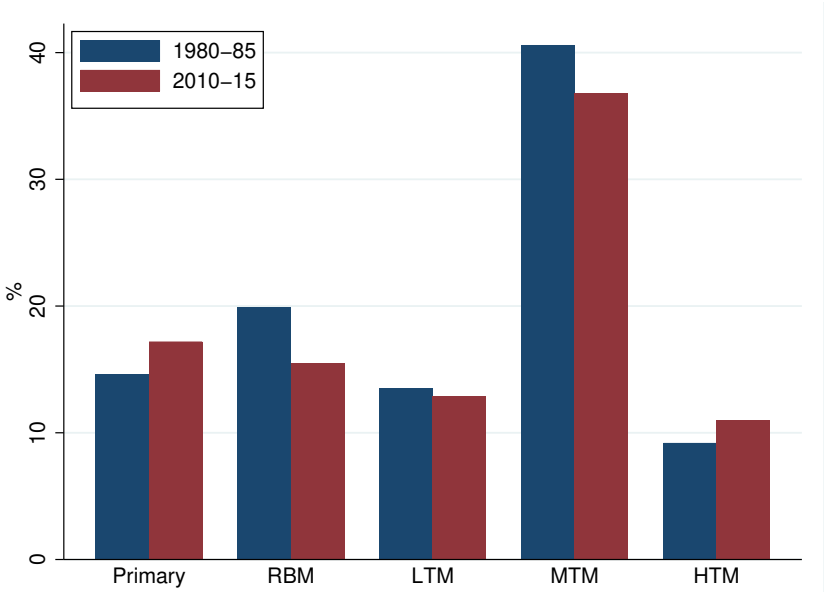

Figure 7: Africa import composition concentration, 1980-85 vs 2010-15. Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

from 40.6% in period 1980-85. While high technology manufactured imports (e.g. aircraft, electrical machines, office machine, medical equipment, steam engines, telecommunication equipment, etc.) increased from 9.2% of total imports in period 1980-85 to 11.0% of total imports. Together these two complex categories (MTM and HTM) accounted for about 63% of imported manufactured goods in period 2010-15, which gives an initial idea of the potential importance of capital goods imports as a source of growth for African economies.

In the growth model theory, imports of capital goods (MTM and HTM) are one of the channels that contribute to the introduction of export innovation at the firm level.[4] In Rodrik (1999), the benefits of openness lie on the import side rather than the export side. He argues that importation of ideas, institutions, intermediate and capital inputs from technologically more advanced countries can help developing economies to overcome some of their obstacles to rapid growth. The price of capital inputs are relatively lower in developed countries. Thus developing countries by importing relatively cheaper capital inputs from developed countries increases efficiency of capital accumulation, and thereby the income growth rates (Lee, 1995).

While in Krueger (1983), an increase of capital goods imports would increase the GDP growth, while an increase of intermediate goods and raw material imports would positively

[4]According to the capability approach, the comparative advantage of a country depends more on the national ability to master and use available technology than on factor endowments. Hence, the pattern of comparative advantage between natural resources endowed African countries varies according to their national policies for technological learning and technologies imports, even if they have similar labour and natural resource endowments. Thus, a strong level of technology transmission from one industry to another tend to equalise productivity similarly (Keller, 2002).

affect output and employment. However, Africa's participation in global imports has remained marginal (Table 4), although its imports values have increased. In 2015, Africa total imports accounted for just 3.5% of global total imports, decline in share from 4.8% in 1980. Primary imports accounted for 3.3% of global imports, an increase in share from 1.9% in 1980. While manufacture imports accounted for 3.5%, a decline in share from 6.2% in 1980. The decline in manufactured imports share was mainly due to the declining in shares of capital goods (MTM and HTM goods). The continent's imports of HTM goods were the lowest among the global regions, and lowest imported manufactured category.[5] The continent's imports of HTM goods accounted for 2.3% of global HTM imports in 2015, a decline in global share by over 50% when compared to 1980. While MTM accounted for 3.9% of global MTM imports in 2015, a decline is global import share from 7.9% in 1980.

Table 4: Africa global market share of imports (% World)

	All products	Primary	All Manufactures	RBM	LTM	MTM	HTM
	Shares of products in world import category 1980 (%)						
1980	4.82	1.93	6.19	4.89	5.37	7.85	5.04
1980-1989	3.70	2.28	4.21	4.00	3.81	4.98	2.99
1990	2.66	2.00	2.87	2.92	2.42	3.43	2.02
1990-1999	2.39	2.24	2.44	2.85	2.03	2.90	1.61
2000	2.08	2.48	2.00	2.64	1.84	2.32	1.29
2000-2009	2.68	2.61	2.67	2.98	2.43	3.20	1.79
2010	3.49	2.86	3.59	3.67	3.36	4.58	2.12
2010-2015	3.47	2.94	3.55	3.88	3.49	4.27	2.14
2015	3.53	3.30	3.52	3.95	3.87	3.94	2.28

Notes: "Other" transaction are not shown here, and account for the difference.
RBM = resource based manufactures; LTM = Low technology manufactures; MTM = Medium technology manufacturing; HTM = High technology manufactures.
Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

For the period 1980-2015, the EU has been a major source of Africa imports, however, its market share in Africa has been on a declining trend. Its markets share has fallen from 66.1% in 1980 to 33.8% in 2015. It is important to note that for the period 2010-2015, the EU market share in Africa was surpassed by the accumulated market share of the Asian countries. The rapid industrial development in Asian countries has made Asia an important supplier of intermediate and capital goods imports to Africa. Asian countries market share in Africa has risen steadily from 16.7% in 1980 to 42.8% in 2015.

[5]The share of the continent's HTM imports was not even comparable to that of Europe, a region that is a major producer of high technology equipment, and as such is expected to have low HTM imports.

4.1 *Regional Trends*

The regions import compositions are concentrated in manufactured goods[6] more that 70% of total imports in all the regions import compositions. Within the manufactured imports, imports are concentrated in MTM goods in all regions. For instance, in period 2010-2015 Central Africa MTM imports accounted for 53.1% of its manufactured imports, 43.3% of East Africa's manufactured imports, 47.6% of North Africa's manufactured imports, 46.1% of Southern Africa's manufactured imports and 54.8% of West Africa's manufactured imports.

The Northern Africa region dominate the bulk of Africa's imports in both primary and manufactured goods, followed by the Southern Africa and the Western Africa region. The Northern Africa total imports accounted for 35.4% of Africa's total imports, 44.8% of the continent primary imports and 35.2% of the continent manufactured imports in period 2010-2015. While, the Southern Africa region accounted for 30.1% of the continent total imports, 27.4% of the continent primary imports and 27.7% of the continent manufactured imports in period 2010-2015.

The Northern Africa is largest importer of manufactured goods in Africa manufactured imports, however with the exclusion of Morocco (the outlier in the region), its share in manufactured imports drops from 35.2% to 28.6% in period 2010-2015. The Southern Africa region is the second biggest manufacturer importer, however, without South Africa its share of manufactured imports share drops from 27.7% to 12.6%. This reflects the high concentration of the two region imports in individual countries.

[6]For instance, in period 2010-2015 Central Africa manufactured imports accounted for 82.0% of its total imports, 86.4% of East Africa's total imports, 75.2% of North Africa's total imports, 70.1% of Southern Africa's total imports and 78.9% of West Africa's total imports.

Table 5: Africa regional market shares of imports (% Africa categories)

	All products	Primary	All Manufactures	RBM	LTM	MTM	HTM
Shares of products in Africa import category 1980 (%)							
Central Africa	4.03	1.87	4.33	4.78	5.46	3.77	4.39
East Africa	9.13	16.64	8.20	9.44	8.09	7.71	8.09
North Africa	40.70	49.84	40.05	41.61	45.97	38.16	36.93
Southern Africa	18.28	7.51	18.79	12.64	13.53	21.25	27.91
West Africa	27.85	24.15	28.64	31.53	26.94	29.12	22.69
Shares of products in Africa import category 1980-1989 (%)							
Central Africa	5.41	2.69	5.86	5.67	6.48	5.61	6.46
East Africa	8.35	10.69	7.98	8.69	7.58	7.66	8.43
North Africa	44.39	60.61	42.01	47.87	50.71	38.74	32.04
Southern Africa	20.18	8.85	21.83	14.78	15.26	24.56	33.64
West Africa	21.67	17.16	22.31	22.99	19.97	23.43	19.43
Shares of products in Africa import category 1990-1999 (%)							
Central Africa	4.16	3.07	4.34	4.79	4.57	4.15	4.05
East Africa	9.85	8.98	9.99	11.42	11.58	8.91	9.61
North Africa	41.11	54.38	39.39	43.48	46.78	36.15	35.75
Southern Africa	25.55	17.60	26.42	21.75	21.82	26.57	37.91
West Africa	19.33	15.97	19.85	18.57	15.25	24.21	12.68
Shares of products in Africa import category 2000-2009 (%)							
Central Africa	4.23	4.17	4.41	5.02	3.88	4.64	3.57
East Africa	11.19	7.77	12.31	12.95	13.29	10.68	15.29
North Africa	34.98	41.21	34.77	34.03	39.81	34.35	31.87
Southern Africa	31.36	29.79	29.82	29.80	27.44	28.65	35.52
West Africa	18.23	17.07	18.70	18.21	15.59	21.68	13.75
Shares of products in Africa import category 2010-2015 (%)							
Central Africa	4.92	4.37	5.32	5.26	4.83	5.89	4.08
East Africa	11.22	6.90	12.74	13.86	14.85	11.38	13.29
North Africa	35.41	44.76	35.21	34.33	38.16	34.64	34.89
Southern Africa	30.13	27.43	27.72	28.44	25.86	26.47	33.07
West Africa	18.32	16.54	19.01	18.12	16.30	21.62	14.67
Shares of products in Africa import category 2015 (%)							
Central Africa	4.55	4.05	4.91	5.43	5.06	4.90	4.14
East Africa	13.98	8.45	15.80	16.11	18.08	14.45	16.45
North Africa	36.28	49.29	36.31	34.40	35.78	37.78	35.08
Southern Africa	27.87	24.13	25.66	27.91	21.32	25.45	28.91
West Africa	17.32	14.08	17.31	16.14	19.75	17.43	15.43

Notes: "Other" transaction are not shown here, and account for the difference between all products and primary plus all manufactured. RBM = Resource based manufactures; LTM = Low technology manufactures; MTM = Medium technology manufactures; and HTM = High technology manufactures.
Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

4.2 *Country Trends*

Africa's import composition is not just concentrated regionally but also at national level, concentrated on a small group of countries (Figure 8). These few leading importers are also the leading exporters. For the period 2010-2015, South Africa had the overall dominance in the continent total imports, followed by Egypt, Morocco, Algeria, and Nigeria. South Africa dominated in the importation of primary goods, low technology, medium technology, and in high technology manufactured goods, while Egypt led in resource based manufactured imports. These top five importers accounted for 54.4% of Africa total imports, while the leading 10 accounted for 70.5% of Africa total imports in period 2010-2015.

These few leading importers also accounted for the bulk of Africa's capital imports (MTM and HTM imports). The leading five importers of capital goods accounted for over 50% of Africa capital goods imports in period 2010-2015. The concentration is very high in HTM imports were South Africa, Algeria and Egypt accounted for 43% of Africa capital goods imports, while the top 10 importers accounted for 74.4% of Africa capital goods imports in period 2010-2015.

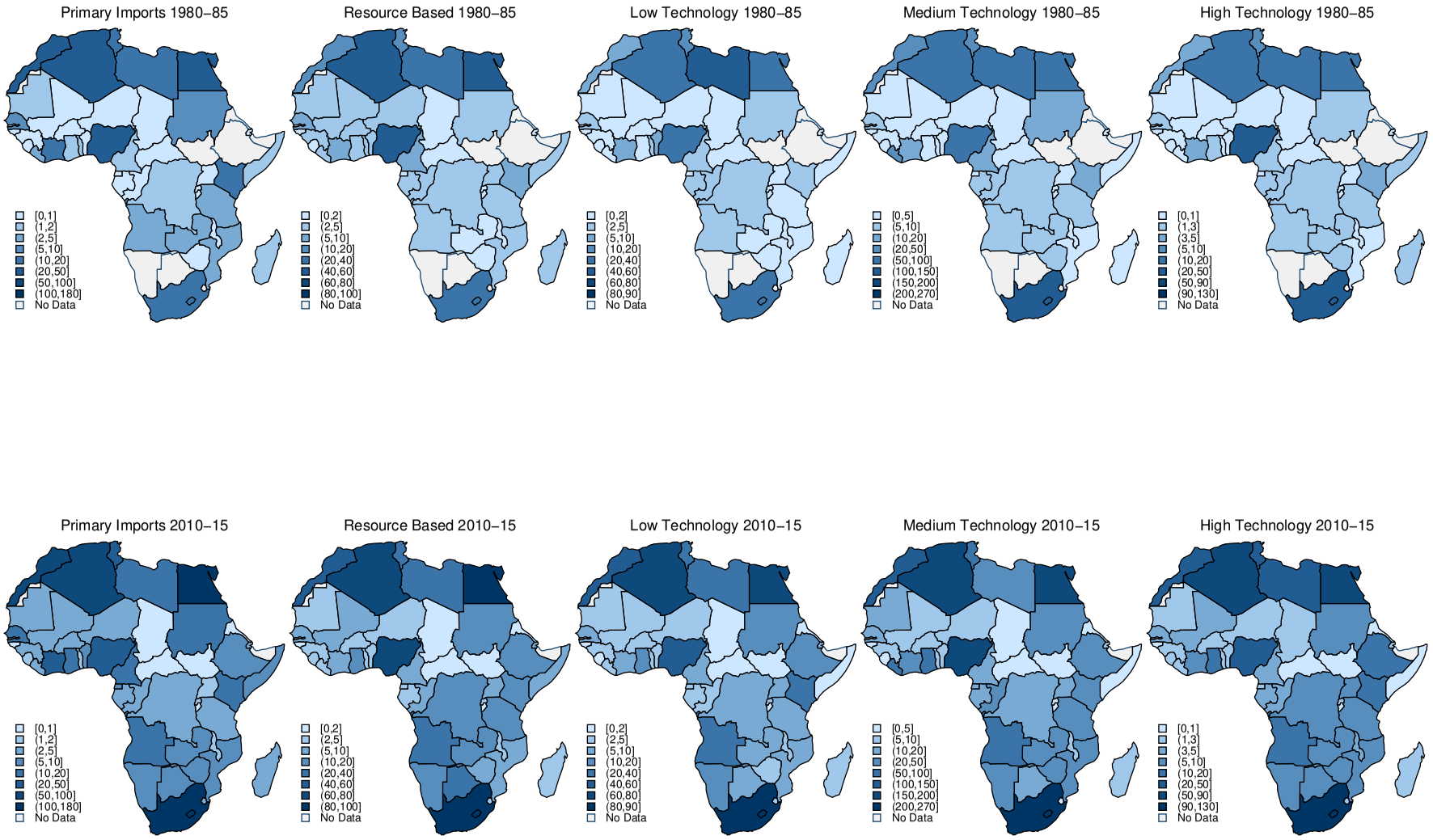

Figure 8: African countries imports composition, 1980-1985 vs. 2010-2015 (real US$ million). Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

4.3 Determinants of Africa's Import Composition

Existing studies (e.g. Goldberg et al., 2010; Kugler and Verhoogen, 2009; Rodrik, 1999) have showed that access to imported technologies can significantly contribute to the introduction of export innovation and efficiency at the firm level. African leading exporters are also the leading importers. In line with these findings, recent evidence has shown that the imports of new inputs can be an important determinant of future exporting activities (e.g. Castellani et al., 2017; Colantone and Crinò, 2014; Halpern et al., 2015), together with more common determinants such as productivity, innovation and firm size. Therefore, it is important to analysis the channels that influence imports of new inputs.

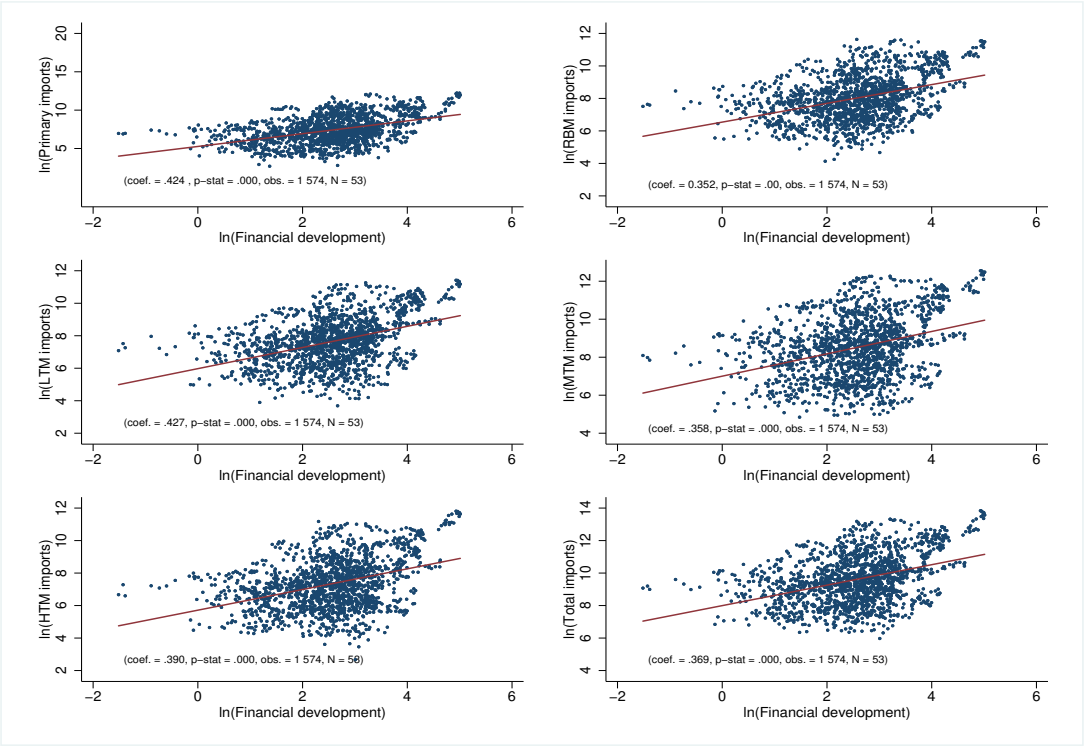

Figure 9: Relationship between import composition and financial development in African countries, 1980-2015.

Africa leading importers are better financially developed than other African countries. Figure 9 shows a positive and significant relationship between imports and financial development within 53 African countries during the period 1980-2015. This suggest that increased access to finance allows African countries to enjoy the benefits embodied in foreign technologies and new primary inputs.

The leading importers are also better endowed with human capital. In the theory of economic growth, educated workers are faster learners, as education enables workers to learn new skills and ideas. In Hausmann et al. (2007) and Biggs et al. (1996), the most important constraint

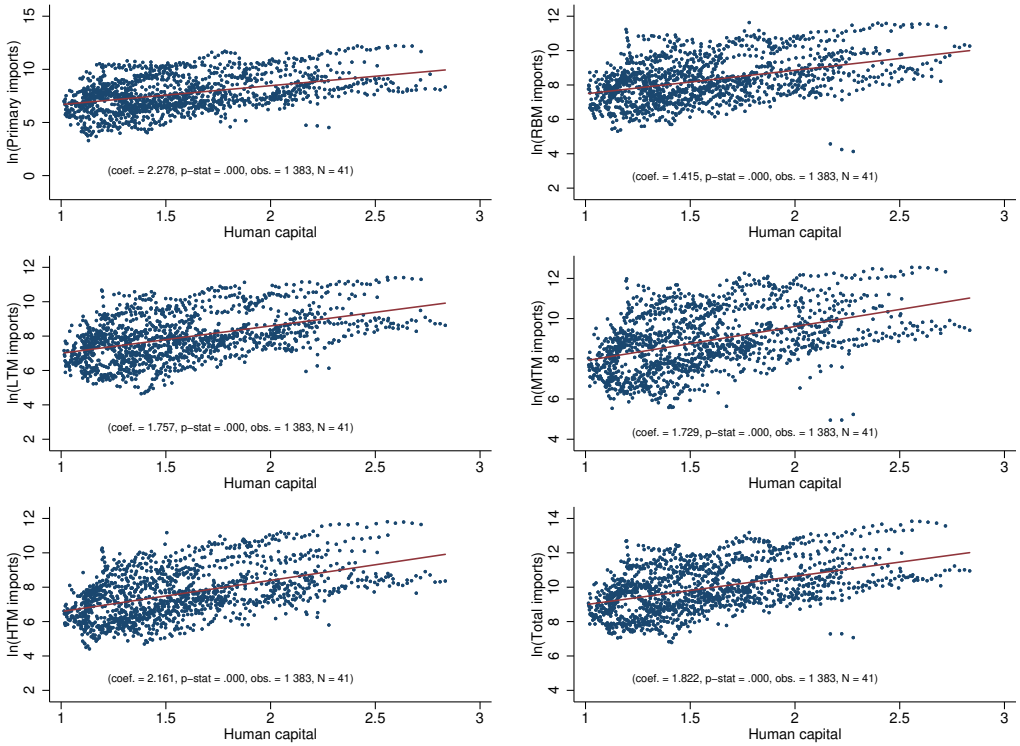

Figure 10: Relationship between import composition and human capital in African countries, 1980-2015.

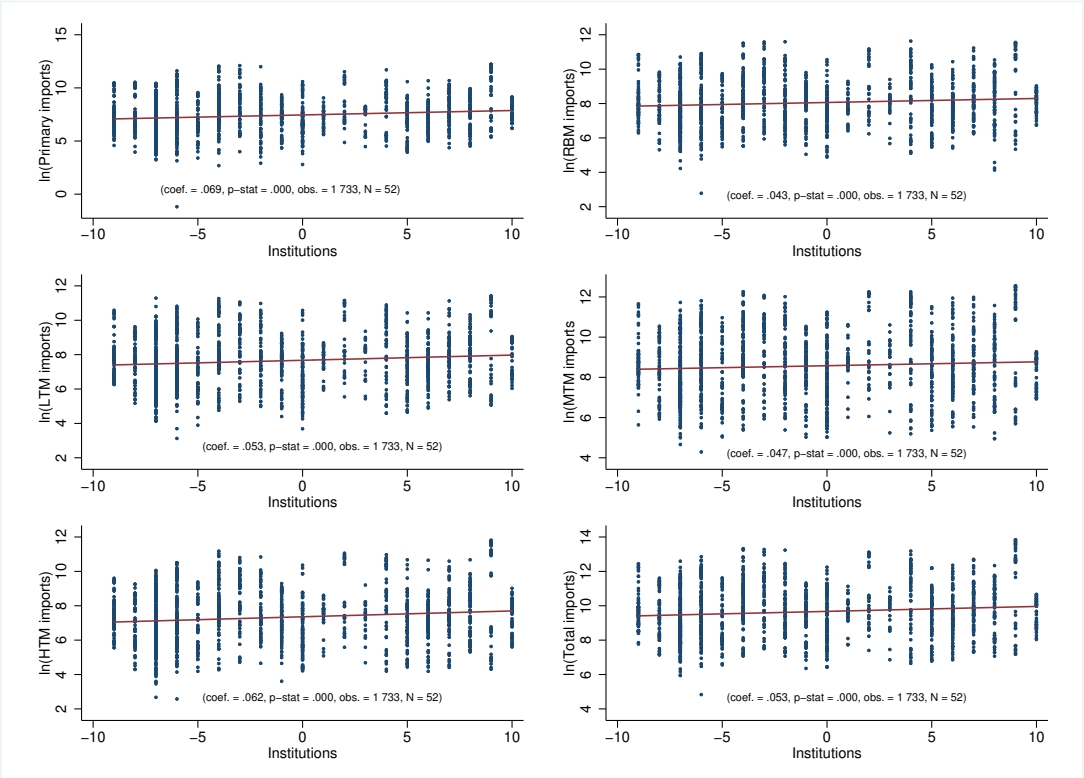

Figure 11: Relationship between import composition and institutions in African countries, 1980-2015.

in developing countries is inadequate mechanisms for transferring new ideas and promoting learning, as skill levels can be raised through exposure to new ways of doing things and training. Weaknesses in learning mechanisms in Africa, for example, stem from the fact that public institutions are weak and lack of adequate infrastructures. Figure 10 show that imports have positively correlation with human capital.

The leading importers are also endowed with better institutions. In Figure 11 we show the relationship between imports and institutional variable among 52 African countries over the period 1980-2015. The results shows that there is a positive relationship between import composition and institutions.

5 Discussion and Conclusion

This paper has analysed Africa's trade composition spanning 1980-2015, using a disaggregated and detailed classification by technological levels. We find that Africa's participation in global trade has remained marginal and concentrated in few countries. The few leading exporters are also the leading importers of capital goods, the continent is a net importer of capital goods. The continent's total exports are highly concentrated in primary goods.

More than 60% of Africa's exports are primary goods and in 38 African countries, just three primary goods accounted for over 50% of their nation's total exports in period 2010-2015. Primary goods are characterised by very volatile prices and lack both technological dynamism and local economic linkages. Manufactured exports have stagnated, remaining low, and less diversified (highly concentrated in resource based manufactured goods).

Globally, the continent has performed poorly compared to other world regions. Africa has lost its global market shares in both primary and manufactured exports. In 2015, Africa's total exports accounted for just 3.1% of global exports, a decline in market share from 6.3% in 1980. Manufactured exports accounted for just 1.4% of global manufactured exports, a decline in market share by 0.4% when compared to 1980. While primary exports accounted for 10.2% of global primary exports, a decline in market share from 15.8% in 1980. The continent export performance was worse than that of other world regions over the past four decades. In fact, individual countries such as China, United States, Germany, Japan, France and Korea had bigger market shares than all of Africa in period 2010-2015.

We also find that regions within Africa have similar technological export composition struc-

tures. Manufactured exports are concentrated in resource based manufactured goods in all regions. Southern Africa dominates the bulk of Africa manufactured exports with over 50% of Africa manufactured exports. Few notable countries such as South Africa, Morocco, Egypt and Tunisia that have managed to transform their export basket into semi-processed and relatively high technology exports are also the leading imports of capital and intermediate goods. They are better financially developed and better endowed with human capital, infrastructure, and institutions than the other African countries.

If African countries could add-value to their abundant and diversified natural and human resources, it has a high growth potential to diversify its export composition into more processed and semi-processed manufactured exports, and could increase its share in global exports. Factor endowments do not have to condemn African countries to specialise only in primary and resource based goods.

Also with the right policies and interventions to develop the manufacturing sector, African countries can produce and export more of manufactured goods. However, this may involve a broad and integrated set of policy interventions. African governments should play major roles by amending capital goods import policies, promoting entrepreneurship, invest in human capital, infrastructure, public institutions and in proactive policies in support of the development of local firms capabilities. We find varying positive correlations between African countries manufactured export composition and their levels of human capital, financial development, infrastructure, and institutions.

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Appendix A

Table A1: World regional growth rates and market shares of exports (% annual average)

	All products	Primary	All Manufactures	RBM	LTM	MTM	HTM
Growth 1980-2015 (%)							
World	7.86	6.97	8.04	6.63	7.97	7.95	9.88
Africa	7.25	6.75	7.91	5.91	9.66	11.91	8.52
Asia	9.34	6.98	10.27	8.53	10.84	9.33	12.60
Europe	7.32	7.59	7.14	6.06	6.03	7.37	9.14
Central & North America	6.77	5.51	7.03	5.46	7.87	7.30	7.43
South America & the Caribbean	8.09	8.40	7.54	7.07	5.89	9.50	9.84
Oceania	7.85	7.02	8.34	8.55	5.47	8.35	8.82
Growth 1980-1989 (%)							
World	5.28	-2.76	7.88	4.58	7.70	8.33	12.31
Africa	-3.48	-6.15	3.09	1.12	7.56	10.64	-1.24
Asia	3.76	-8.17	10.64	4.72	11.07	9.69	19.27
Europe	7.19	3.96	7.51	5.28	6.49	8.15	11.25
Central & North America	5.11	-1.46	7.00	5.44	6.07	6.98	8.98
South America & the Caribbean	3.42	1.48	4.98	-0.08	12.69	16.35	7.99
Oceania	5.08	5.41	3.53	2.02	6.34	6.25	11.67
Growth 1990-1999 (%)							
World	7.29	3.65	7.95	5.68	8.06	7.19	11.35
Africa	3.82	1.15	7.88	4.30	15.51	10.14	10.30
Asia	8.31	2.19	9.59	7.24	10.08	7.04	13.71
Europe	6.31	5.02	6.38	5.30	5.44	6.04	9.55
Central & North America	9.20	4.23	10.15	5.55	13.73	10.27	11.40
South America & the Caribbean	6.73	6.03	6.99	6.44	5.85	8.04	12.43
Oceania	4.78	2.92	6.36	4.58	7.59	9.68	9.26
Growth 2000-2009 (%)							
World	11.08	15.69	9.99	11.41	9.59	10.59	8.39
Africa	17.34	20.26	12.82	12.98	8.38	16.29	13.70
Asia	13.64	17.20	12.75	14.93	12.90	13.69	10.88
Europe	10.62	14.10	9.98	10.11	8.76	10.76	9.18
Central & North America	5.50	11.44	4.37	6.79	2.09	5.51	2.46
South America & the Caribbean	15.78	17.13	14.57	17.74	6.31	15.03	9.41
Oceania	13.66	13.52	13.90	17.36	3.84	10.26	8.24
Growth 2010-2015 (%)							
World	1.30	-2.19	2.00	0.47	2.59	2.48	1.99
Africa	-3.24	-7.13	1.10	2.15	-0.26	0.02	3.55
Asia	1.97	-2.72	2.97	2.06	3.72	2.83	2.97
Europe	0.84	-2.07	1.12	0.07	1.15	1.83	0.57
Central & North America	3.01	1.23	3.22	0.83	3.38	4.41	2.52
South America & the Caribbean	-1.45	-0.11	-3.20	-3.41	-1.99	-3.22	-2.75
Oceania	-0.14	0.71	-1.22	-0.52	-5.80	-3.46	-2.56
Shares of products in world export category 1980 (%)							
Africa	6.34	15.77	1.82	4.75	1.04	0.44	0.80
Asia	25.28	42.46	17.67	14.99	19.79	18.72	17.25
Europe	44.81	18.06	57.43	51.77	66.76	59.85	49.09
Central & North America	18.12	15.40	18.92	17.52	9.99	19.80	31.90
South America & the Caribbean	3.77	5.62	2.95	7.80	1.81	0.79	0.63
Oceania	1.67	2.70	1.21	3.17	0.60	0.39	0.33
Shares of products in world export category 1980-1989 (%)							
Africa	4.37	13.26	1.50	4.17	1.10	0.49	0.45
Asia	24.51	34.38	21.96	16.00	25.10	22.66	25.77
Europe	46.45	23.91	53.45	52.01	61.06	54.82	43.90
Central & North America	19.18	17.58	19.27	18.03	9.56	20.35	28.92
South America & the Caribbean	3.79	7.04	2.82	6.93	2.59	1.33	0.62
Oceania	1.70	3.83	1.01	2.86	0.59	0.35	0.34
Shares of products in world export category 1990-1999 (%)							
Africa	2.57	9.87	1.20	3.28	1.57	0.55	0.24
Asia	25.64	28.68	25.73	17.10	32.32	22.52	33.39
Europe	47.31	32.23	49.71	53.53	49.91	53.69	39.15
Central & North America	19.88	16.37	20.28	17.81	13.28	21.30	26.46
South America & the Caribbean	3.12	8.33	2.22	5.73	2.34	1.47	0.42
Oceania	1.47	4.51	0.85	2.54	0.58	0.45	0.34
Shares of products in world export category 2000-2009 (%)							
Africa	3.43	12.63	1.35	3.26	1.77	1.02	0.30
Asia	31.76	32.08	32.41	21.65	42.69	27.22	40.59
Europe	43.54	29.43	46.21	49.86	42.14	51.10	38.82
Central & North America	16.19	12.95	16.73	14.78	11.14	18.43	19.36
South America & the Caribbean	3.63	9.26	2.39	7.01	1.85	1.77	0.64
Oceania	1.45	3.64	0.91	3.43	0.41	0.46	0.30
Shares of products in world export category 2010-2015 (%)							
Africa	3.99	12.18	1.53	3.67	1.55	1.24	0.36
Asia	36.88	35.56	38.42	27.01	51.14	33.15	47.02
Europe	38.72	26.56	41.38	42.81	36.64	46.06	35.82
Central & North America	14.33	11.78	14.81	13.00	9.02	17.43	15.98
South America & the Caribbean	4.20	10.00	2.59	8.13	1.34	1.75	0.56
Oceania	1.88	3.91	1.27	5.37	0.31	0.37	0.26
Shares of products in world export category 2015 (%)							
Africa	3.13	10.30	1.41	3.61	1.43	1.11	0.35
Asia	37.60	32.42	39.89	28.20	53.61	33.79	48.23
Europe	38.44	27.72	40.03	42.70	34.22	44.83	34.45
Central & North America	15.41	13.85	15.42	13.37	9.28	18.49	16.22
South America & the Caribbean	3.73	11.04	2.20	7.35	1.20	1.46	0.52
Oceania	1.70	4.67	1.06	4.78	0.25	0.33	0.23

Notes: "Other" transaction are not shown here, and account for the difference between all products and primary plus all manufactured. RBM = Resource based manufactures; LTM = Low technology manufactures; MTM = Medium technology manufactures and HTM = High technology manufactures.
Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

Table A2: Africa sample: Three largest exports as a share of total merchandised exports for each country, 2010-2015.

Country	1st export product	% share	2nd export product	% share	3rd export product	% share	% share of top 3 exports
South Sudan	Crude petroleum	99.7	Seeds for other fixed oils	0.1	Seeds for soft fixed oils	0.1	99.8
Libya	Crude petroleum	86.5	Gas, natural and manufactured	9.4	Gold	2.0	97.8
Chad	Crude petroleum	92.9	Gold	2.0	Cotton	1.6	96.5
Algeria	Crude petroleum	52.0	Gas, natural and manufactured	42.9	Residual petroleum products	1.5	96.4
Angola	Crude petroleum	92.0	Pearl, precious stones	2.4	Natural abrasives	1.7	96.1
Equatorial Guinea	Crude petroleum	71.3	Gas, natural and manufactured	21.6	Alcohols, phenols	2.8	95.8
Nigeria	Crude petroleum	81.6	Gas, natural and manufactured	11.4	Cocoa	1.2	94.2
Eritrea	Gold	48.5	Base metal ores	43.0	Silver, platinum	1.5	92.9
Mali	Gold	79.4	Cotton	11.0	Fertilizers, manufactured	2.3	92.7
Gabon	Crude petroleum	79.5	Base metal ores	7.7	Ships and boats	5.2	92.3
Congo	Crude petroleum	74.6	Copper	8.5	Ships and boats	6.8	89.9
Botswana	Pearl, precious stones	77.9	Base metal ores	9.1	Meat fresh child, frozen	1.4	88.4
Sudan	Crude petroleum	61.7	Gold	21.9	Live animals for food	4.7	88.3
Burkina Faso	Gold	62.0	Cotton	22.5	Seeds for soft fixed oils	2.8	87.3
Comoros	Spices	67.8	Ships and boats	15.6	Special transactions	3.6	87.0
Guinea-Bissau	Fruit, nuts, fresh , dried	69.4	Fish, fresh, chilled, frozen	9.2	Crude petroleum	7.3	85.9
Somalia	Live animals for food	70.1	Animals, live	7.3	Seeds for soft fixed oils	6.5	83.9
Sierra Leone	Iron ore	54.4	Base metal ores	15.0	Pearl, precious stones	12.9	82.3
Seychelles	Fish, prepared, preserved	53.2	Fish, fresh, chilled, frozen	24.1	Lime, cement	4.1	81.4
Zambia	Copper	77.7	Sugar and honey	1.7	Maize unmilled	1.4	80.8
Burundi	Gold	50.6	Coffee and substitutes	22.3	Tea and mate	7.0	79.9
Ghana	Gold	30.5	Cocoa	26.5	Crude petroleum	21.0	78.0
Dem. Rep. Congo	Copper	42.4	Base metal ores	23.9	Crude petroleum	11.2	77.5
Liberia	Ships and boats	32.5	Natural rubber, gums	20.7	Iron ore	20.4	73.6
Guinea	Base metal ores	34.5	Gold	21.0	Crude petroleum	16.5	72.0
Rwanda	Base metal ores	47.3	Coffee and substitutes	12.5	Tea and mate	12.1	71.9
Niger	Radioactive	41.9	Tobacco, manufactured	16.9	Uranium, thorium ore	10.6	69.3
Sao Tome & Principe	Cocoa	60.0	Ships and boats	3.8	Transistors, valves	2.8	66.5
Mauritania	Iron ore	40.7	Fish, fresh, chilled, frozen	14.1	Base metal ores	11.2	66.0
Cameroon	Crude petroleum	41.3	Cocoa	12.3	Wood shaped sleepers	8.9	62.5
Gambia	wood, rough	22.8	Woven man-made fibre fabric	20.7	Fruit, nuts, fresh , dried	17.7	61.2
Côte d'Ivoire	Cocoa	43.0	Crude petroleum	9.1	Natural rubber, gums	7.9	60.0
Central African Rep.	wood, rough	27.5	Pearl, precious stones	20.2	Cotton	12.0	59.6
Lesotho	Pearl, precious stones	32.2	Outwear knit non elastic	15.6	Mens outwear not knitted	11.7	59.5
Ethiopia	Coffee and substitutes	24.8	Vegetables, fresh, preserved	19.3	Seeds for soft fixed oils	13.7	57.8
Benin	Gold	26.2	Cotton	15.6	Fruit, nuts, fresh , dried	15.0	56.8
Cabo Verde	Fish, fresh, chilled, frozen	21.8	Trailers, non motorized vehicles	17.5	Fish, prepared, preserved	17.4	56.7
Swaziland	Essential oils, perfumes	22.5	Sugar and honey	18.6	Chemical products	10.0	51.1

Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

Table A3: Regional shares of manufactured exports in Africa total manufactured export, 1980-85 vs. 2010-15 (%)

	Period	Central Africa	East Africa	North Africa	North Africa (excl Morocco)	Southern Africa	Southern Africa (excl South Africa)	West Africa
All manufactures	1980-1985	7.49	6.10	39.81	33.79	28.09	4.01	18.50
	2010-2015	5.21	5.84	30.40	19.99	50.42	11.30	8.13
RBM total	1980-1985	6.76	4.36	30.67	27.40	16.62	2.48	13.98
	2010-2015	3.59	2.85	8.18	5.61	25.60	8.29	4.37
RBM1	1980-1985	2.87	2.50	2.25	1.11	4.81	0.88	5.32
	2010-2015	1.30	1.53	3.03	2.12	4.91	1.23	1.79
RBM2	1980-1985	3.88	1.85	28.42	26.29	11.81	1.60	8.66
	2010-2015	2.29	1.32	5.16	3.49	20.69	7.05	2.58
LTM total	1980-1985	0.17	1.21	5.55	3.55	3.70	0.41	0.64
	2010-2015	0.13	1.82	9.96	6.66	4.58	0.74	0.93
LTM1	1980-1985	0.06	1.00	5.20	3.30	1.28	0.16	0.51
	2010-2015	0.01	1.37	7.81	4.80	1.26	0.47	0.52
LTM2	1980-1985	0.10	0.21	0.35	0.25	2.42	0.24	0.13
	2010-2015	0.12	0.45	2.14	1.85	3.32	0.27	0.41
MTM total	1980-1985	0.09	0.39	2.95	2.33	5.37	1.05	2.32
	2010-2015	1.40	0.78	10.10	6.23	17.87	1.75	2.28
MTM1	1980-1985	0.01	0.06	0.11	0.04	0.17	0.01	0.07
	2010-2015	0.06	0.10	1.17	0.37	5.49	0.11	0.13
MTM2	1980-1985	0.03	0.14	2.21	1.76	4.64	0.98	0.24
	2010-2015	0.28	0.34	4.25	2.88	6.63	0.58	0.42
MTM3	1980-1985	0.04	0.19	0.63	0.53	0.56	0.06	2.01
	2010-2015	1.06	0.34	4.69	2.99	5.75	1.07	1.72
HTM total	1980-1985	0.48	0.15	0.65	0.52	2.40	0.07	1.57
	2010-2015	0.09	0.39	2.15	1.48	2.38	0.51	0.55
HTM1	1980-1985	0.02	0.05	0.23	0.13	0.18	0.02	0.06
	2010-2015	0.03	0.25	1.52	1.03	1.12	0.10	0.12
HTM2	1980-1985	0.47	0.10	0.42	0.38	2.23	0.05	1.50
	2010-2015	0.07	0.14	0.64	0.45	1.26	0.41	0.43

Notes: RBM1 - RBM agro-based; RBM2 -RBM other products; LTM1 - LTM textile, garment and footwear; LTM2 - LTM other products ; MTM1 - MTM automotive; MTM2 - MTM process; MTM3 - MTM engineering; HTM1 - HTM electronic and electrical; HTM2 - HTM other product.
Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

Table A4: Leading 15 exporters of all products in period 1980-1985 vs 2010-2015

		Total exports	Primary	Total manufactures	Total RBM	RBM1	RBM2	Total LTM	LTM1	LTM2	Total MTM	MTM1	MTM2	MTM3	Total HTM	HTM1	HTM2
1980-1985: Technological category share (%) in country total exports																	
1	Nigeria	100	98.07	1.87	1.48	0.17	1.31	0.15	0.13	0.02	0.18	0.02	0.02	0.14	0.02	0.02	0.04
2	Algeria	100	73.99	25.91	25.43	0.19	25.24	0.06	0.01	0.05	0.33	0.01	0.24	0.08	0.02	0.02	0.06
3	Libya	100	94.06	5.90	4.79	0.01	4.78	0.01	0.01	0.00	0.76	0.00	0.65	0.11	0.01	0.01	0.33
4	South Africa	100	40.69	41.98	24.54	6.90	17.64	5.94	1.91	4.03	7.41	0.27	6.29	0.86	0.43	0.43	3.66
5	Egypt	100	87.37	11.71	6.36	0.94	5.43	4.12	3.73	0.39	0.88	0.02	0.37	0.49	0.15	0.15	0.20
6	Côte d'Ivoire	100	63.58	35.72	31.44	24.82	6.62	2.17	1.78	0.39	1.86	0.21	0.91	0.73	0.14	0.14	0.11
7	Morocco	100	54.03	45.67	24.94	8.70	16.24	15.05	14.31	0.74	4.71	0.55	3.43	0.73	0.71	0.71	0.26
8	Gabon	100	75.81	24.03	19.92	9.13	10.79	0.47	0.00	0.47	0.18	0.03	0.03	0.12	0.02	0.02	3.45
9	Cameroon	100	86.65	13.00	12.13	8.87	3.27	0.49	0.40	0.09	0.23	0.03	0.10	0.09	0.06	0.06	0.09
10	Tunisia	100	44.81	54.47	17.76	6.90	10.86	23.34	22.37	0.97	12.34	0.18	9.75	2.41	0.66	0.66	0.37
11	Angola	100	89.91	9.95	9.78	0.10	9.68	0.02	0.01	0.01	0.07	0.01	0.01	0.05	0.02	0.02	0.06
12	DRC	100	66.22	20.82	19.74	2.44	17.30	0.31	0.11	0.20	0.20	0.01	0.07	0.12	0.04	0.04	0.52
13	Kenya	100	57.71	41.02	31.91	9.69	22.22	4.27	1.98	2.29	3.69	0.80	1.89	1.00	0.35	0.35	0.81
14	Congo	100	83.25	16.38	15.52	8.71	6.80	0.35	0.01	0.34	0.24	0.02	0.13	0.09	0.02	0.02	0.25
15	Liberia	100	12.90	76.05	47.21	6.72	40.49	0.18	0.08	0.10	28.55	0.10	0.05	28.39	0.05	0.05	0.08
2010-2015: Technological category share (%) in country total exports																	
1	South Africa	100	20.22	51.36	22.77	4.82	17.95	5.03	1.04	3.99	21.08	7.05	7.90	6.14	2.48	1.35	1.13
2	Nigeria	100	96.29	3.27	0.87	0.42	0.45	0.84	0.65	0.18	1.46	0.03	0.16	1.27	0.10	0.05	0.05
3	Angola	100	94.48	5.48	3.77	0.03	3.73	0.05	0.00	0.05	1.62	0.05	0.02	1.55	0.05	0.03	0.02
4	Algeria	100	95.43	4.36	3.40	0.59	2.81	0.12	0.06	0.06	0.79	0.19	0.43	0.17	0.05	0.02	0.03
5	Libya	100	95.97	1.98	0.55	0.02	0.53	0.10	0.01	0.09	1.30	0.01	1.18	0.11	0.04	0.02	0.02
6	Egypt	100	44.62	49.94	12.94	7.34	5.60	17.68	10.67	7.01	16.87	0.44	11.22	5.21	2.45	1.30	1.15
7	Morocco	100	22.41	76.24	18.75	6.58	12.17	24.00	21.90	2.11	28.13	5.82	9.97	12.34	5.35	4.02	1.33
8	Tunisia	100	15.56	83.97	10.98	6.03	4.94	35.27	29.19	6.08	27.40	2.33	5.03	20.04	10.33	7.98	2.35
9	Equatorial Guinea	100	92.96	6.27	1.45	1.37	0.08	0.01	0.00	0.01	4.38	0.01	2.86	1.51	0.43	0.00	0.43
10	Congo	100	83.95	15.30	5.12	3.59	1.53	0.68	0.02	0.66	9.19	0.46	0.20	8.54	0.31	0.12	0.19
11	Ghana	100	53.36	14.52	9.64	5.39	4.24	1.36	0.48	0.88	3.13	0.14	0.71	2.28	0.39	0.20	0.19
12	Côte d'Ivoire	100	73.15	20.24	9.84	8.25	1.59	2.00	0.79	1.21	7.96	0.43	1.48	6.05	0.43	0.27	0.16
13	Zambia	100	82.18	15.37	10.43	3.36	7.07	1.80	0.12	1.68	2.79	0.30	0.83	1.65	0.35	0.22	0.13
14	Gabon	100	80.08	19.30	13.17	5.19	7.98	0.08	0.01	0.07	5.85	0.04	0.06	5.75	0.21	0.06	0.15
15	Sudan	100	74.07	3.65	2.19	1.13	1.06	0.48	0.38	0.10	0.66	0.08	0.47	0.11	0.33	0.27	0.06

Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

Table A5: Leading 15 exporters of each manufactured category in Africa during period 1980-85 & 2010-15 (US$ billion and % share in each category)

	Total Manufacturers			Resource Based			Low Technology			Medium Technology			High Technology		
	Country	Exports	Share	Country	Exports	Share	Country	Exports	Share	Country	Exports	Share	Country	Exports	Share
	1980-1985: Average exports values (US$ billion) and share (%)														
1	South Africa	5.51	24.7%	Algeria	4.23	26.2%	South Africa	0.78	30.6%	South Africa	0.97	39.2%	South Africa	0.54	45.5%
2	Algeria	4.31	19.3%	South Africa	3.22	20.0%	Tunisia	0.54	21.4%	Liberia	0.38	15.5%	Niger	0.31	26.3%
3	Morocco	1.33	6.0%	Côte d'Ivoire	1.01	6.3%	Morocco	0.44	17.3%	Tunisia	0.29	11.5%	Gabon	0.09	7.3%
4	Tunisia	1.27	5.7%	Libya	0.80	4.9%	Egypt	0.23	9.2%	Zimbabwe	0.20	7.9%	Libya	0.06	4.8%
5	Côte d'Ivoire	1.15	5.2%	Morocco	0.73	4.5%	Mauritius	0.15	5.9%	Morocco	0.14	5.5%	Morocco	0.03	2.4%
6	Liberia	1.02	4.6%	Liberia	0.63	3.9%	Côte d'Ivoire	0.07	2.8%	Libya	0.13	5.1%	Tunisia	0.02	2.0%
7	Libya	0.98	4.4%	Gabon	0.49	3.1%	Kenya	0.06	2.4%	Côte d'Ivoire	0.06	2.4%	Egypt	0.02	1.8%
8	Egypt	0.70	3.1%	Guinea	0.47	2.9%	Zimbabwe	0.05	1.9%	Algeria	0.06	2.2%	Kenya	0.02	1.4%
9	Gabon	0.59	2.7%	Kenya	0.45	2.8%	Nigeria	0.03	1.1%	Egypt	0.05	2.2%	Algeria	0.01	1.1%
10	Kenya	0.59	2.6%	DRC	0.42	2.6%	Mozambique	0.03	1.0%	Kenya	0.05	2.2%	Nigeria	0.01	1.0%
11	Mauritius	0.48	2.2%	Tunisia	0.41	2.6%	Madagascar	0.02	1.0%	Nigeria	0.03	1.4%	DRC	0.01	1.0%
12	Niger	0.48	2.1%	Egypt	0.39	2.4%	Senegal	0.02	0.8%	Mozambique	0.03	1.1%	Zimbabwe	0.01	0.7%
13	Guinea	0.47	2.1%	Mauritius	0.32	2.0%	Tanzania	0.02	0.8%	Senegal	0.02	0.8%	Côte d'Ivoire	0.01	0.7%
14	DRC	0.44	2.0%	Cameroon	0.29	1.8%	Cameroon	0.01	0.5%	Mauritius	0.02	0.6%	Mauritius	0.00	0.4%
15	Nigeria	0.36	1.6%	Nigeria	0.29	1.8%	Gabon	0.01	0.5%	Sudan	0.01	0.3%	Sudan	0.00	0.4%
	Total above	19.68	88.1%	Total above	14.1	87.8%	Total above	2.5	97.1%	Total above	2.4	97.8%	Total above	1.1	96.7%
	2010-2015: Average exports values (US$ billion) and share (%)														
1	South Africa	79.97	39.1%	South Africa	35.45	38.9%	South Africa	7.84	22.0%	South Africa	32.83	49.8%	South Africa	3.86	33.4%
2	Morocco	21.28	10.4%	Botswana	6.30	6.9%	Tunisia	7.03	19.7%	Morocco	7.86	11.9%	Tunisia	2.06	17.8%
3	Egypt	18.35	9.0%	Morocco	5.23	5.7%	Morocco	6.70	18.8%	Egypt	6.19	9.4%	Morocco	1.50	12.9%
4	Tunisia	16.72	8.2%	Egypt	4.76	5.2%	Egypt	6.50	18.2%	Tunisia	5.45	8.3%	Egypt	0.90	7.8%
5	Botswana	6.68	3.3%	DRC	3.51	3.8%	Mauritius	1.29	3.6%	Nigeria	1.71	2.6%	Niger	0.69	5.9%
6	Angola	3.92	1.9%	Angola	2.69	3.0%	Nigeria	0.97	2.7%	Angola	1.16	1.8%	Namibia	0.64	5.5%
7	Nigeria	3.81	1.9%	Namibia	2.42	2.7%	Kenya	0.96	2.7%	Congo	1.09	1.7%	Kenya	0.21	1.8%
8	DRC	3.66	1.8%	Tunisia	2.19	2.4%	Madagascar	0.55	1.6%	Côte d'Ivoire	1.08	1.6%	Mauritius	0.20	1.7%
9	Namibia	3.63	1.8%	Mauritania	2.11	2.3%	Lesotho	0.55	1.5%	Gabon	0.68	1.0%	Uganda	0.13	1.1%
10	Mauritius	2.94	1.4%	Algeria	2.11	2.3%	Tanzania	0.34	1.0%	Equatorial Guinea	0.62	0.9%	Nigeria	0.12	1.0%
11	Côte d'Ivoire	2.75	1.3%	Gabon	1.53	1.7%	Côte d'Ivoire	0.27	0.8%	Swaziland	0.53	0.8%	Tanzania	0.12	1.0%
12	Algeria	2.71	1.3%	Tanzania	1.45	1.6%	Ethiopia	0.27	0.8%	Libya	0.49	0.7%	Malawi	0.11	0.9%
13	Kenya	2.61	1.3%	Zambia	1.38	1.5%	Swaziland	0.26	0.7%	Algeria	0.49	0.7%	Equatorial Guinea	0.06	0.5%
14	Gabon	2.24	1.1%	Swaziland	1.34	1.5%	Uganda	0.25	0.7%	Kenya	0.48	0.7%	Swaziland	0.06	0.5%
15	Swaziland	2.19	1.1%	Côte d'Ivoire	1.34	1.5%	Zambia	0.24	0.7%	Zimbabwe	0.45	0.7%	Côte d'Ivoire	0.06	0.5%
	Total above	173.5	84.9%	Total above	73.8	81.0%	Total above	34.0	95.4%	Total above	61.1	92.6%	Total above	10.7	92.6%

Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

Table A6: World regional growth rates and market shares of imports (% annual average)

	All products	Primary	All Manufactures	RBM	LTM	MTM	HTM
			Growth 1980-2015 (%)				
World	7.86	6.97	8.04	6.63	7.97	7.95	9.88
Africa	7.19	8.01	6.82	6.08	7.06	6.74	7.96
Asia	9.37	8.29	9.72	8.41	9.19	9.46	12.07
Europe	7.24	5.91	7.49	5.92	7.29	7.76	9.05
Central & North America	7.43	6.71	7.65	5.88	8.62	7.09	9.55
South America & the Caribbean	8.26	6.51	8.66	6.91	9.54	8.70	9.92
Oceania	7.54	8.57	7.41	5.17	7.78	7.90	8.00
			Growth 1980-1989 (%)				
World	5.28	-2.76	7.88	4.58	7.70	8.33	12.31
Africa	-3.33	-3.12	-3.28	-3.52	-3.84	-3.52	-0.92
Asia	3.89	-2.50	6.78	5.61	6.58	5.57	12.24
Europe	5.98	-2.46	8.58	4.59	7.78	10.10	12.68
Central & North America	7.36	-3.75	10.85	5.80	12.07	11.25	15.17
South America & the Caribbean	0.17	-2.30	0.89	2.39	-0.25	0.21	1.70
Oceania	5.24	-3.76	6.05	1.82	6.48	5.56	12.06
			Growth 1990-1999 (%)				
World	7.29	3.65	7.95	5.68	8.06	7.19	11.35
Africa	5.22	7.90	4.67	5.64	5.63	3.23	6.80
Asia	7.66	4.43	8.52	5.37	8.61	6.39	14.39
Europe	5.79	2.26	6.34	4.83	6.00	6.03	8.82
Central & North America	9.81	4.90	10.62	7.69	11.91	9.70	13.42
South America & the Caribbean	12.18	5.68	13.52	10.70	15.79	12.75	17.29
Oceania	6.85	7.66	6.90	3.98	7.29	7.77	7.12
			Growth 2000-2009 (%)				
World	11.08	15.69	9.99	11.41	9.59	10.59	8.39
Africa	16.65	17.00	16.63	14.40	16.29	18.14	15.35
Asia	14.41	17.82	13.34	15.42	12.14	15.41	10.24
Europe	11.14	14.80	10.21	10.78	10.43	10.82	8.55
Central & North America	6.36	13.72	5.01	6.71	5.24	4.23	5.14
South America & the Caribbean	13.83	16.10	13.47	11.93	13.42	14.89	11.70
Oceania	12.56	15.53	11.79	10.66	11.36	13.78	9.09
			Growth 2010-2015 (%)				
World	1.30	-2.19	2.00	0.47	2.59	2.48	1.99
Africa	1.72	-0.17	2.04	1.99	5.89	0.26	3.43
Asia	2.35	0.44	2.64	0.73	3.92	2.68	3.57
Europe	-0.42	-3.61	0.27	-1.01	0.75	0.88	-0.17
Central & North America	3.17	-6.24	4.83	3.20	4.45	6.39	3.58
South America & the Caribbean	0.69	-0.42	0.63	0.91	2.19	0.15	0.46
Oceania	0.67	-5.54	1.65	0.89	3.89	2.13	-0.92
			Shares of products in world import category 1980 (%)				
Africa	4.82	1.93	6.19	4.89	5.37	7.85	5.04
Asia	19.75	25.38	17.43	20.29	13.91	17.00	17.48
Europe	51.05	48.90	52.20	53.62	61.52	47.18	51.54
Central & North America	19.38	20.45	18.34	16.37	14.78	21.02	19.36
South America & the Caribbean	3.43	2.64	3.87	2.99	2.69	4.85	4.43
Oceania	1.57	0.71	1.97	1.85	1.73	2.10	2.15
			Shares of products in world import category 1980-1989 (%)				
Africa	3.70	2.28	4.21	4.00	3.81	4.98	2.99
Asia	20.67	28.30	18.34	21.80	15.45	17.30	18.92
Europe	47.93	46.54	48.58	50.01	55.76	44.88	48.02
Central & North America	23.09	19.01	24.01	19.58	21.24	27.45	24.98
South America & the Caribbean	2.87	3.15	2.82	2.82	1.89	3.29	2.67
Oceania	1.74	0.72	2.03	1.78	1.86	2.11	2.42
			Shares of products in world import category 1990-1999 (%)				
Africa	2.39	2.24	2.44	2.85	2.03	2.90	1.61
Asia	22.24	30.14	21.00	23.62	17.01	19.17	25.36
Europe	47.73	45.96	48.02	50.59	52.35	47.15	43.73
Central & North America	23.05	17.93	23.72	18.11	24.77	25.29	24.88
South America & the Caribbean	3.07	2.92	3.16	3.45	2.30	3.72	2.63
Oceania	1.52	0.82	1.66	1.38	1.55	1.77	1.79
			Shares of products in world import category 2000-2009 (%)				
Africa	2.68	2.61	2.67	2.98	2.43	3.20	1.79
Asia	25.50	33.40	23.85	27.46	18.09	21.85	28.76
Europe	45.08	39.52	46.17	47.48	49.79	46.49	42.19
Central & North America	22.46	20.83	22.83	18.01	25.84	23.22	23.28
South America & the Caribbean	2.77	2.64	2.84	2.82	2.25	3.37	2.41
Oceania	1.52	0.99	1.64	1.25	1.60	1.88	1.57
			Shares of products in world import category 2010-2015 (%)				
Africa	3.47	2.94	3.55	3.88	3.49	4.27	2.14
Asia	33.08	42.73	30.45	37.37	22.91	28.41	33.91
Europe	39.13	34.69	40.24	39.54	45.86	39.81	37.46
Central & North America	19.08	15.70	20.09	14.64	22.55	20.58	21.75
South America & the Caribbean	3.60	2.87	3.87	3.32	3.33	4.74	3.21
Oceania	1.63	1.07	1.80	1.25	1.86	2.19	1.53
			Shares of products in world import category 2015 (%)				
Africa	3.53	3.30	3.52	3.95	3.87	3.94	2.28
Asia	32.58	43.96	30.36	36.58	23.23	28.28	34.59
Europe	37.70	34.26	38.34	38.11	43.08	38.23	35.27
Central & North America	21.18	14.64	22.43	16.76	24.77	23.15	23.55
South America & the Caribbean	3.39	2.95	3.54	3.30	3.13	4.21	2.91
Oceania	1.60	0.89	1.80	1.31	1.92	2.19	1.40

Notes: "Other" transaction are not shown here, and account for the difference between all products and primary plus all manufactured. Oceania is not shown here and account for the difference between World and (America plus Europe Asia plus Africa). RBM = resource based manufactures; LTM = Low technology manufactures; MTM = Medium technology, and HTM = High technology manufactures.
Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

Table A7: Leading 10 importers of each category in Africa during period 1980-85 vs. 2010-15 (%)

	Total Imports			Primary			Resource Based			Low Technology			Medium Technology			High Technology		
	Country	Imports	Share	Country	Imports	Share	Country	Imports	Share	Country	Imports	Share	Country	Imports	Share	Country	Imports	Share
	1980-1985: Average imports values (US$ billion) and share (%)																	
1	South Africa	66.1	15.7	Egypt	10.1	16.4	Egypt	12.6	15.1	Libya	9.8	16.9	South Africa	33.5	19.6	South Africa	11.2	28.7
2	Algeria	55.7	13.2	Morocco	8.8	14.3	Algeria	12.3	14.8	Algeria	8.2	14.3	Algeria	22.9	13.4	Nigeria	5.5	14.1
3	Nigeria	52.3	12.4	Algeria	8.3	13.5	Nigeria	11.4	13.6	Nigeria	6.7	11.7	Nigeria	22.7	13.2	Egypt	3.6	9.2
4	Egypt	47.6	11.3	Nigeria	5.4	8.7	South Africa	8.4	10.1	South Africa	6.6	11.4	Libya	16.8	9.8	Libya	3.5	9.0
5	Libya	40.6	9.6	Kenya	3.9	6.3	Libya	6.5	7.8	Egypt	5.5	9.6	Egypt	15.5	9.1	Algeria	3.4	8.6
6	Morocco	21.8	5.2	Tunisia	3.6	5.9	Tunisia	4.2	5.0	Tunisia	2.8	4.9	Liberia	11.2	6.5	Tunisia	1.3	3.4
7	Tunisia	18.2	4.3	Libya	3.6	5.8	Morocco	3.5	4.2	Morocco	2.3	4.0	Tunisia	6.0	3.5	Morocco	1.1	2.8
8	Liberia	14.3	3.4	South Africa	3.5	5.6	Côte d'Ivoire	1.9	2.3	Côte d'Ivoire	1.3	2.3	Morocco	5.8	3.4	Côte d'Ivoire	1.0	2.5
9	Kenya	10.5	2.5	Côte d'Ivoire	2.9	4.7	Kenya	1.4	1.7	Benin	1.2	2.1	Kenya	3.3	1.9	Kenya	0.8	2.0
10	Côte d'Ivoire	10.3	2.4	Sudan	1.5	2.4	Cameroon	1.4	1.7	Cameroon	1.1	2.0	Côte d'Ivoire	3.0	1.7	Cameroon	0.7	1.9
	Total above	337.3	80.0	Total above	51.6	83.5	Total above	63.6	76.3	Total above	45.7	79.0	Total above	140.7	82.2	Total above	32.1	82.1
	2010-2015: Average imports values (US$ billion) and share (%)																	
1	South Africa	584.6	18.8	South Africa	111.4	20.9	Egypt	61.3	12.8	South Africa	54.3	13.6	South Africa	163.6	14.4	South Africa	79.6	23.2
2	Egypt	360.8	11.6	Egypt	99.3	18.7	South Africa	60.2	12.6	Egypt	41.2	10.3	Algeria	122.1	10.7	Algeria	34.9	10.2
3	Algeria	289.4	9.3	Morocco	60.0	11.3	Nigeria	43.0	9.0	Algeria	39.2	9.8	Egypt	115.2	10.1	Egypt	33.1	9.6
4	Nigeria	236.8	7.6	Algeria	42.5	8.0	Algeria	40.3	8.4	Morocco	31.0	7.8	Nigeria	102.2	9.0	Nigeria	26.2	7.6
5	Morocco	220.1	7.1	Nigeria	31.1	5.8	Morocco	29.7	6.2	Nigeria	28.7	7.2	Morocco	74.0	6.5	Morocco	21.0	6.1
6	Angola	128.6	4.1	Tunisia	23.0	4.3	Angola	22.2	4.6	Tunisia	21.9	5.5	Angola	56.4	4.9	Tunisia	15.4	4.5
7	Tunisia	120.2	3.9	Côte d'Ivoire	21.9	4.1	Libya	16.8	3.5	Angola	18.8	4.7	Liberia	56.1	4.9	Libya	12.9	3.8
8	Libya	89.3	2.9	Angola	11.1	2.1	Botswana	15.5	3.2	Libya	16.6	4.1	Tunisia	44.5	3.9	Angola	12.0	3.5
9	Liberia	79.1	2.6	Cameroon	11.1	2.1	Tunisia	13.9	2.9	Kenya	13.4	3.4	Ghana	32.1	2.8	Kenya	11.7	3.4
10	Kenya	78.2	2.5	Libya	10.6	2.0	Zambia	12.6	2.6	Ghana	12.0	3.0	Libya	31.0	2.7	Ethiopia	8.5	2.5
	Total above	2187.0	70.51	Total above	421.9	79.30	Total above	315.4	65.77	Total above	277.0	69.36	Total above	797.2	69.96	Total above	255.3	74.38

Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

Table A8: Regional shares of manufactured imports 1980-85 vs. 2010-2015, (%) of Africa manufactured imports

	Period	Central Africa	East Africa	North Africa	North Africa (excl Morocco)	Southern Africa	Southern Africa (excl South Africa)	West Africa
All manufactures	1980-1985	5.30	7.15	42.77	39.06	20.71	3.71	24.07
	2010-2015	5.32	12.74	35.21	28.60	27.72	12.58	19.01
RBM total	1980-1985	1.24	2.03	11.35	10.34	3.26	0.82	6.10
	2010-2015	1.07	2.82	6.99	5.72	5.79	3.23	3.69
RBM1	1980-1985	0.67	1.00	6.86	6.12	1.47	0.41	3.07
	2010-2015	0.68	2.09	4.61	3.86	2.96	1.67	2.46
RBM2	1980-1985	0.57	1.03	4.49	4.22	1.79	0.41	3.03
	2010-2015	0.39	0.73	2.38	1.87	2.82	1.57	1.23
LTM total	1980-1985	0.96	1.05	8.36	7.67	2.38	0.59	3.41
	2010-2015	0.82	2.51	6.45	5.13	4.37	2.08	2.75
LTM1	1980-1985	0.28	0.31	2.24	2.04	0.79	0.26	1.12
	2010-2015	0.16	0.86	2.22	1.68	1.44	0.46	0.76
LTM2	1980-1985	0.68	0.74	6.11	5.62	1.59	0.33	2.29
	2010-2015	0.65	1.65	4.23	3.45	2.93	1.62	2.00
MTM total	1980-1985	2.49	3.31	19.36	17.67	11.42	1.84	12.23
	2010-2015	2.85	5.50	16.75	13.60	12.80	5.87	10.45
MTM1	1980-1985	0.67	0.85	4.38	4.18	3.10	0.48	2.98
	2010-2015	0.39	1.46	4.16	3.40	3.48	1.48	2.35
MTM2	1980-1985	0.58	0.98	4.47	3.93	2.23	0.49	1.82
	2010-2015	0.42	1.77	5.00	4.01	3.04	1.45	2.08
MTM3	1980-1985	1.23	1.48	10.51	9.56	6.10	0.88	7.43
	2010-2015	2.03	2.27	7.59	6.19	6.27	2.93	6.03
HTM total	1980-1985	0.61	0.76	3.70	3.39	3.66	0.46	2.33
	2010-2015	0.59	1.92	5.03	4.14	4.77	1.41	2.11
HTM1	1980-1985	0.33	0.41	2.35	2.17	2.34	0.24	1.26
	2010-2015	0.30	1.06	2.79	2.23	3.02	0.80	1.33
HTM2	1980-1985	0.28	0.35	1.35	1.22	1.32	0.22	1.07
	2010-2015	0.29	0.86	2.24	1.91	1.75	0.61	0.78

Notes: RBM1 - RBM agro-based; RBM2 -RBM other products; LTM1 - LTM textile, garment and footwear; LTM2 - LTM other products ; MTM1 - MTM automotive; MTM2 - MTM process; MTM3 - MTM engineering; HTM1 - HTM electronic and electrical; HTM2 - HTM other product.
Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

Table A9: Africa regional growth rates and market shares of exports (% annual average).

	All products	Primary	All Manufactures	RBM	LTM	MTM	HTM
			Growth 1980-2015 (%)				
Africa	7.25	6.75	7.91	5.91	9.66	11.91	8.52
Central Africa	6.83	7.14	6.12	5.33	6.36	17.09	1.29
East Africa	7.96	7.31	7.69	6.33	9.03	10.37	11.60
North Africa	5.70	5.29	6.79	2.54	10.08	12.11	12.53
Southern Africa	9.73	9.06	10.46	9.75	9.36	12.73	9.12
West Africa	6.77	6.89	4.54	3.12	9.38	7.98	3.26
			Growth 1980-1989 (%)				
Africa	-3.48	-6.15	3.09	1.12	7.56	10.64	-1.24
Central Africa	-2.04	-2.84	2.83	2.61	6.81	17.63	-1.06
East Africa	0.37	0.36	0.33	-4.70	12.86	2.95	3.86
North Africa	-5.49	-9.24	5.14	2.72	9.44	14.66	10.06
Southern Africa	2.68	2.66	2.80	1.36	3.20	9.53	-6.83
West Africa	-6.23	-7.97	0.94	-0.53	1.27	8.08	0.22
			Growth 1990-1999 (%)				
Africa	3.82	1.15	7.88	4.30	15.51	10.14	10.30
Central Africa	1.38	-0.38	5.39	5.43	6.85	11.16	-1.82
East Africa	8.58	8.14	8.79	5.38	13.11	6.69	10.54
North Africa	2.05	-1.24	6.93	1.19	17.67	6.03	10.02
Southern Africa	6.60	2.16	11.08	8.27	12.77	14.57	15.19
West Africa	3.16	2.69	4.69	3.47	13.92	6.44	4.76
			Growth 2000-2009 (%)				
Africa	17.34	20.26	12.82	12.98	8.38	16.29	13.70
Central Africa	19.68	21.91	13.33	10.21	14.49	45.71	16.09
East Africa	15.15	17.04	11.21	13.69	5.68	20.03	22.36
North Africa	18.37	20.93	13.49	16.30	8.90	19.38	12.52
Southern Africa	16.66	22.30	13.10	13.47	7.70	14.78	13.55
West Africa	16.63	17.87	9.55	7.72	12.65	11.36	12.35
			Growth 2010-2015 (%)				
Africa	-3.24	-7.13	1.10	2.15	-0.26	0.02	3.55
Central Africa	-2.80	-2.99	-4.16	-0.86	4.30	-19.09	-0.72
East Africa	2.60	-2.14	7.99	9.81	6.82	0.70	14.16
North Africa	-7.11	-12.13	1.67	-0.01	-0.04	3.51	7.53
Southern Africa	-0.43	-3.83	0.51	1.98	-2.44	-0.35	-2.77
West Africa	-4.56	-7.46	0.72	5.15	-6.41	-6.82	9.83
			Shares of products in Africa export category 1980 (%)				
Central Africa	7.58	6.89	8.31	10.07	0.94	0.76	11.95
East Africa	4.06	3.31	7.59	7.82	10.76	4.61	3.82
North Africa	41.36	45.99	28.63	28.56	48.00	22.07	5.17
Southern Africa	16.19	10.26	32.63	29.10	33.67	55.19	37.70
West Africa	30.81	33.56	22.85	24.45	6.63	17.36	41.36
			Shares of products in Africa export category 1980-1989 (%)				
Central Africa	8.72	9.20	7.56	9.82	1.37	1.24	9.51
East Africa	4.74	4.47	5.97	5.47	12.64	3.01	3.34
North Africa	41.60	43.64	40.07	41.80	52.32	28.76	14.15
Southern Africa	19.98	14.33	28.38	23.80	28.70	46.87	41.02
West Africa	24.97	28.35	18.03	19.10	4.97	20.11	31.98
			Shares of products in Africa export category 1990-1999 (%)				
Central Africa	7.76	8.57	7.37	13.22	0.49	0.73	3.25
East Africa	5.73	5.33	6.79	5.35	12.92	3.01	5.68
North Africa	36.82	35.77	39.59	34.25	58.68	29.12	41.57
Southern Africa	27.56	21.13	32.60	28.73	23.81	54.98	34.31
West Africa	22.12	29.19	13.64	18.45	4.10	12.16	15.19
			Shares of products in Africa export category 2000-2009 (%)				
Central Africa	7.53	9.13	5.11	10.46	0.40	2.17	1.65
East Africa	5.41	5.01	5.83	5.63	10.47	2.27	7.05
North Africa	33.03	35.56	31.08	18.64	55.81	27.50	37.49
Southern Africa	33.33	23.21	49.86	54.93	29.25	59.58	46.88
West Africa	23.17	30.61	8.13	9.81	5.32	7.03	9.95
			Shares of products in Africa export category 2010-2015 (%)				
Central Africa	8.16	10.53	5.21	8.05	0.74	4.30	1.70
East Africa	5.48	4.77	5.84	6.39	10.46	2.41	6.94
North Africa	26.54	27.86	30.40	18.35	57.17	31.16	38.70
Southern Africa	36.65	26.24	50.42	57.40	26.31	55.09	42.71
West Africa	20.70	27.09	8.12	10.34	4.07	8.48	6.93
			Shares of products in Africa export category 2015 (%)				
Central Africa	7.65	11.08	4.40	8.43	1.40	1.16	1.01
East Africa	7.36	6.85	7.13	7.68	12.65	2.47	11.13
North Africa	24.65	23.46	32.56	18.66	57.36	35.93	42.35
Southern Africa	39.06	28.99	49.29	55.86	24.72	56.65	35.92
West Africa	21.28	29.61	6.62	9.37	3.86	3.79	9.60

Notes: "Other" transaction are not shown here, and account for the difference between all products and primary plus all manufactured. RBM = Resource based manufactures; LTM = Low technology manufactures; MTM = Medium technology manufactures; and HTM = High technology manufactures.
Source: Authors' calculations using UN Comtrade data (SITC rev. 2).

Table A10: Leading 15 importers of each manufactured category in Africa during period 1980-85 vs. 2010-15 (%)

	Total Manufacturers			Resource Based			Low Technology			Medium Technology			High Technology		
	Country	Imports	Share	Country	Imports	Share	Country	Imports	Share	Country	Imports	Share	Country	Imports	Share
	1980-1985: Average imports values (US$ billion) and share (%)														
1	South Africa	60.0	17.0	Algeria	12.6	14.9	Libya	9.7	16.8	South Africa	33.8	19.6	South Africa	11.3	28.9
2	Algeria	48.1	13.6	Egypt	12.5	14.8	Algeria	8.8	15.2	Algeria	23.3	13.5	Nigeria	5.4	13.9
3	Nigeria	46.7	13.2	Nigeria	12.2	14.4	Nigeria	6.4	11.1	Nigeria	22.7	13.2	Egypt	3.6	9.2
4	Egypt	36.9	10.4	South Africa	8.6	10.2	South Africa	6.3	11.0	Libya	16.9	9.8	Libya	3.5	9.0
5	Libya	36.7	10.4	Libya	6.6	7.8	Egypt	5.3	9.2	Egypt	15.5	9.0	Algeria	3.4	8.7
6	Tunisia	14.8	4.2	Tunisia	4.2	5.0	Tunisia	3.0	5.3	Liberia	11.2	6.5	Tunisia	1.4	3.5
7	Morocco	13.1	3.7	Morocco	3.6	4.2	Morocco	2.4	4.2	Tunisia	6.2	3.6	Morocco	1.1	2.8
8	Liberia	12.2	3.5	Côte d'Ivoire	2.0	2.3	Côte d'Ivoire	1.3	2.3	Morocco	6.0	3.5	Côte d'Ivoire	1.0	2.5
9	Côte d'Ivoire	7.3	2.1	Kenya	1.5	1.8	Benin	1.2	2.0	Kenya	3.4	2.0	Kenya	0.8	2.0
10	Kenya	6.6	1.9	Cameroon	1.4	1.7	Cameroon	1.2	2.0	Côte d'Ivoire	3.1	1.8	Cameroon	0.8	1.9
11	Cameroon	6.3	1.8	Senegal	1.4	1.6	Kenya	0.9	1.6	Cameroon	2.9	1.7	Sudan	0.6	1.5
12	Sudan	5.4	1.5	Sudan	1.2	1.4	Sudan	0.9	1.5	Sudan	2.8	1.6	Angola	0.5	1.4
13	DRC	4.6	1.3	DRC	1.2	1.4	Angola	0.8	1.4	DRC	2.2	1.3	DRC	0.5	1.3
14	Angola	4.4	1.2	Mauritius	1.1	1.3	DRC	0.7	1.3	Angola	2.1	1.2	Zimbabwe	0.5	1.2
15	Senegal	3.6	1.0	Angola	0.9	1.1	Gabon	0.7	1.1	Tanzania	2.0	1.2	Gabon	0.4	1.1
	Total above	306.9	86.9	Total above	71.0	83.9	Total above	49.1	84.9	Total above	154.0	89.3	Total above	34.7	88.9
	2010-2015: Average imports values (US$ billion) and share (%)														
1	South Africa	356.1	15.1	Egypt	61.4	12.8	South Africa	53.9	13.5	South Africa	163.0	14.3	South Africa	79.0	23.3
2	Egypt	250.8	10.7	South Africa	60.1	12.6	Egypt	41.2	10.3	Algeria	122.2	10.7	Algeria	34.9	10.3
3	Algeria	236.6	10.1	Nigeria	42.9	9.0	Algeria	39.2	9.8	Egypt	115.2	10.1	Egypt	33.0	9.7
4	Nigeria	198.1	8.4	Algeria	40.3	8.4	Morocco	30.9	7.7	Nigeria	101.7	8.9	Nigeria	25.0	7.4
5	Morocco	155.5	6.6	Morocco	29.7	6.2	Nigeria	28.5	7.1	Morocco	74.0	6.5	Morocco	21.0	6.2
6	Angola	108.9	4.6	Angola	22.2	4.6	Tunisia	21.8	5.5	Angola	56.3	4.9	Tunisia	15.4	4.5
7	Tunisia	95.7	4.1	Libya	16.8	3.5	Angola	18.7	4.7	Liberia	56.1	4.9	Libya	12.9	3.8
8	Libya	77.3	3.3	Botswana	15.5	3.2	Libya	16.6	4.2	Tunisia	44.5	3.9	Angola	11.6	3.4
9	Kenya	66.6	2.8	Tunisia	13.9	2.9	Kenya	13.3	3.3	Ghana	32.0	2.8	Kenya	11.3	3.3
10	Ghana	62.0	2.6	Zambia	12.6	2.6	Ghana	11.9	3.0	Libya	31.0	2.7	Ethiopia	8.5	2.5
11	Liberia	60.2	2.6	Kenya	12.3	2.6	Ethiopia	11.8	3.0	Kenya	29.7	2.6	Ghana	6.7	2.0
12	Ethiopia	58.0	2.5	Ghana	11.3	2.4	Sudan	8.5	2.1	Ethiopia	28.7	2.5	Sudan	6.3	1.8
13	Sudan	41.9	1.8	Sudan	9.5	2.0	Namibia	6.9	1.7	Congo	25.1	2.2	Tanzania	5.7	1.7
14	Tanzania	40.9	1.7	Namibia	9.4	2.0	DRC	5.7	1.4	Tanzania	20.7	1.8	Uganda	4.5	1.3
15	Zambia	39.9	1.7	Tanzania	9.0	1.9	Tanzania	5.4	1.4	Zambia	18.2	1.6	Mozambique	4.2	1.2
	Total above	1848.4	78.56	Total above	366.7	76.58	Total above	314.6	78.79	Total above	918.5	80.61	Total above	280.2	82.62

Source: Authors' calculations using UN Comtrade data (SITC rev. 2).