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Trade Integration, Export Patterns, and Growth in Sub-Saharan Africa

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Abstract

This paper examines systematically the growth effects of trade integration in Sub-Saharan Africa. It complements and improves upon the empirical literature in two aspects: first, it jointly estimates the impact of different dimensions of trade integration, namely, trade volumes, export/trade patterns by product (primary and manufacturing goods), and by destination (inter- and intra-regional). Second, it estimates the impact of trade integration on economic growth and its sources, that is, capital accumulation and total factor productivity growth. The analysis finds causal evidence that trade integration fosters growth. Additionally, manufacturing trade boosts growth and trade in primary goods hampers growth. Doubling the manufacturing trade share in Sub-Saharan Africa's gross domestic product would increase growth by 1.9 percentage points per year, while increases in primary trade reduce growth by 1 percentage point. This impact is mainly transmitted through lower capital accumulation. Finally, inter- and intra-regional trade have a positive impact on growth in Sub-Saharan Africa. Doubling inter-regional trade will increase growth by 1.9 percentage points, and the same increase for intra-regional trade enhances growth by 0.6 percentage points. The effects of inter-regional trade are transmitted primarily through capital accumulation, while those of intra-regional trade are channeled through enhanced total factor productivity growth.

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1 Introduction

International trade has long been hailed as an engine of long-term growth (Lewis 1980). Theoretically, trade can have an impact on growth in developing countries through a series of channels. Greater trade integration fosters the efficient allocation of resources through comparative advantage and enables countries to realize economies of scale and scope. It also facilitates the diffusion of technology and managerial know-how, becomes a tool to share risks that emerge from international macroeconomic shocks, reduces anti-competitive practices among domestic firms and encourages competition in both domestic and international markets.

Country experiences of sustained growth have been triggered and have come along with greater trade openness (Hausmann et al. 2005; Jong-A-Pin and De Haan 2011). For instance, increases in trade openness are associated with a 55 percent increase in the likelihood of a growth takeoff (Aizenman and Spiegel 2010). There is evidence that rapid growth in the long run and high levels of growth tend to comove: doubling the ratio of exports and imports to GDP would raise the growth of income per capita by 2.5 percent per year (Dollar and Kraay 2003). Economic growth in countries that liberalized their trade regimes were 1.4 percentage point higher than pre-liberalization while the trade share in GDP increased by nearly 6 percentage points (Wacziarg and Welch 2008).[2] More recent studies show that reduced tariffs on capital and intermediate goods led to a one percentage point growth acceleration for countries that liberalized their trade regimes (Estevadeordal and Taylor 2013).

Policies that foster international trade integration create growth opportunities, but also entail risks. If inappropriately managed, opening the economy could expose the country to lower growth, and increase instability and inequality. Trade integration, under certain conditions, can lead to underutilized physical and human capital and, hence, affect growth negatively. Market and institutional imperfections, concentration in extractive activities and specializing away from technologically advanced sectors can curtail the gains from trade (Chang et al. 2009). For instance, commodity exporters and countries with uninsured production risk are more unstable in the event of adverse terms of trade shocks (Malik and Temple 2009).

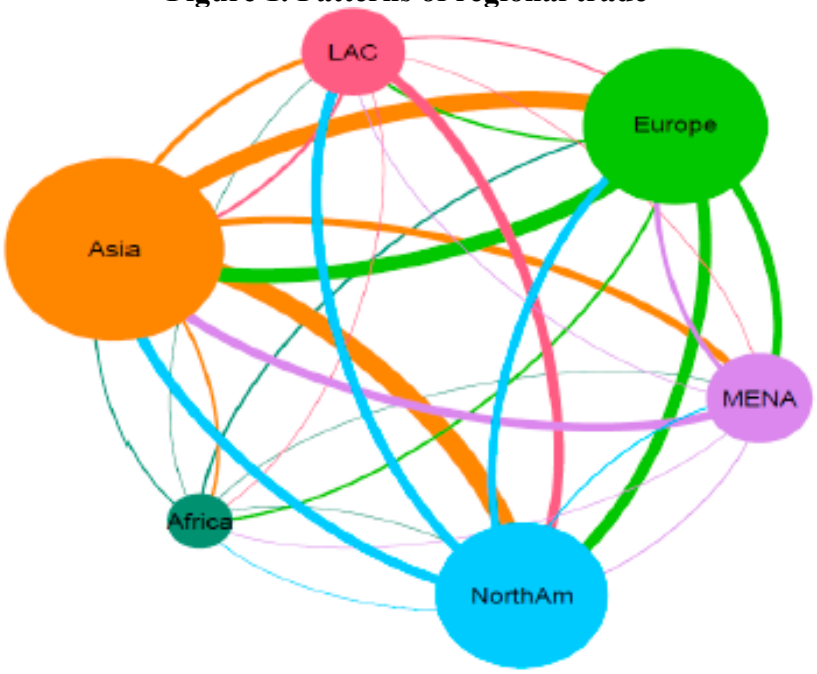
[2] Episodes of rapid export growth are more likely to take place in open or liberalizing countries —about 58 percent of these episodes occurred in open countries or countries that liberalized within five years before the episode. Rapid export growth episodes, in addition, were typically driven by new export products (Freund and Pierola 2012).

International trade integration has deepened over the past decades, not only in the world but also in Sub-Saharan Africa. Global trade grew almost twice as fast as global output (6 and 3.2 percent per year, respectively) during the period 1983-2008. The trade share in GDP of Sub-Saharan Africa increased from about 40 percent in 1983 to 69 percent in 2008 (an increase in real terms of 6 and 3.3 percent per year in trade and economic activity, respectively). This trend is partly attributed to countries' efforts to liberalize trade unilaterally and engage in free trade and regional integration agreements. This process of globalization widened the set of shocks faced by economic agents and increased the connectivity across countries in the world.

After the 2008-09 global financial crisis, trade grew at a slower pace than economic activity — especially, in Sub-Saharan Africa. For instance, real economic activity in the region grew at an average annual rate of 3.7 percent while the amount of trade only grew at 0.3 percent per year. This implies that trade openness in Sub-Saharan Africa declined from 69 percent of GDP in 2008 to 51 percent of GDP in 2017. The sharp deceleration of trade was attributed to the sluggish recovery of high-income countries (which account for two-thirds of global imports), shifts in the structure of value chains with lower cross-border trade in intermediate goods, and a slowdown in global investment (World Bank 2015, Aslam et al. 2017).

The main goal of this paper is two-fold: first, it jointly examines the growth effects of different dimensions of integrational trade integration; that is, the extent of trade openness (*i.e.* how much the country trades with the rest of the world), the diversification of the country's export basket (*i.e.* what we export to the rest of the world), and the diversification of the country's export destinations (*i.e.* to whom we export). Our analysis also includes the impact of the composition of trade volumes by product (*i.e.* estimating the growth effects of commodities vis-à-vis manufacturing goods' trade) and that of the composition of trade volumes by destination (inter- vis-à-vis intra-regional trade). Figure 1 illustrates: (a) the small size of intra-regional trade in Africa compared with other regions, and (b) the lower trade linkages of Africa with the rest of the world —when compared with other regions. Second, it systematically examines the impact of the different dimensions of international trade integration on economic growth as well as on the sources of growth. That is, it evaluates the impact of trade openness, diversification across products and diversification across markets on the growth rate of physical capital per worker and total factor productivity (TFP) growth. Our empirical analysis hopes to provide a more comprehensive picture of the relationship between trade integration and growth compared to existing empirical studies.

Figure 1. Patterns of regional trade



Note: The size of each node is proportional to each region's trade flow and the width of each link reflects trade values and the color of the link corresponds to that of the exporting region. Source: Beaton et al. 2017.

In order to accomplish this task, we estimate growth (as well as sources of growth) regressions on the different dimensions of trade (volumes, diversification, and natural resource dependence) on a non-overlapping 5-year-period panel data set of 174 countries (of which 45 countries are in Sub-Saharan Africa) from 1970 to 2014. Our empirical analysis points to a causal relationship between the different dimensions of international trade integration and economic growth. This implies that economic growth is enhanced by higher trade volumes, greater export product diversification, and lower natural resource export dependence. The growth effects of international trade integration are transmitted significantly through faster accumulation of physical capital (per worker) and enhanced TFP growth. The impact of greater trade volumes and lower natural resource dependence is driven primarily by an enhanced TFP growth while that of export product diversification is transmitted through faster capital accumulation. These findings imply that: (a) greater trade openness affects growth primarily through the diffusion of technology and managerial know-how as well as enhanced allocative efficiency, (b) greater natural resource dependence hinders growth through greater resource misallocation and lower productivity of non-resource-based sectors, and (c) greater export product diversification may affect growth through greater investment across sectors of economic activity.

Zooming in on the volume of trade, this paper also examines the composition of trade volumes by product and by destination. More specifically, we estimate the growth effects of trade volume by product (primary goods vs. manufacturing goods) and that of trade volume by destination (inter-regional vs. intra-regional trade). In the case of the product composition of trade volume, we find that manufacturing trade promotes economic growth while trade in primary goods hampers it. Our econometric estimates suggest that doubling the manufacturing trade share in GDP would increase economic growth by 1.9 percentage points pear year while an analogous increase in the primary goods trade share in GDP would lower economic growth by 1 percentage point per year. The negative impact of trade in primary goods is transmitted through both slower capital accumulation and sluggish TFP growth, although the impact appears to be larger in the former channel. This effect implies that mostly trading in primary goods would hinder investment in non-resource-based sectors of economic activity. On the other hand, the analysis of trade volumes by destination reveals that both inter- and intra-regional trade have a positive, significant and causal impact on growth. The regression estimates suggest that doubling the inter-regional trade share in GDP would increase economic growth by 1.9 percentage points per year while a similar increase in the intra-regional share in GDP enhances growth by 0.6 percentage point per year. The growth effects of inter-regional trade are transmitted significantly through faster accumulation of capital and enhanced TFP growth although the largest impact materializes through the former channel. In the case of intra-regional trade, the growth effects are primarily transmitted through enhanced TFP growth. These findings suggest that the growth impact of intra-regional trade is mainly transmitted through the diffusion of technology, managerial know-how, and competitive practices as well as the operation of economies of scale and scope.

This paper has 6 sections. Section 2 describes the evolution of the different dimensions of trade integration (trade volumes, trade diversification, and natural resource dependence) in Sub-Saharan Africa for the region as a whole and for country groups within the region classified by their extent of natural resource abundance. Section 3 presents the econometric analysis of the impact of international integration on growth, and on the sources of growth (capital accumulation and TFP growth). Section 4 estimates the potential growth benefits of narrowing the gap of certain dimensions of trade integration in Sub-Saharan Africa (that is, manufacturing trade, export product concentration, and intra-regional trade) vis-à-vis other benchmark regions. Section 5 builds on the econometric results to discuss actions that might increase the scope for greater regional integration. Finally, Section 6 elaborates some concluding remarks.

2 International Trade Integration: Stylized Facts

This section describes the several dimensions of international trade integration considered in this paper and looks at their evolution from the perspective of Sub-Saharan Africa (SSA). Specifically, it examines the changes over time (in the median) of: (a) trade volume (as proxy of openness), (b) patterns of trade concentration across products and markets, (c) natural resource dependence of exports, (d) patterns of sectoral trade (primary goods and manufacturing goods), and (e) patterns of regional trade. The description of these indicators and their sources as well as the discussion of their evolution over time is presented below. **Table 1** shows the medians of all the trade integration indicators for Sub-Saharan Africa as well as for resource and non-resource rich countries in the region.

Trade Openness: Volumes, Diversification, and Resource Dependence

Trade volume. Trade openness is typically measured by the volume of trade, defined as the sum of real exports and imports, and normalized by the level of economic activity or gross domestic product (GDP). Overall, the volume of trade has sharply increased across SSA countries over the past two decades: (median) trade openness surged from 57.1 percent of GDP in 1990-94 to 76.4 percent 2010-14; that is, an increase of almost 20 percentage points of GDP (see **Table 1**). Trade openness increased across both resource and non-resource abundant countries in the region over the past two decades; it grew by about 16 and 10 percentage points of GDP, respectively. Additionally, the volume of exports and imports as percentage of GDP is significantly higher among resource abundant countries (87 percent of GDP in 2010-14) than among non-resource abundant countries (65 percent of GDP in 2010-14).

Trade diversification. The volume of trade is necessary but not sufficient to understand the linkages between international trade integration and growth. It matters not only how much the country trades with the rest of the world but also its patterns of trade across products and across markets. In other words, are the country's exports concentrated in a few products or a few markets? Or is their export basket diversified across a wide array of products or markets? Earlier evidence shows that higher levels of export product diversification may result in higher growth per capita (Lederman and Maloney 2007) and lower output volatility (Haddad, Lim, Pancaro and Saborowski 2013). Export diversification is an important element of the agenda on growth resilience, especially among low- and middle-income countries that tend to be specialized in few export products in highly volatile sectors (Cadot et al. 2013). Therefore, policies that foster export diversification and/or boost the productivity of their existing product space through

lower costs are at the top of their economic plans.

Table 1. Medians, Trade measures in SSA

	Sub Saharan Africa		
	Region	Resource Rich	Non-Resource Rich
Trade Openness			
Percent of GDP			
1990 - 94	57.09	71.87	54.93
2010 - 14	76.39	87.23	64.81
Herfindahl Index			
Product Concentration			
1990 - 94	0.31	0.80	0.27
2010 - 14	0.21	0.54	0.16
Market Concentration			
1990 - 94	0.14	0.29	0.12
2010 - 14	0.13	0.21	0.12
Natural Resources Trade			
Percent of GDP			
1990 - 94	11.78	46.19	9.21
2010 - 14	7.88	23.58	5.98
Percent of total exports			
1990 - 94	91.43	98.63	83.57
2010 - 14	77.25	86.48	74.92
Regional Trade			
Inter-regional, Percent of GDP			
1990 - 94	31.91	40.36	26.74
2010 - 14	34.83	48.57	31.39
Intra-regional, Percent of GDP			
1990 - 94	20.04	19.40	23.88
2010 - 14	23.57	21.98	25.36
Sectoral Trade			
Primary			
1990 - 94	19.62	65.79	13.39
2010 - 14	22.3	38.71	19.51
Manufacturing			
1990 - 94	16.81	15.1	17.72
2010 - 14	21.87	23.88	21.56

Sources: WDI, and author's calculations using WITS, COMTRADE

Trade diversification is proxied by the Herfindahl-Hirschman index (HHI) of exports across products and across markets. The Herfindahl-Hirschman index of export products (HHI_P) is the sum of squared weights of goods in the export basket and it is calculated using the following formula:

$$HHI_P = \sum_i^n \left(\frac{x_i}{\sum_i^n x_i} \right)^2$$

where x represents the amount of exports of good i and n is the number of products. When a country exports a single good, the value of HHI_P is equal to one while HHI_P is equal to 0 when the country exports a large variety of products (Haddad et al. 2013; Cadot et al. 2011 2013). Lower values of HHI_P indicate a greater extent of product diversification. COMTRADE data on exports by product at a 4-digit level from the SITC Revision 1.0 are used to compute HHI_P. On the other hand, the Herfindahl-Hirschman index of export markets (HHI_M) is the sum of squared weights of export by destination in total trade. The formula is similar than the one above: in the case of HHI_M, x represents the amount of exports to country i and n is the number of destinations. Again, lower values of HHI_M indicate a greater extent of market diversification. Bilateral trade data from COMTRADE are used to compute HHI_M.

Table 1 shows the medians for HHI_P and HHI_M across groups in Sub-Saharan Africa for the periods 1990-94 and 2010-14. In terms of export product concentration, the (median) value of HHI_P for Sub-Saharan Africa declined from 0.31 in 1990-94 to 0.21 in 2010-14 (that is, a reduction of 0.10). The reduction of HHI_P was sharper among resource rich countries in the region —with the median declining from 0.8 in 1990-94 to 0.54 in 2010-14. Non-resource rich countries —with greater levels of export product diversification than resource rich countries— also experienced a decline in HHI_P from 0.27 to 0.16.

In the case of export market concentration, the (median) value of HHI_M remained almost invariant in Sub-Saharan Africa over the past two decades. Export market concentration slightly fell from 0.14 in 1990-94 to 0.13 in 2010-14. The HHI_M also remained invariant over time for the group of non-resource rich countries (0.12 in both 1990-94 and 2010-14). However, export market concentration fell from 0.29 in 1990-94 to 0.21 in 2010-14 across resource rich countries. In sum, export market diversification increased among resource rich countries; however, non-resource rich countries still export their goods to a relatively greater number of destinations.

Natural resource dependence. There is no consensus in the empirical literature about the effects of natural resources on growth. A recent meta-analysis of the impact of natural resources on long-term economic growth is not conclusive: about 80% of the papers reviewed find a negative effect or no effect (Havranek et al. 2016). However, the long-term effects of natural resources might depend upon: (a) distinguishing between the different types of natural resources, and (b) differentiating between resource dependence and resource abundance.

Natural resources play an important role in export baskets and economic activity for a large number of African countries. The importance of natural resources in export activity will be measured by the value of natural resource exports (in US$ at current prices) normalized by either the GDP or total merchandise exports. The data are collected from the World Integrated Trade Solution (WITS) database on the SITC, Revision 1.0. The definition of natural resource exports includes commodities exported in the SITC sections 0 – Food and live animals, 1 – Beverages and tobacco, 2- Crude materials, inedible except fuels (excluding 22 – oil seeds, oil nuts and oil kernels), 3 – mineral fuels, lubricants and related materials, 4 – Animal and vegetable oils and fats, and 68 - No ferrous metals (Lederman and Maloney 2007).

Natural resources exports as a percentage of GDP. Natural resource exports in Sub-Saharan Africa declined, on average, from 11.8 percent of GDP in 1990-94 to 7.9 percent of GDP in 2010-14. The decline in this ratio also took place among resource and non-resource rich countries. In the case of resource rich countries, the (median) ratio of natural resources exports to GDP among resource rich countries dropped by almost half from 46.2% of GDP in 1990-94 to 23.6% of GDP in 2010-14. The (median) ratio also fell among non-resource rich countries (from 9.2% of GDP in 1990-94 to 6% in 2010-14). Finally, the share of natural resource exports in total economic activity in resource rich countries was nearly four times as large as that in non-resource rich countries.

Natural resource exports as a percentage of total merchandise exports. Table 1 shows that the share of natural resource exports in total merchandise exports decreased over time in all country groups at different speeds. For the region as a whole, this share declined from 91.4 percent in 1990-94 to 77.3 percent in 2010-14; that is a reduction of nearly 15 percentage points of total merchandise exports in the past two decades. For resource rich countries, the share of natural resource exports in total merchandise exports dropped from 98.6 percent in 1990-94 to 86.5 percent in 2010-14. Finally, natural resource export dependence among non-resource rich countries decreased from 83.6 percent in 1990-94 to 74.9 percent in 2010-14. Note that although the share of natural resource exports in total merchandise exports among non-resource rich countries is high, this ratio does not include services exports and their importance relative to the size of economic activity is small.

Sectoral trade: Trade in primary goods vs. Trade in Manufacturing Goods

Assessing the linkages of the country with world goods' markets also implies examining what you export —that is the type of products that the country sells abroad. Table 1 presents the amount of trade (in exports and imports) of primary goods vis-à-vis manufacturing goods of Sub-Saharan Africa over the past

20 years. Trade in primary goods includes exports and imports of agricultural raw materials, food, fuel, mineral ores and metals. Trade in manufacturing goods comprises exports and imports in SITC sections 5 (chemicals), 6 (basic manufactures), 7 (machinery and transport equipment), and 8 (miscellaneous manufactured goods), excluding division 68 (non-ferrous metals). Trade in primary and manufacturing goods is expressed as a percentage of GDP and the data are collected from the World Bank's World Development Indicators.

The (median) value of trade in primary goods increased in Sub-Saharan Africa from 19.6 percent of GDP in 1990-94 to 22.3 in 2010-14 while trade in manufacturing goods grew from 16.8 percent of GDP in 1990-94 to 21.9 percent of GDP in 2010-14. This implies that the intensity of trade in manufacturing goods increased at a faster pace in Sub-Saharan Africa (by about 5 percentage points of GDP). In the case of resource rich countries, there is a sharp decline in the trade of primary goods (from 65.8 percent of GDP in 1990-94 to 38.7 percent of GDP in 2010-14) while trade in manufacturing goods increased (from 15.1 percent of GDP in 1990-94 to 23.9 percent of GDP in 2010-14). Finally, trade in both primary and manufacturing goods (as percentage of GDP) increased among non-resource rich countries over the past 20 years. As expected, trade in primary goods is smaller in non-resource rich countries (relative to resource rich countries) and trade in manufacturing goods for this group is higher than that of primary goods.

Regional trade: Patterns of inter-regional and intra-regional trade

To close the characterization of the integration with global markets of goods, it matters how much, what and to whom you have trade linkages with. Table 1 shows the (median) amount of trade conducted by Sub-Saharan Africa with other world regions (inter-regional trade) and the amount of trade undertaken within the region (intra-regional trade). The data are gathered from the World Bank's World Development Indicators and COMTRADE.

The (median) value of inter-regional across Sub-Saharan African countries increased over the past two decades from 31.9 percent of GDP in 1990-94 to 34.8 percent in 2010-14, while intra-regional trade grew from 20.04 percent of GDP in 1990-94 to 23.75 percent of GDP in 2010-14. Inter-regional trade grew at a faster pace among resource rich countries from 1990-94 to 2010-14. Inter-regional trade increased by about 8 percentage points of GDP (from 40.4 percent of GDP in 1990-94 to 48.6 percent of GDP in 2010-14) while intra-regional trade grew by nearly 3 percentage points of GDP (from 19.4 percent of GDP in 1990-94 to 21.98 percent of GDP in 2010-14). Finally, inter-regional trade for non-resource rich countries in the region grew by approximately 5 percentage points of GDP (from 26.7 percent of GDP

in 1990-94 to 31.4 percent of GDP in 2010-14) while intra-regional trade remained almost unchanged at about 30% of GDP over the past two decades.

3 Trade and Growth: A Detailed Econometric Analysis.

This section estimates the long-term growth effects of the different dimensions of international trade integration. The regression analysis is conducted on (unbalanced) panel data of non-overlapping 5-year period averages for 174 countries (of which 45 countries are located in Sub-Saharan Africa) from 1970 to 2014. This section not only evaluates the impact of international trade integration on economic growth, but it also examines the effects of international trade on the sources of growth; namely, growth of capital per worker and total factor productivity (TFP) growth.

3.1 International trade integration and economic growth

Table 2 reports the GMM-IV system estimation of growth per worker on the different dimensions of trade integration; namely, trade volume, export product concentration, export market concentration, and the dependence on natural resource exports. Column [1] reports the effects of trade, and market and product concentration while controlling for the initial level of GDP per worker. This specification will be referred to as the baseline specification for the remainder of this section. Column [2] adds the ratio of natural resources exports to GDP to the baseline specification. Column [3] adds growth determinants like education (as measured by the secondary enrollment rate) and institutional quality (proxied by the ICRG Political Risk Index). Finally, column [4] adds financial development (credit to the private sector as % of GDP), government consumption (as % of GDP) and growth volatility to the specification in column [3]. The initial level of real output per worker, expressed in logs and included in all the specifications estimated in Table 2, has a negative and significant coefficient. This is evidence of conditional convergence in labor productivity.

Trade openness, as measured by real exports and imports as a percentage of GDP, has a positive and significant effect on growth per worker. The coefficient estimates of trade openness in Table 2 range from 0.016 to 0.034. After accounting for the other dimensions of trade integration in the growth regression equation (say, export product diversification, export market diversification, and natural resource dependence), the coefficient estimated of trade openness is still positive and significant; however, the coefficient becomes smaller. Economically speaking, if trade volume in Sub-Saharan Africa doubles,

growth per worker accelerates between **1.1** and **2.4** percentage points per year.

Table 2. Trade, diversification and growth: Baseline specification.

Dependent variable, Growth of real GDP per worker (5-year non-overlapping averages)
Estimation Method: GMM-IV System Estimator (Arellano and Bover, 1995; Blundell and Bond,1998)

	[1]	[2]	[3]	[4]
Initial GDP per worker	-0.022***	-0.027***	-0.022***	-0.020***
(in logs)	(0.000)	(0.000)	(0.000)	(0.000)
Exports and Imports	0.034***	0.032***	0.016***	0.017***
(% of GDP, logs)	(0.000)	(0.000)	(0.000)	(0.000)
Market Concentration	0.015***	0.020***	0.013***	0.006***
(Herfindahl Index)	(0.000)	(0.000)	(0.000)	(0.000)
Product Concentration	-0.031***	-0.038***	-0.019***	-0.020***
(Herfindahl Index)	(0.000)	(0.000)	(0.000)	(0.000)
Natural Resource exports		0.007**	-0.002**	-0.005***
(% of GDP)		(0.002)	(0.002)	(0.000)
Secondary enrollment rate			0.003***	0.008***
(initial level, logs)			(0.001)	(0.000)
ICRG Political Risk Index			0.005***	0.006***
(principal components)			(0.000)	(0.000)
Credit to private sector				-0.013***
(% of GDP)				(0.000)
Government consumption				-0.002
(% of GDP)				(0.862)
Growth volatility				0.222***
(S.D. growth per worker)				(0.000)
Constant	0.044*	0.083***	0.142***	0.130***
	(0.024)	(0.000)	(0.000)	(0.000)
Observations	870	840	613	601
AR(1)	0.000	0.000	0.015	0.001
AR(2)	0.281	0.238	0.330	0.527
Hansen	0.072	0.198	0.477	0.386

p-values in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Export market concentration, measured by the Herfindahl-Hirschman index of exports from country *i* to its trading partners (HHI_M), has a positive and significant coefficient in all specifications reported in Table 2. The coefficient estimate of HHI_M fluctuates between 0.006 to 0.020. A positive relationship between growth per worker and HHI_M can be rationalized as a country having fewer trading partners whose economic activities are highly synchronized (in the medium term). On the other hand, export product concentration, measured by the Herfindahl-Hirschman index of export products (HHI_P), has the expected negative sign and it has a robust relationship with growth per worker. The estimated coefficient of HHI_P ranges from -0.019 to -0.038, and this coefficient decreases in size as more control

variables are included in the growth regression. This finding suggests that diversification of export products fosters economic growth. Economically, if the Herfindahl index of export products were to be reduced in half, growth per worker would accelerate between **1.3** and **2.6** percentage points per year.

Natural resource exports as a percentage of GDP does not present a robust relationship with growth per worker. In column [2] of Table 2, the relationship is positive and significant. However, as more control variables are added in the regression (see columns [3] and [4] of Table 2), the coefficient becomes negative and significant. These findings may indicate that, after controlling for other growth determinants, the greater abundance of natural resource exports relative to the size of the economy may hinder growth. Why? The concentration of natural resource exports in the country's export basket renders it vulnerable to volatile fluctuations in international commodity prices, and that greater volatility harms growth. On the other hand, natural resource abundance may lower growth per worker if the export proceeds from these goods are not invested in reproducible capital or if not used to support institutional and/or structural reforms. In the context of our regression analysis (columns [3] and [4] of Table 2), reducing natural resource export dependence in half would render faster growth per worker between **0.1** and **0.3** percentage point per year.

3.2 International trade integration and the sources of growth

Table 3 examines the channels through which the impact of international trade integration on growth is transmitted; that is, it assesses the impact of the different dimensions of trade integration on the sources of growth —namely, growth of physical capital per worker and total factor productivity (TFP) growth. Note that the specification of the regressions in Table 3 follow that of columns [2] and [4] from Table 2. The first three columns of Table 3 reproduce the growth per worker regression from column [2] of Table 2 and estimates the same specification for growth in capital per worker and TFP growth. Columns [4] – [6] repeat the same exercise for the specification of Column [4] of Table 2. The underlying difference between the estimation of the first three columns and next three columns of Table 3 is the inclusion of additional growth drivers: secondary enrollment rate, ICRG Political Risk Index, credit to private sector, government consumption, and growth volatility.

The first takeaways from Table 3 are that, first, countries with lower starting level of labor productivity tend to exhibit higher growth per worker as well as higher growth of physical capital per worker and faster TFP growth. Second, education and institutional quality have a positive and significant

effect on growth per worker through the TFP growth channel. Third, growth-enhancing effects of lower government burden are also transmitted through the TFP growth channel. Finally, the impact of growth volatility on growth per worker is more likely to be transmitted through lower domestic investment.

Trade openness has a positive and significant impact on growth per worker (see Table 2) and that impact is transmitted not only through a faster accumulation of physical capital per worker but also through an acceleration in TFP growth (see Table 3). The impact of trade openness through both channels of transmission tends to be larger in the more parsimonious specifications —that is, 0.024 in the growth of physical capital accumulation equation and 0.022 in the TFP growth equation (see columns [2] and [3] of Table 3, respectively). Accounting for other drivers of growth, the impact of trade openness on the sources of growth is still significant but smaller: 0.011 for the capital accumulation equation and 0.014 for the TFP growth equation —see columns [5] and [6] of Table 3, respectively. Using the regression results that controls for other drivers of growth, our estimates suggest that doubling the volume of trade would increase the growth of physical capital per worker by **0.8** percentage point per year while TFP growth would accelerate by **1** percentage point per year.

Export product concentration (HHI_P) has a negative and significant relationship with growth per worker, and its effects are transmitted through a faster accumulation of physical capital per worker and higher TFP growth. The impact of export product concentration on the sources of growth tends to be larger (in size) in the baseline specification —that is, -0.024 in the growth of physical capital accumulation equation and -0.027 in the TFP growth equation (see columns [2] and [3] of Table 3, respectively). Accounting for other drivers of growth, the impact of HHI_P on the sources of growth is still significant but smaller: -0.018 for the capital accumulation equation and -0.011 for the TFP growth equation —see columns [5] and [6] of Table 3, respectively. According to the latter estimated equations, reducing the Herfindahl index of export product concentration in half would increase the growth of the physical stock of capital by 1.2 percentage points per year, and TFP growth would accelerate by 0.8 percentage point per year.

Export market concentration (HHI_M) has a positive impact on growth per worker (see columns [1] and [4] in Table 3); however, the sign and significance of its impact on the sources of growth is not robust to changes in the specification. In the baseline specification, HHI_M has no significant impact on physical capital accumulation and a positive and significant impact on TFP growth (see columns [2] and [3] of Table 3, respectively). In contrast, growth effects are positively transmitted through capital accumulation and TFP growth in the augmented specification (see columns [5] and [6] of Table 3, respectively).

Table 3. Trade, diversification, and growth: Transmission channels

Dependent variable normalized by per worker (5-year non-overlapping averages)

Estimation Method: GMM-IV System Estimator (Arellano and Bover, 1995; Blundell and Bond,1998)

	[1] Output per worker	[2] Capital per worker	[3] TFP	[4] Output per worker	[5] Capital per worker	[6] TFP
Initial GDP per worker	-0.027***	-0.019***	-0.016***	-0.020***	-0.009***	-0.011***
(in logs)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Exports and Imports	0.032***	0.024***	0.022***	0.017***	0.011***	0.014***
(% of GDP, logs)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market Concentration	0.020***	-0.002	0.021***	0.006***	0.007***	0.003**
(Herfindahl Index)	(0.000)	(0.499)	(0.000)	(0.000)	(0.000)	(0.002)
Product Concentration	-0.038***	-0.024***	-0.027***	-0.020***	-0.018***	-0.011***
(Herfindahl Index)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Natural Resource exports	0.007**	0.008***	0.006***	-0.005***	-0.002***	-0.003***
(% of GDP)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Secondary enrollment rate				0.008***	-0.001	0.002***
(initial level, logs)				(0.000)	(0.800)	(0.000)
ICRG Political Risk Index				0.006***	0.001***	0.005***
(principal components)				(0.000)	(0.000)	(0.000)
Credit to private sector				-0.013***	-0.006***	-0.009***
(% of GDP)				(0.000)	(0.000)	(0.000)
Government consumption				-0.002	0.007***	-0.012***
(% of GDP)				(0.862)	(0.000)	(0.000)
Growth volatility				0.222***	-0.059***	0.033**
(S.D. growth per worker)				(0.000)	(0.000)	(0.003)
Constant	0.083***	0.034	0.042**	0.130***	0.044***	0.089***
	(0.000)	(0.091)	(0.002)	(0.000)	(0.000)	(0.000)
Observations	840	840	811	601	601	601
AR(1)	0.000	0.003	0.000	0.001	0.209	0.000
AR(2)	0.238	0.015	0.704	0.527	0.003	0.912
Hansen	0.198	0.035	0.183	0.386	0.338	0.317

p-values in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Finally, natural resource exports (as percentage of GDP) hamper growth when controlling for other sources of growth, and its adverse impact on economic growth is transmitted through lower capital accumulation per worker and slower TFP growth. The coefficient estimate of natural resource export dependence is larger (in absolute value) for the TFP growth regression than for the capital accumulation regression although the differences are small: -0.002 for the growth of capital stock per worker equation (column [5] of Table 3) and -0.003 for the TFP growth regression equation (column [6] of Table 3). These estimates suggest that cutting in half the extent of natural resource export dependence would increase the growth rate of capital stock per worker by 0.1 percentage point per year and would accelerate TFP growth by 0.2 percentage point per year.

3.3 International trade integration and economic growth: Primary vs. Manufacturing Exports

Table 4 estimates whether what you export or trade matters for long-term growth —specifically, it disaggregates exports as well as overall trade (exports plus imports) into two broad categories of goods: primary commodities and manufacturing goods. All these variables are expressed as a percentage of GDP. The description and the sources of data of these variables are described in Section 2. Column [1] of Table 4 regresses growth per worker on total exports as a percentage of GDP (which combines both primary and manufacturing exports) while controlling for other growth determinants. Column [2] of Table 4 controls for the composition of trade volumes by product; that is, we include exports of primary and manufacturing goods. Column [3] includes the Herfindahl indices of export product and export market concentration to the specification. Analogously, columns [4] – [6] of Table 4 have similar specifications to columns [1] – [3] but replace exports of primary and manufacturing goods with total trade (exports and imports) of primary and manufacturing goods. Note that the growth determinants included in the regression analysis are the (gross) secondary enrollment rate, the ICRG index of political risk, credit to the private sector (as percentage of GDP), general government consumption expenditure (as percentage of GDP), and growth volatility (measured by the standard deviation of growth per worker). For the sake of space, we do not review the regressions with total exports or total trade in columns [1] and [4].

Our regression analysis finds that the coefficient of manufacturing exports (as percentage of GDP) is positive and significant regardless of whether we control for export product and market concentration (see columns [2] and [3] from Table 4). On the other hand, the coefficient estimate of primary exports is negative and loses significance when including the Herfindahl indices of export concentration HHH_M and HHH_P. Our findings in Table 4 point to manufacturing exports helping boost long-term growth while exports of primary goods have, at best, a negligible impact. From column [3] of Table 4, it can be argued that: (a) the coefficient of export product concentration is negative and significant, and (b) the coefficient of primary exports to GDP becomes not significant when including HHH_P. This basically implies that, in the case of primary commodities, long-term growth effects are reaped when we reduce their participation in the country's export basket rather than lowering their usage. In columns [5] and [6] of Table 4, we examine the relationship between manufacturing trade, trade in primary goods and long-term growth. The estimation results are similar to those found for primary and manufacturing exports. That is, manufacturing trade enters in the long-term growth regression with a positive and significant coefficient (ranging from 0.062 to 0.067) while trade in primary goods enters with a negative and significant

coefficient that fluctuates over a wider range (from -0.108 to -0.042). These results hold even when we include the indicators of export product and export market concentration.

Table 4. Trade, diversification and growth: Primary vs. Manufacturing Exports.

Dependent variable, Growth of real GDP per worker (5-year non-overlapping averages)

Estimation Method: GMM-IV System Estimator (Arellano and Bover, 1995; Blundell and Bond,1998)

	[1]	[2]	[3]	[4]	[5]	[6]
Initial GDP per worker	-0.0247***	-0.020***	-0.022***	-0.0213***	-0.018***	-0.018***
(in logs)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Total Exports (X)	0.0612***					
(M*anufacturing + primary)*	(0.000)					
Exports, manufacturing		0.089***	0.098***			
(% of GDP)		(0.000)	(0.000)			
Exports, primary		-0.104***	-0.002			
(% of GDP)		(0.000)	(0.827)			
Total Trade (X+M)				0.0368***		
(Manufacturing + primary)				(0.000)		
Trade (X+M), manufacturing					0.062***	0.067***
(% of GDP)					(0.000)	(0.000)
Trade (X+M), primary					-0.108***	-0.042***
(% of GDP)					(0.000)	(0.000)
Market Concentration	0.00881***		0.005**	0.0119***		0.006**
(Herfindahl Index)	(0.000)		(0.004)	(0.000)		(0.005)
Product Concentration	-0.0246***		-0.020***	-0.0277***		-0.020***
(Herfindahl Index)	(0.000)		(0.000)	(0.000)		(0.000)
Secondary enrollment rate	0.00951***	0.015***	0.009***	0.00822***	0.014***	0.008***
(initial level, logs)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ICRG Political Risk Index	0.00475***	0.009***	0.004***	0.00381***	0.008***	0.003***
(principal components)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Credit to private sector	-0.0125***	-0.015***	-0.017***	-0.0148***	-0.015***	-0.019***
(% of GDP)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Government consumption	0.00572***	0.006**	0.011***	0.00119	-0.001	0.005***
(% of GDP)	(0.000)	(0.001)	(0.000)	(0.521)	(0.400)	(0.000)
Growth volatility	0.137***	0.227***	0.156***	0.201***	0.265***	0.221***
(S.D. growth per worker)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.195***	0.194***	0.181***	0.180***	0.191***	0.170***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	595	614	595	589	607	589
AR(1)	0.002	0.005	0.003	0.001	0.003	0.002
AR(2)	0.425	0.675	0.516	0.505	0.809	0.676
Hansen	0.566	0.426	0.724	0.507	0.521	0.689

p-values in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Using our coefficient estimates in column [6] of Table 4, we find that reducing in half the ratio of exports and imports of primary goods (as a percentage to GDP) in Sub-Saharan Africa would lead to an increase in the annual rate of growth per worker of 0.5 percentage point. Another way to estimate the

economic impact of trade in primary goods is to estimate the potential growth effects of reducing this share to the median level of industrial countries. Under this scenario, growth per worker would increase by 0.3 percentage point. On the other hand, doubling the ratio of exports and imports of manufacturing goods (as a percentage of GDP) in Sub-Saharan Africa would lead to higher growth per worker of about 1.5 percentage points per year. If manufacturing trade in Sub-Saharan Africa were to increase to the levels of the median level of industrial countries, economic growth would increase by 0.7 percentage point per year.

Table 5 estimates the impact of trade in primary and manufacturing goods (proxied by either exports or total trade as a percentage of GDP) on the sources of growth using the specification in columns [3] and [6] of Table 4. Analogous to Table 3, the first three columns of Table 5 reproduced the growth per worker regression equation (column [3] of Table 4) and estimate a similar specification for the growth of physical capital per worker and TFP growth. The remaining three columns in Table 5 repeats the specification in column [6] of Table 4 and estimates a similar specification for the sources of growth. In the first three columns of Table 5, manufacturing exports have a positive and significant impact on growth per worker through both faster accumulation of physical capital per worker and higher TFP growth — although the coefficient of the former variable seems to be larger than the latter. Primary exports have a negative and not significant impact on growth per worker and the accumulation of capital per worker. Surprisingly, it has a positive and significant impact on TFP growth.

The last three columns of Table 5 depict the impact of trade in primary and manufacturing goods on the sources of growth. The impact of manufacturing trade (as % of GDP) on long-term growth is positive and it is transmitted through either a faster accumulation of the physical capital stock per worker or through an acceleration of TFP growth. Manufacturing trade has a greater effect on growth through capital accumulation than through TFP growth (with a coefficient of 0.061 in the capital accumulation equation, and 0.037 in the TFP growth equation). In contrast, trade in primary goods have a negative and significant impact on growth, and it is transmitted through both capital accumulation and TFP growth. Again, the adverse impact is larger on the accumulation of physical capital per worker.

Table 5. Trade, diversification and sources of growth: Primary vs. Manufacturing Exports

Dependent variable normalized by per worker (5-year non-overlapping averages)

Estimation Method: GMM-IV System Estimator (Arellano and Bover, 1995; Blundell and Bond,1998)

	[1] Output per worker	[2] Capital per worker	[3] TFP	[4] Output per worker	[5] Capital per worker	[6] TFP
Initial GDP per worker	-0.022***	-0.010***	-0.013***	-0.018***	-0.006***	-0.010***
(in logs)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Exports, manufacturing	0.098***	0.086***	0.060***			
(% of GDP)	(0.000)	(0.000)	(0.000)			
Exports, primary	-0.002	-0.003	0.026***			
(% of GDP)	(0.827)	(0.725)	(0.000)			
Trade (X+M), manufacturing				0.067***	0.061***	0.037***
(% of GDP)				(0.000)	(0.000)	(0.000)
Trade (X+M), primary				-0.042***	-0.019***	-0.008*
(% of GDP)				(0.000)	(0.000)	(0.031)
Market Concentration	0.005**	0.008***	0.003**	0.006**	0.012***	0.005***
(Herfindahl Index)	(0.004)	(0.000)	(0.004)	(0.005)	(0.000)	(0.000)
Product Concentration	-0.020***	-0.016***	-0.011***	-0.020***	-0.019***	-0.012***
(Herfindahl Index)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Secondary enrollment rate	0.009***	-0.004*	0.003***	0.008***	-0.006***	0.002***
(initial level, logs)	(0.000)	(0.011)	(0.000)	(0.000)	(0.001)	(0.000)
ICRG Political Risk Index	0.004***	0.000	0.004***	0.003***	-0.000	0.004***
(principal components)	(0.000)	(0.734)	(0.000)	(0.000)	(0.491)	(0.000)
Credit to private sector	-0.017***	-0.009***	-0.011***	-0.019***	-0.010***	-0.012***
(% of GDP)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Government consumption	0.011***	0.016***	-0.004*	0.005***	0.011***	-0.007***
(% of GDP)	(0.000)	(0.000)	(0.019)	(0.000)	(0.000)	(0.000)
Growth volatility	0.156***	-0.039*	-0.007	0.221***	-0.016	-0.005
(S.D. growth per worker)	(0.000)	(0.014)	(0.580)	(0.000)	(0.268)	(0.763)
Constant	0.181***	0.092***	0.140***	0.170***	0.077***	0.133***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	595	595	595	589	589	589
AR(1)	0.003	0.239	0.000	0.002	0.678	0.000
AR(2)	0.516	0.006	0.878	0.676	0.009	0.948
Hansen	0.724	0.417	0.515	0.689	0.464	0.538

p-values in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Our coefficient estimates in columns [5] and [6] of Table 5 suggest the following economic interpretation: first, doubling trade in manufacturing goods would accelerate growth of physical capital per worker and TFP growth in Sub-Saharan Africa by 1.3 and 0.8 percentage points per year, respectively. Second, doubling trade in primary goods would decelerate growth of physical capital per worker and TFP growth in Sub-Saharan Africa by 0.4 and 0.2 percentage points per year, respectively. We should note that the evidence is consistent with: first, the success of manufacturing export-led growth strategies in East Asia, where exports provided a basis for learning (transfer of technology, knowledge spillovers to

other industries and sectors and greater demand for skilled labor). Second, the negative impact of commodity exports on growth due to, among other factors, the instability of export proceeds, the negative spillovers on non-resource-based activities in countries with poor governance and, more broadly, misallocation of resources.

3.4 International trade integration and economic growth: Inter-regional vs. Intra-regional trade

Table 6 investigates if it matters to whom you export. More specifically, it estimates the growth effect of: (a) exporting goods within your region vis-à-vis outside your region, and (b) inter- vs. intra-regional trade, where trade is proxied by the sum of exports and imports. Similar to Table 4, Columns [1] and [4] compute total exports and total trade but are not discussed for comparison. Columns [2] and [3] look at the impact of intra- vs. inter-regional exports while columns [5] and [6] estimate the growth effects of inter- and intra-regional trade. The main difference between these specifications is not only the use of exports rather than trade but also the inclusion of natural resource exports (as % of GDP). The four specifications presented in Table 6 include the following growth determinants: the Herfindahl index export product concentration, secondary enrollment rate, the ICRG index of political risk, credit to private sector (as percentage of GDP), general government consumption expenditure (as percentage of GDP), and growth volatility. Export market concentration (as proxied by the Herfindahl index on bilateral exports) was removed from the estimation due to its correlation with the measures of inter- and intra-regional trade.

Table 6. Trade, diversification, and growth: Inter- and intra-regional trade

Dependent variable, Growth of real GDP per worker (5-year non-overlapping averages)

Estimation Method: GMM-IV System Estimator (Arellano and Bover, 1995; Blundell and Bond,1998)

	[1]	[2]	[3]	[4]	[5]	[6]
Initial GDP per worker	-0.0245***	-0.0225***	-0.0214***	-0.0198***	-0.019***	-0.018***
(in logs)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Exports, total	0.0610***					
(inter + intra)	(0.000)					
Exports, inter-regional		0.0869***	0.101***			
		(0.000)	(0.000)			
Exports, intra-regional		0.0137	0.00914			
		(0.059)	(0.291)			
Trade, total				0.0350***		
(inter + intra)				(0.000)		
Trade, inter-regional					0.048***	0.054***
					(0.000)	(0.000)
Trade, intra-regional					0.019**	0.006
					(0.003)	(0.174)
Natural Resource exports			-0.00628***			-0.020***
(% of GDP)			(0.000)			(0.000)
Product Concentration	-0.0197***	-0.0214***	-0.0181***	-0.0215***	-0.023***	-0.005***
(Herfindahl Index)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Secondary enrollment rate	0.00868***	0.00976***	0.00911***	0.00704***	0.007***	0.008***
(initial level, logs)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ICRG Political Risk Index	0.00620***	0.00621***	0.00655***	0.00681***	0.007***	0.007***
(principal components)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Credit to private sector	-0.0115***	-0.0107***	-0.0107***	-0.0135***	-0.013***	-0.013***
(% of GDP)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Government consumption	0.00806***	0.00738***	0.00613***	0.00495**	0.005**	0.005***
(% of GDP)	(0.000)	(0.000)	(0.000)	(0.003)	(0.003)	(0.000)
Growth volatility	0.181***	0.194***	0.217***	0.201***	0.215***	0.232***
(S.D. growth per worker)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.151***	0.151***	0.163***	0.142***	0.130***	0.137***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	606	606	597	602	602	594
AR(1)	0.000	0.000	0.001	0.000	0.000	0.001
AR(2)	0.481	0.478	0.456	0.504	0.493	0.495
Hansen	0.515	0.435	0.498	0.426	0.356	0.463

p-values in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Our regression estimates from Table 6 yield the following results: first, the coefficient of inter-regional exports is positive and significant while that of intra-regional exports has a negligible impact on long-term growth (see columns [2] and [3] of Table 6). Second, inter-regional and intra-regional trade have a positive and significant impact on growth per worker; especially, when we do not account for

natural resource exports (as a percentage of GDP) in the regression specification.[3] We illustrate the economic impact of greater inter- and intra-regional trade using the regression estimates in column [5] of Table 6. Doubling the amount of inter-regional trade would lead to an average annual increase of the rate of growth per worker of about 1.7 percentage points. An alternative scenario is to increase the level of inter-regional trade of Sub-Saharan African countries to the 75th percentile of non-SSA developing countries —which amounts to an increase of 14 percentage points of GDP. Under this scenario, growth per capita would increase by 0.7 percentage point per year. On the other hand, intra-regional trade also renders positive growth returns although they are smaller than those of inter-regional trade. For instance, doubling intra-regional trade in Sub-Saharan Africa would accelerate growth per worker by 0.5 percentage points per year. Analogously, raising the level of intra-regional trade of Sub-Saharan African countries to the 75th percentile of non-SSA developing countries (almost 39 percentage points of GDP) would increase the growth rate by 0.7 percentage point of GDP.

Table 7 evaluates the impact of inter- and intra-regional trade on the sources of growth. Again, the growth regressions in columns [2] and [5] of Table 6 are selected to estimate the impact of trade on the growth of physical capital per worker and TFP growth. The first three columns of Table 7 estimate the effects of inter- and intra-regional exports while the remaining three columns present the impact of inter- and intra-regional trade (that is, exports and imports).

Inter-regional exports enhance growth per worker and the impact is significant through both a faster accumulation of capital per worker and higher TFP growth, and the impact through the capital accumulation channel is larger than that of TFP growth (0.069 and 0.052 in columns [2] and [3] of Table 7, respectively). Intra-regional exports, on the other hand, have a muted impact on growth per worker. However, they appear to have a significant impact on capital accumulation and TFP growth (0.021 vs. 0.044 in columns [2] and [3] of Table 7, respectively).

The last three columns of Table 7 empirically show that: (a) inter-regional trade has an impact on long-term growth through the capital accumulation channel rather than the TFP growth channel, and (b) intra-regional trade affects long-term growth through the TFP growth channel only.[4] Overall, these findings show that elevating the intensity of intra-regional trade linkages among countries in the region

[3] Note that natural resource exports (as percentage of GDP) is detrimental to growth in our regression analysis. The coefficient estimates suggest that if countries were to cut the dependence of natural resources from their export baskets in half, growth per worker would increase by 1 percentage point (using column [6] of Table 6).
[4] Note that all these regressions also reveal that export product diversification contributes positively to growth.

may render faster growth per worker (although at a slower pace than increasing inter-regional trade linkages); however, the impact of intra-regional trade would work through boosting TFP growth.

Table 7. Trade, diversification, and sources of growth: Inter- and intra-regional trade
Dependent variable normalized by per worker (5-year non-overlapping averages)
Estimation Method: GMM-IV System Estimator (Arellano and Bover, 1995; Blundell and Bond,1998)

	[1] Output per worker	[2] Capital per worker	[3] TFP	[4] Output per worker	[5] Capital per worker	[6] TFP
Initial GDP per worker	-0.023***	-0.011***	-0.014***	-0.019***	-0.006***	-0.012***
(in logs)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Exports, inter-regional	0.087***	0.069***	0.052***			
(% of GDP)	(0.000)	(0.000)	(0.000)			
Exports, intra-regional	0.014	0.021**	0.044***			
(% of GDP)	(0.059)	(0.005)	(0.000)			
Trade, inter-regional				0.048***	0.056***	0.016***
(% of GDP)				(0.000)	(0.000)	(0.000)
Trade, intra-regional				0.019**	0.010	0.027***
(% of GDP)				(0.003)	(0.177)	(0.000)
Product Concentration	-0.021***	-0.020***	-0.010***	-0.023***	-0.020***	-0.010***
(Herfindahl Index)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Secondary enrollment rate	0.010***	-0.000	0.002***	0.007***	-0.002	0.003**
(initial level, logs)	(0.000)	(0.798)	(0.001)	(0.000)	(0.224)	(0.003)
ICRG Political Risk Index	0.006***	-0.000	0.005***	0.007***	0.001**	0.005***
(principal components)	(0.000)	(0.774)	(0.000)	(0.000)	(0.002)	(0.000)
Credit to private sector	-0.011***	-0.005***	-0.008***	-0.013***	-0.006***	-0.010***
(% of GDP)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Government consumption	0.007***	0.011***	-0.003*	0.005**	0.008***	-0.004**
(% of GDP)	(0.000)	(0.000)	(0.018)	(0.003)	(0.001)	(0.004)
Growth volatility	0.194***	-0.010	-0.029**	0.215***	0.040	-0.014
(S.D. growth per worker)	(0.000)	(0.460)	(0.009)	(0.000)	(0.062)	(0.280)
Constant	0.151***	0.059***	0.139***	0.130***	0.017**	0.117***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.010)	(0.000)
Observations	606	606	606	602	602	602
AR(1)	0.000	0.177	0.000	0.000	0.250	0.000
AR(2)	0.478	0.016	0.780	0.503	0.046	0.882
Hansen	0.435	0.438	0.516	0.361	0.622	0.486

p-values in parentheses
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

To economically interpret our findings, we use the regression estimates in columns [5] and [6] of Table 7. Doubling the amount of inter-regional trade in Sub-Saharan Africa would accelerate physical capital accumulation and TFP growth by 2 percentage points and 0.6 percentage point per year, respectively. Additionally, doubling the amount of intra-regional trade in Sub-Saharan Africa would

increase the average annual growth rate of physical capital per worker by 0.2 percentage point and enhance TFP growth by 0.6 percentage point per year.

4 Potential Growth Benefits of Greater International Trade Integration: A Comparative Statics Analysis

This section uses the econometric analysis from section 3 to conduct a series of exercises through which we calculate the potential growth benefits of improving international trade integration in Sub-Saharan Africa. In this section, improving international trade integration involves illustrating the growth effects of: (a) expanding manufacturing trade volumes, (b) increasing export product diversification, and (c) increasing intra-regional trade. The (potential) improvement of the aforementioned dimensions of international trade integration implies comparing the trade performance of Sub-Saharan African countries (including country groups classified by their extent of natural resource abundance within the region) to a series of regional/international benchmarks.

Specifically, the comparative statics analysis conducted in this section consists of increasing the degree of manufacturing trade, reducing the Herfindahl index of export product concentration, and raising the extent of intra-regional trade to a determined benchmark. The comparative analysis is conducted across two different dimensions: first, we compute the growth benefits of narrowing the gap (using the latest time series observation for each country in the panel database) in manufacturing trade, export product diversification, and intra-regional trade for the whole region (and natural-resource-dependent country groups in Sub-Saharan Africa) vis-à-vis select regional benchmarks. Second, we compute the growth benefits from improvements in manufacturing trade, product diversification and intra-regional trade over time (say, over either a 10- or a 20-year horizon). Note that, in both cases, we compute the growth effects as well as the impact on physical capital accumulation, and TFP growth. Furthermore, the comparative statistical analysis is illustrative rather than conclusive because —among other simplifying assumptions— it is based on the implicit hypothesis that changes in trade do not lead to changes in any of the other growth determinants.

We will first look at the impact of narrowing the gaps in international trade integration on growth per worker, the accumulation of physical capital per worker and TFP growth for specific period in time (in our case, it is the most recent available). The benchmark countries/regions selected for this comparative exercise are: (i) the country leader in Sub-Saharan Africa (SSA), (ii) the 90^{th} percentile of the world sample excluding SSA countries, (iii) the median value of the industrialized countries, and (iv) the median for the

East Asia and the Pacific (EAP) region. Computing the growth benefits of closing the gap relative to a specific benchmark uses the values of the different dimensions of trade integration over the last five-year period (2010-14) using the following formula:

$$Growth\ benefit = \beta_{from\ regresion}(z_{benchmark} - z_{SSAregion})$$

Table 8 reports the potential benefits on economic growth, physical capital accumulation, and TFP growth of increasing manufacturing trade in SSA (including the different Sub-Saharan Africa country groups by natural resource abundance) and narrowing the gap relative to other benchmarks. Panel A of Table 8 reports the potential economic growth benefits of closing the gap in terms of manufacturing trade using the coefficient estimates in column [4] of Table 5 (0.067 for manufacturing trade). Our calculations reveal that growth per worker in Sub-Saharan Africa would accelerate by 3.85 percentage points per year if the region were to closet its gap in manufacturing trade volumes relative to the SSA leader. Note that the estimated gap for the region as a whole differs from the potential gains across country groups classified according to their degree of natural resource abundance. For instance, in SSA, the largest potential growth benefits of rising trade volumes are likely to be accrued by non-resource abundant SSA countries (3.87 percentage points per year) while the smallest growth benefits are attained by resource abundant SSA countries in the region (3.72 percentage points per year).

Table 8. Comparative Statistics, Manufacturing Trade (2010 – 2014)

		Region Leader	World excl. SSA (90th percentile)	Industrial countries (median)	East Asia & the Pacific (median)
Panel A. Growth 0.067	SSA	3.85%	4.17%	0.76%	0.63%
	Resource Rich	3.72%	4.03%	0.63%	0.50%
	Non-Resource Rich	3.87%	4.19%	0.79%	0.66%
Panel B. Capital 0.061	SSA	3.51%	3.79%	0.70%	0.58%
	Resource Rich	3.39%	3.67%	0.57%	0.46%
	Non-Resource Rich	3.53%	3.81%	0.71%	0.60%
Panel C. TFP 0.037	SSA	2.13%	2.30%	0.42%	0.35%
	Resource Rich	2.05%	2.23%	0.35%	0.28%
	Non-Resource Rich	2.14%	2.31%	0.43%	0.36%

NOTE: The estimations are calculated based on the results from regressions in Table 5 Columns [4] [5] and [6].

Similarly, we look at the channels of transmission of closing the gap in manufacturing trade by assessing their benefit in terms of (potential) growth of physical capital per worker and total factor

productivity (TFP) growth. Panel B in Table 8 shows the sensitivity of physical capital accumulation to manufacturing trade (0.061 as reported in column [5] of Table 5) and the Panel C reports the sensitivity of TFP (0.037 as in column [6] of Table 5). In all cases, the largest gains in physical capital accumulation and TFP growth from closing the trade openness gap vis-à-vis the corresponding region leader would be attained by the non-resource rich countries in SSA (3.53 and 2.14 percentage points per year). Finally, the potential gains in capital accumulation and TFP growth for the region as a whole vis-à-vis the region leader for SSA amount to 3.51 and 2.13 percentage points per year.[5]

Next, we analyze the likely benefits of SSA (and the corresponding sub-groups of resource dependence) in narrowing the gaps in manufacturing trade integration relative to the median of the industrialized countries. For instance, narrowing the manufacturing trade gap of SSA relative to the industrialized countries median would improve economic growth by 0.76 percentage points, capital accumulation by 0.70 percentage points, and TFP by 0.42 percentage points. Resource rich countries in the SSA region reap the smallest growth benefits in all three variables: growth, capital and TFP. The non-resource rich countries would have greater than average (potential) benefits in terms of growth (0.63 percentage points), capital accumulation (0.57 percentage points), and TFP growth (0.35 percentage points).

Table 9 reports the (potential) gains of closing the gap of diversifying the export product basket in terms of growth, physical capital, and TPF compared to benchmark countries/regions (holding constant all other international trade integration dimensions). The coefficient estimates of product market concentration from the growth, physical capital accumulation and TFP growth are taken from the columns [4] [5] and [6] of Table 7 (or -0.023, -0.02, and -0.01, respectively). As expected, these coefficient estimates are negative —as lower concentration signals greater diversification. The higher the number, the more concentrated the products are. In this sense, if SSA were to close its gap in terms of export product market concentration to the regional lead (i.e. if its basket of products were to become more diverse), growth of output per worker would increase by 0.40 percentage point per year. In addition, their physical capital would expand by 0.35 percentage point annually and TFP growth would accelerate by 0.18 percentage point. The sub-group that would attain the highest growth benefit from reaching the

[5] Note that closing the gap in international trade integration relative to the 90th percentile of the world (excluding SSA) would render higher potential benefits in terms of growth, capital accumulation and TFP growth than by closing the gap with respect to the SSA leader. For the sake of space, the rest of the results (those for the industrial countries' median and the East Asia and Pacific median) are reported in Table 8, but they are not discussed in the document.

regional leader's figures would be the resource rich countries (that is, countries that are abundant in metals and minerals). This group is probably the most laggard in terms of export product diversification. Specifically, if these countries were to diversify their export product basket more, their growth rate per worker would increase by 1.18 percentage points. In terms of physical capital accumulation, the average annual gains would be 1.02 percentage points while TFP growth accelerates by 0.51 percentage point annually. Finally, note that non-resource rich countries attain the lowest potential growth benefits (0.30 percentage point per year) from narrowing the gap in terms of export product diversification. The gains in physical capital accumulation and TFP growth are about 0.26 and 0.13 percent per year.

Table 9. Comparative Statistics, Product concentration (2010 -2014)

		Region Leader	World excl. SSA (10th percentile)	Industrial countries (median)	East Asia & the Pacific (median)
Panel A. Growth -0.023	SSA	0.40%	0.42%	0.38%	0.07%
	Resource Rich	1.18%	1.19%	1.16%	0.85%
	Non-Resource Rich	0.30%	0.31%	0.28%	-0.04%
Panel B. Capital -0.02	SSA	0.35%	0.36%	0.33%	0.06%
	Resource Rich	1.02%	1.04%	1.01%	0.74%
	Non-Resource Rich	0.26%	0.27%	0.24%	-0.03%
Panel C. TFP -0.01	SSA	0.18%	0.18%	0.17%	0.03%
	Resource Rich	0.51%	0.52%	0.50%	0.37%
	Non-Resource Rich	0.13%	0.14%	0.12%	-0.02%

NOTE: The estimations are calculated based on the results from regressions in Table 7 Columns [4] [5] and [6]. These coefficients are expressed in negative numbers are higher figures would mean more concentration and less would mean more diversity.

Additionally, **Table 10** presents the potential increase in economic growth, physical capital growth and TFP growth if the gap in intra-regional trade was to close relative to the four benchmarks mentioned earlier. If SSA were to match the regional leader's intra-regional trade in their overall export basket, growth would accelerate 1.54 percentage points, capital accumulation would be enhanced by 0.81 percentage points and TFP growth would rise by 2.19 percentage points. If we look at the potential gains (including the sub-groups) relative to the regional leader, the resource rich countries would benefit the most from closing the gap with the benchmarks in terms of growth, capital accumulation, and TFP growth.

Table 10. Comparative statistics, Intra-regional trade (2010 – 2014)

		Region Leader	World excl. SSA (10th percentile)	Industrial countries (median)	East Asia & the Pacific (median)
Panel A. Growth 0.019	SSA	1.54%	1.18%	0.34%	0.59%
	Resource Rich	1.58%	1.22%	0.38%	0.63%
	Non-Resource Rich	1.52%	1.16%	0.32%	0.57%
Panel B. Capital 0.01	SSA	0.81%	0.62%	0.18%	0.31%
	Resource Rich	0.83%	0.64%	0.20%	0.33%
	Non-Resource Rich	0.80%	0.61%	0.17%	0.30%
Panel C. TFP 0.027	SSA	2.19%	1.67%	0.49%	0.84%
	Resource Rich	2.24%	1.73%	0.54%	0.89%
	Non-Resource Rich	2.16%	1.65%	0.46%	0.81%

NOTE: The estimations are calculated based on the results from regressions in Table 7 Columns [4] [5] and [6].

Table 11 reports the actual gains from improved international trade integration over a 10-year span (2010-14 vs. 2000-04) and a 20-year span (2010-14 vs. 1990-94) in terms of growth of output per worker, the accumulation of capital per worker and TFP growth. The increase of manufacturing trade in SSA over the past 10 years (2010-14 vs. 2000-04) contributed to higher growth of output per worker by 0.33 percentage point whereas it contributed to an accelerated of the accumulation of capital per worker and TFP growth by 0.30 percentage point and 0.18 percentage point, respectively. An improvement in SSA export productive diversification over the past decade led to a growth per worker benefits of 0.14 percentage point. TFP did not account for more than 0.15 percentage point in the past 10 years. The impact on growth per worker of higher export product diversification in SSA is transmitted higher by greater accumulation of capital than by higher TFP growth, 0.12 and 0.06 percentage points per year, respectively. What are the effects of increasing intra-regional trade? Table 11 depicts that the progress has been greater in the past 20 years. Improved intra-regional trade has increased growth per worker in the region by 0.08 percentage point per year over the past 20 years, and the impact is mainly transmitted through faster TFP growth (0.11 percentage point per year).

Table 11. Comparative Statistics, over time

		GROWTH		CAPITAL		TFP	
		10 year	**20 year**	**10 year**	**20 year**	**10 year**	**20 year**
Manufacturing Trade	SSA	0.33%	0.34%	0.30%	0.31%	0.18%	0.19%
	Resource Rich	0.13%	0.59%	0.12%	0.54%	0.07%	0.32%
	Non-Resource Rich	0.26%	0.26%	0.24%	0.23%	0.15%	0.14%
Product concentration	SSA	0.14%	0.24%	0.12%	0.21%	0.06%	0.10%
	Resource Rich	-0.06%	0.58%	-0.05%	0.50%	-0.02%	0.25%
	Non-Resource Rich	0.22%	0.24%	0.19%	0.21%	0.10%	0.11%
Intra-regional Trade	SSA	0.00%	0.08%	0.00%	0.04%	0.00%	0.11%
	Resource Rich	-0.08%	0.06%	-0.04%	0.03%	-0.11%	0.08%
	Non-Resource Rich	0.06%	0.02%	0.03%	0.01%	0.08%	0.03%

During the past 20 years, the growth benefits of higher manufacturing trade, lower product concentration, have been transmitted through an acceleration of capital accumulation and TFP growth. Yet in terms of intra-regional trade, the progress has just started to accelerate. What dimension of trade integration explains over the past 20 years the highest growth per worker benefits? The SSA region benefited the most from increasing manufacturing trade products: 0.34 percentage point per year increase in growth per worker, and the impact is primarily driven by faster capital accumulation (0.31 percentage point per year).

Greater export product diversification over the past 20 years in SSA resource rich countries and non-resource rich countries also renders higher growth benefits. There are two takeaways from these results: (a) the growth benefits from product diversification are larger among non-resource rich than among resource rich countries in SSA, and (b) the impact on the sources of growth in SSA is greater through faster capital accumulation than through an acceleration of TFP growth.

Finally, we observe an analogous result when explaining the growth effects of increasing intra-regional trade in SSA groups classified according to their extent of natural resource abundance. An increase in this type of trade over the past decade has led to greater growth benefits among non-resource rich countries and a stronger transmission through TFP growth. However, for the resource rich countries, the growth benefits were smaller in the past 10 years, yet higher than the non-resource rich countries in the past two decades.

5 Policy Discussion

The econometric analysis and comparative statics exercises conducted in sections 3 and 4 reveal important messages on the relationship between trade integration and long-term growth: first, there is evidence of a causal relationship from trade openness (i.e. export and import volumes) to long-term growth. This relationship is robust to the inclusion of variables that measure diversified export baskets distinct patterns of geographical trade. Second, export product diversification has a robust positive relationship with long-term growth, and its impact is transmitted through both faster capital accumulation and total factor productivity growth. Additionally, diversifying away from primary goods and towards higher-value added products (e.g. manufactured goods) renders higher growth returns in the long run.[6] Third, intra-regional trade has a positive and causal impact on growth per worker. The sensitivity of growth to intra-regional trade is lower than that of inter-regional trade. However, the former is an additional engine of growth with the potential to bring about economies of scale and scope to enhance its estimated impact on growth. The effect is mainly transmitted through faster TFP growth. Market expansion within the region is key to ignite other drivers of growth such as the entry of FDI, and the development and/or deepening of regional value chains. Overall, it matters for long-term growth how much you trade, what you trade and to whom you trade.

The empirical analysis conducted in this paper provides the basis for the discussion of three broad policy actions for Sub-Saharan Africa. First, the diversification of the export basket away from primary goods and towards higher value-added goods. In doing so, the economy will increase its resilience towards volatile fluctuations in commodity prices. Second, the build-up of stronger links with emerging trade partners that play a big role in global markets —e.g. China and India. This implies that Sub-Saharan Africa will have a more ample group of trading partners that may help —to some extent— smoothen adverse (international) shocks. Finally, polices should be implemented to increase intra-regional trade not only to reduce volatility from external shocks but to also exploit economies of scale and benefit from a larger and unified regional market. This section discusses the rationale behind these three policy options.

[6] This finding is related to the negative relationship between primary goods and growth as opposed to the positive relationship between manufacturing goods and growth. Specifically, the price of primary commodities declines relative to the price of manufactured goods over the long-run causing deterioration of those economies which are predominately primary-based goods, such as those in SSA.

5.1 Export product diversification

Export diversification is at the top of the agenda of policy makers in the region. Designing policies to reduce the export product concentration of countries in Africa —especially those countries that are abundant in natural resources— is not a trivial issue. There are several drivers that policy makers may take into consideration such as trade, market access, trade costs, FDI, human capital, public investment, exchange rate volatility, terms of trade, financial development, infrastructure, quality of institutions, and resource wealth, among others.

Assessing the main drivers of export diversification is beyond the scope of this paper. However, empirical evidence suggests that export diversification can deliver successful outcomes for developing countries. For instance, firms in Malawi, Mali, Senegal and Tanzania that continue operating beyond the first year of business are those that diversify in terms of products and markets (Cadot et al. 2011). Tanzania stands out as an example of export diversification and greater output. Since the late 1990s, mining, manufacturing, construction and services experienced sustained growth while the production and exports of traditional cash crops (e.g. cotton, coffee, tea, sisal, cashew nuts, and tobacco) declined. The broader selection of higher-value added goods came along with changes in the export market shares. For instance, the share of exports to the euro zone diminished while intra-regional trade —particularly within the East African Community— increased (Papageorgiou and Spatafora 2012).

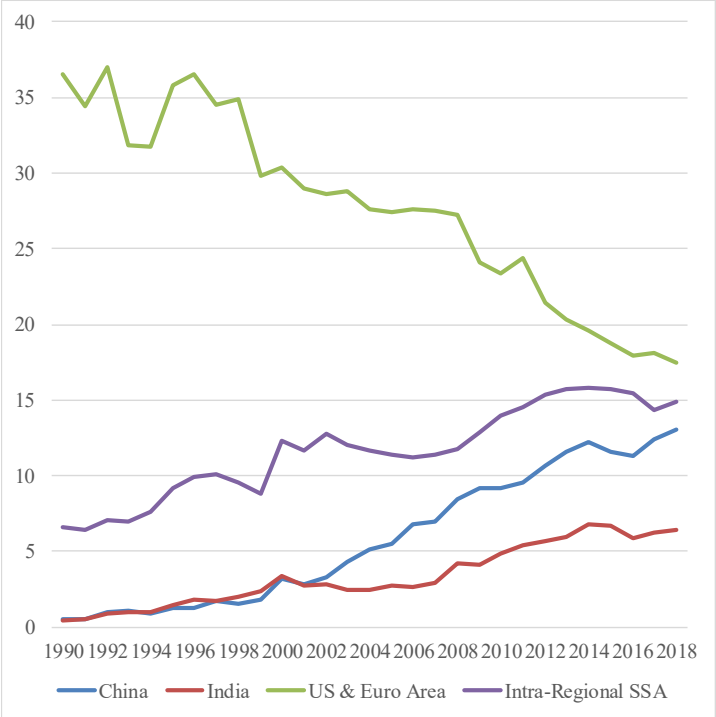
Rwanda is another example of trade diversification in Sub-Saharan Africa. The government introduced a series of changes to the trade framework from 2000 to 2016; for instance, policies to mitigate the effects of swings of international commodity prices —including quality upgrading of traditional exports (e.g. coffee) and measures to diversify trade destinations. As a result, the share of traditional exports (i.e. tea, coffee and minerals) in total exports decreased from 41 to 25 percent, and yet their overall export value more than tripled —it increased from US$ 415 million to US$ 4,125 million (World Bank 2019a).

5.2 Emerging inter-regional partners and rising intra-regional trade

Policies to promote trade integration in Sub-Saharan Africa can help increase overall economic activity and total factor productivity. Figure 2 plots Sub-Saharan Africa's average export and import shares over the period 1990-2018 within the region and with trading partners outside the region such as China, India, and the United States + euro area. Three facts emerge from this figure: first, China and India

have become important trading partners of the Africa region over the past quarter-century. Although China and India's average export and import shares with Sub-Saharan Africa barely exceeded 1 percent at the start of the 1990s, these shares increased steadily over the past three decades. By 2018, average export and import shares of the region with China and India amounted to 13.1 and 6.5 percent, respectively. Second, trade between Africa and the United States + euro area aggregate has declined steadily over the past 25 years. Specifically, it decreased from about 35 percent at the beginning of the 1990s to nearly 18 percent in recent years. Finally, intra-regional trade more than double, from 7 percent at the beginning of the 1990s to approximately 15 percent in 2018. Overall, there is an increase in the number of trade destinations of Sub-Saharan African products.

FIGURE 2: Average trade share of Sub-Saharan Africa with regional and international partners
(percent of GDP)



Source: Direction of Trade Statistics, International Monetary Fund.

The rising export and import shares with China over the past 25 years has been accompanied by a shift in the composition of goods that the region exports and imports from the East Asian country. For instance, exports of "*crude materials, inedible, except fuels*" and "*mineral fuels, lubricant and related materials*" amount to US$ 7.2 and US$ 6.2 billion respectively in 2015-18, up from US$ 262 and US$ 38

million in 1995-98 respectively.[7] On the other hand, the two main groups of products imported from China to Sub-Saharan Africa during 2015-18 were "*machinery and transport equipment*" and "*manufactured goods classified by material*". Each group represented US$ 18.7 and US$ 9 billion in 2015-18, respectively —a sharp increase from US$ 433 and US$ 416 million in 1995-98, respectively.

5.3 Is there greater scope for intra-regional trade?

Across the world, countries have increasingly engaged in regional trade agreements (RTAs). For instance, the number of RTAs in force worldwide has increased from 50 in 1990 to 280 in 270. Currently, the most notable examples around the world are the Trans-Pacific Partnership (TPP), the Transatlantic Trade and Investment Partnership (T-TIP), the Regional Comprehensive Economic Partnership (RCEP) in Asia, the Pacific Alliance in Latin America, and the Tripartite Free Trade Agreement in Africa.[8]

These agreements have also become more complex in nature. Regional trade negotiations go beyond tariffs and include policies that boost trade and investment in goods and services such as competition policies, government procurement rules, and intellectual property rights. These more complex agreements —also known as *deep* agreements— are found to boost trade, foreign investment, and global value chain participation (more than less complex trade agreements). On average, deep trade agreements increase goods trade by more than 35 percent, services trade by more than 15 percent, and GVC integration by more than 10 percent (Mattoo et al. 2017, Osnago et al. 2017, and Ruta 2017).

Negotiating and enacting regional trade agreements can help: (a) promote long-term growth by enabling countries to exploit comparative advantage and economies of scale, and (b) accelerate the process of structural transformation by facilitating the transmission of knowledge and technology and the development of new products. In the case of Sub-Saharan Africa, a question that emerges is how trade can be further increased within the region and exploit the scale of a larger and unified regional market to create opportunities for economic transformation.

[7] The export product categories are based on COMTRADE SITC Revision 1.
[8] The Tripartite Free Trade Area (TFTA) was signed in 2015. It proposed a free trade agreement between the Common Market for Eastern and Southern Africa (COMESA), Southern African Development Community (SADC), and East African Community (EAC). Overall, it enabled the participation of trade between 27 African countries.

5.3.1 Patterns of intra-regional trade

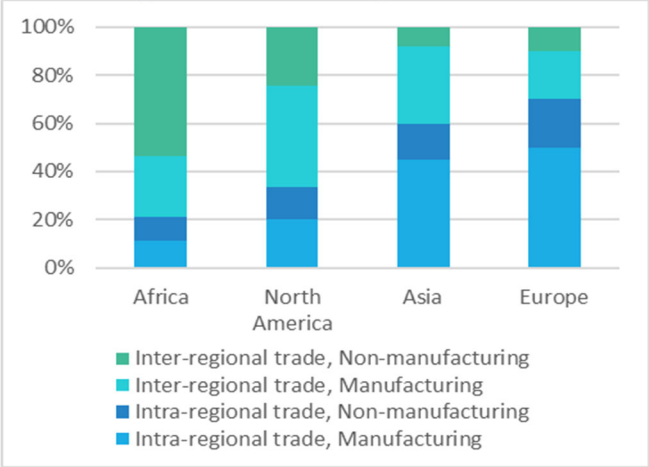
Intra-regional trade in Africa grew by 8 percentage points of GDP since 1990 (see Figure 2). However, the actual volume of trade across borders might be underestimated as it does not account for informal (or unrecorded) trade in the region.[9] The share (and size) of intra-regional trade in Sub-Saharan Africa is significantly lower compared with other regions —especially with East Asia (See Figure 3). In 2017, intra-regional trade in Africa represented only 17 percent of total exports, an amount that is considerably lower than that of Asia (59 percent) or Europe (69 percent). Additionally, one of the main drivers of the gap in Africa's intra-regional trade vis-à-vis Asia and Europe is the large share of intra-regional trade of manufactured goods in the latter regions.[10]

The evolution of the patterns of intra- vs. inter-regional exports and imports in Sub-Saharan Africa over the last decade is presented in Figure 4. Shifts in the extent of Sub-Saharan Africa's trade openness in the region are mainly driven by fluctuations in exports and imports outside the region. In turn, inter-regional trade is vastly influenced by fluctuations in international commodity prices —where exports still heavily rely on extractive industries (say, mineral ores, metals, and energy commodities). Intra-regional exports and imports represent a small and fairly stable share of total exports and imports over time. The low levels of intra-regional trade suggest significant barriers to trade across borders as well as the lack of depth in regional value chains.

[9] Recent estimates suggest that informal cross-border trading contributes about 30-40 percent of the overall intra-regional trade in the Southern Africa Development Community (SADC) and 40 percent in the Common Market for Eastern and Southern Africa (COMESA) (Nshimbi and Moyo 2017).

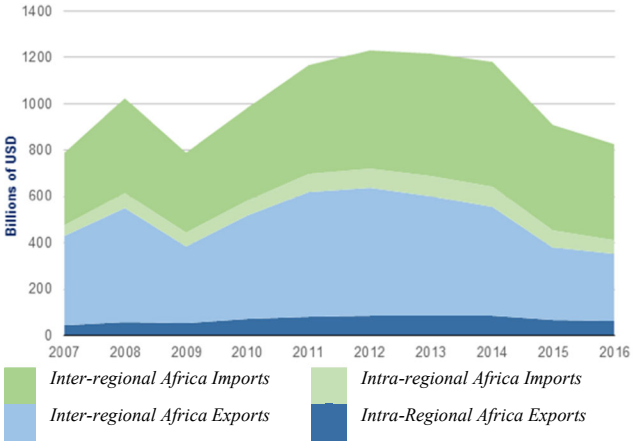
[10] When exporting to manufactured markets with different income levels, Sub-Saharan African firms face a cost-quality trade-off. Quality tends to matter when exporting manufactured goods to markets with higher income level such as the United States and the euro area. Cost considerations seem to be more important when exporting to markets with lower income level (Easterly and Reshef 2016).

Figure 3. Structure of Africa's exports compared to other regions in 2017.



Source: Songwe (2019) with data from UNCTAD.

Figure 4. Africa's inter and intra-regional trade, over time

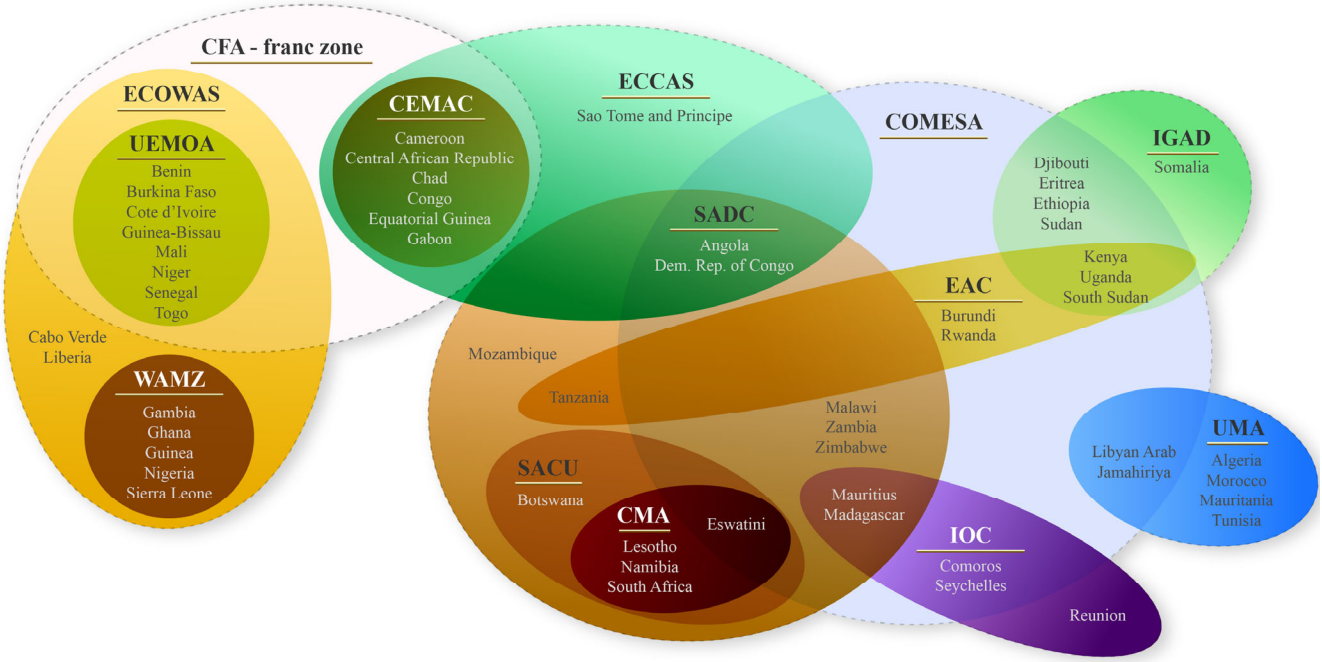


Source: Brookings with data from UNCTAD, 2018.

Intra-regional trade in Sub-Saharan Africa typically takes place within each of the regional economic communities (RECs) existing in the region.[11] Figure 5 plots the universe of RECs and their interplay in the Africa region. The main five RECs (CEMAC, COMESA, EAC, ECOWAS and SADC) in the region account for about 75 percent of intra-regional trade in 2017. Regional hubs emerged as trade in each community intensified; namely, Côte d'Ivoire, Kenya, Senegal, and South Africa. For instance, South Africa is the source of approximately 35 percent of intra-regional imports in Africa and about 40 percent of intra-regional manufacturing imports. Despite near-zero preferential tariffs among community country members, the poor performance of foreign trade of Sub-Saharan African RECs compared to those outside the region may reflect: (i) costly non-tariff barriers within each of these communities, and (ii) differences in trade regimes that hamper trade between communities.

[11] Currently, most African countries belong to at least one regional economic community — for instance, Angola and Congo, D.R. are part of Southern Africa Development Community (SADC), Common Market for Eastern and Southern Africa (COMESA) and the Economic Community of Central African States (ECCAS).

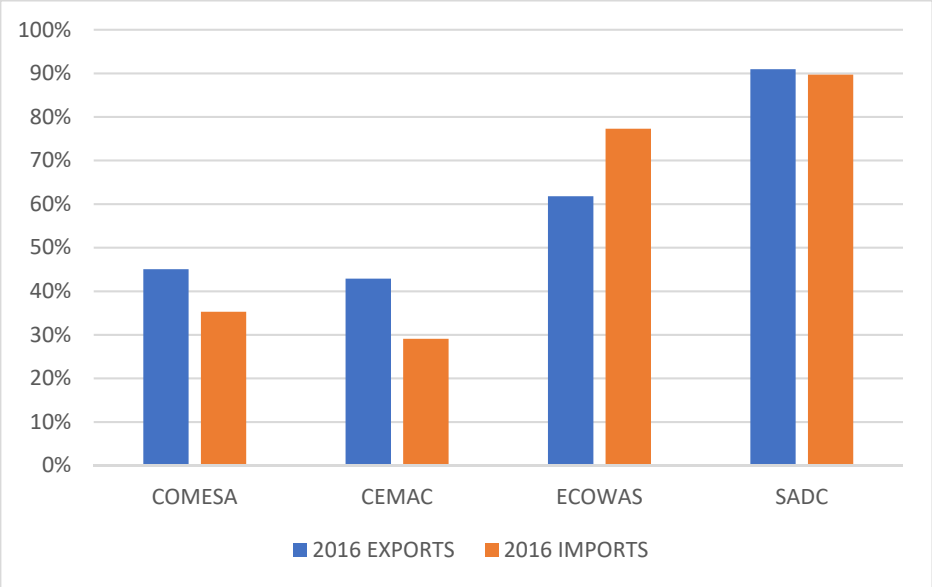
Figure 5. Regional Economic Communities in Africa



Source: Acharya et al. (2011, Figure 2.18); WTO Secretariat.
Note: CFA, French Colonies of Africa (Colonies françaises d'Afrique); CMA, Common Monetary Area; CEMAC, Economic and Monetary Community of Central Africa (Communauté Économique et Monétaire de l'Afrique Centrale); COMESA, Common Market for Eastern and Southern Africa; EAC, East African Community; ECCAS, Economic Community of Central African States; ECOWAS, Economic Community of West African States; IGAD, Intergovernmental Authority on Development IOC, Indian Ocean Commission; SACU, Southern African Customs Union; SADC, Southern African Development Community; UMA, Union of Arab Maghreb; WAEMU/UEMOA, West African Economic and Monetary Union/Union Économique et Monétaire OuestAfricaine; WAMZ, West Africa Monetary Zone.

Overall, intra-regional trade in Sub-Saharan Africa has been driven by an expansion of "*intra-REC*" rather than "*inter-REC*" trade. The lower tariffs implemented after the creation of the REC increased significantly trade flows within sub-regions in the continent —although the effects were uneven across RECs (see Figure 6). For instance, tariff reductions were not accompanied by substantial increases in sub-regional trade flows in CEMAC. This suggests that the inability to boost trade within the community could be attributed to important non-tariff barriers (NTBs) and relatively undiversified exports. On the other hand, the limited trade between countries from different RECs may, for instance, result from high tariffs imposed by countries from different RECs.

Figure 6. Trade in Sub-Saharan Africa within Regional Economic Communities, 2017
(percent of regional trade)



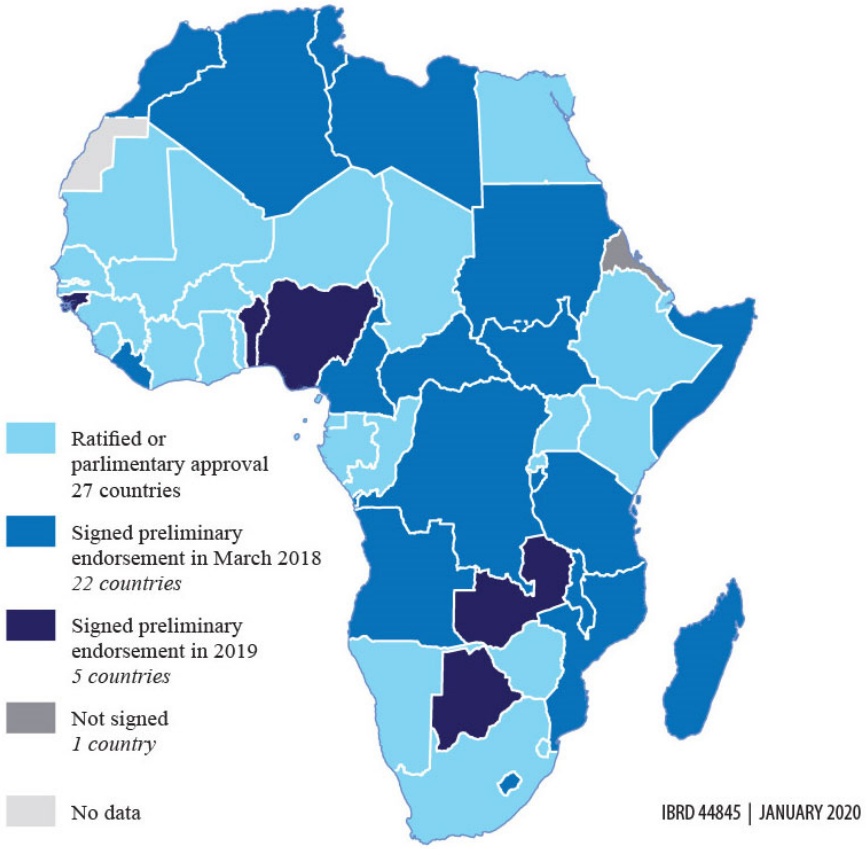
Source: Direction of Trade Statistics, International Monetary Fund.

5.3.2 Regional trade agreements: The AfCFTA

The African Continental Free Trade Agreement (AfCFTA) has been signed by member countries of the African Union to bolster trade within the region by eliminating tariff on most goods, liberalizing trade in services, reducing (or eliminating) non-tariff barriers to intra-regional trade and creating a continental single market with free labor and capital mobility (Figure 7). Once operational, it has been estimated that the AfCFTA will establish a market of 1.2 billion people (60 percent of which are below the age of 25 years) with a combined GDP of US$ 2.5 trillion (IMF 2019).

The AfCFTA has the potential to enhance connectivity across markets in the region—especially the linkages between smaller economies and larger markets. It can also be a risk management mechanism to protect Sub-Saharan African countries from trade tensions outside the region and/or economic downturns in the world's larger markets. A larger effective domestic market acts as insurance against disruptions to global trade associated either with global volatility or with contraction in global demand.

Figure 7. The African Continental Free Trade Agreement



Notes. By July 2019, 52 of the 55 African Union countries had signed the agreement. Benin and Nigeria announced that they will sign the AfCFTA in the month of July 2019, thus leaving Eritrea as the sole outsider of this continental free trade agreement. Twenty-four initial member states deposited their instruments of ratification of the African Continental Free Trade Area (AfCFTA) agreement to the African Union (AU), meeting the threshold for the agreement to come into effect. The AfCFTA entered into force on May 30, 2019. Source: African Union.

The AfCFTA is expected to make foreign trade more inclusive within the region; that is, to reduce the concentration of intra-regional trade. Recent figures show that about two-thirds of the regional demand for intra-regional exports is accounted for by 10 countries—including South Africa and some of its neighboring countries, Côte d'Ivoire, and the Democratic Republic of Congo. In this context, the signing of the African Continental Free Trade Agreement should aim at removing the obstacles to trade between the continent's sub-regional blocs.

The AfCFTA will be implemented in two phases. Phase I designs a framework for trade liberalization of goods and services and establishes a mechanism for the settlement of disputes concerning

members' rights and obligations.[12] It will also address the issue of non-tariff barriers (NTBs), a major obstacle to trade in Africa.[13] Recent evidence suggests that trade logistics constitute the most important non-tariff factor in explaining trade linkages among countries, followed by infrastructure, access to credit and the business environment (IMF 2019). The liberalization of trade in services proposes a request-and-offer approach by member countries based on seven priority sectors: logistics and transport, financial services, tourism, professional services, energy services, construction, and communications. Finally, Phase II will address issues of competition policy, investment, and intellectual property rights.[14]

The African continent lacks an economy that plays the role of a continent-wide trading hub. Except for South Africa, which operates as a trading hub for Southern Africa, the continent does not have a systemic global exporter that imports value added within Africa. This feature, along with the high NTBs, limit the creation or deepening of regional value chains. The implementation of trade facilitation measures and enhanced border management could curtail costs within Africa and shorten the distance to global hubs. The AfCTA should address then the obstacles that deter the formation of regional value chains and, thus help insert African economies into global supply and value chains. Despite increasing outsource production to a wider array of countries, a large proportion of the value-added distribution in global value chains remains within regional blocs. This is attributed to lower transit costs and shorter supply chains related to the distance from suppliers (sourcing) or targeted export markets (Fofack 2018).

Recent research evaluates the welfare effects of reductions in tariffs and non-tariff barriers as well as the implementation of trade facilitation measures in Sub-Saharan Africa (World Bank 2019b). Welfare gains are larger when policies address NTBs and trade facilitation measures rather than tariffs. For

[12] On the liberalization of trade in goods, Phase I determines the path to eliminate tariffs on 90 percent of product categories. Countries can prolong the period to implement tariff reductions in the case of sensitive goods or maintain existing tariffs among the 10% of excluded products. Additionally, the new protocol on trade in goods includes institutional structures for the categorization, reporting, monitoring and gradual elimination of non-tariff barriers (NTBs), rules of origin, customs operation, technical barriers to trade, sanitary and phytosanitary measures, and transit and trade remedies.

[13] The most common non-tariff barriers to trade include quotas, licenses, dissimilar rules of origin, technical barriers to trade (e.g. labeling requirements, standards on technical specification and quality standards, measures to protect the environment, and procedures for certification, testing and inspection, among others), sanitary and phytosanitary barriers to trade (rules for food safety and animal and plant health standards), infrastructure gaps in quantity, quality and access (high ground transportation costs, low quality of ports, air transportation, and poor infrastructure efficiency), and other trade-related transaction costs (say, time and cost to start a new business, lack of access to trade financing or getting bank credit to start/expand firms). Some regional initiatives have been launched in recent years to address infrastructure gaps —for instance, the Presidential Infrastructure Champion Initiative (PICI), the Program for Infrastructure Development in Africa (PIDA), the Dakar Financing Summit (DFS) for Africa's Infrastructure, and the Continental Business Network on Infrastructure Financing. However, they will take time to narrow the existing infrastructure network and quality gaps.

[14] The AfCFTA is complemented by other continental initiatives, including the Protocol on Free Movement of Persons, Right to Residence and Right to Establishment, and the Single African Air Transport Market (SAATM).

instance, reduced tariffs will yield welfare gains of 0.2 percent for AfCFTA country members. Cutting NTBs in half would increase welfare gains by 1.6 percent while the full implementation of the WTO's Trade Facilitation agreement would lead to overall welfare gains of 5 percent by 2035 (World Bank 2019b).[15]

6 Conclusions

The goal of this paper is to provide evidence on the nature of the relationship between international trade integration for Sub-Saharan Africa in a comprehensive and systematic manner. Unlike previous research in this strand of the literature, this paper first examines the impact of trade integration on growth as well as on the sources of growth —that is, physical capital accumulation and TFP growth. Second, it evaluates the impact on growth (and its sources) of the different dimensions of trade integration (trade volume, trade diversification, and natural resource dependence). This implies that the nature of the trade-growth relationship depends not only on how much you trade but also on what you export and to whom you export (or have trade with). Third, it examines the impact of growth of the composition of trade volumes by product (primary goods vs. manufacturing goods) and the composition of trade volumes by destination (inter- vs. intra-regional trade).

We have collected a comprehensive data set on international trade integration indicators, growth per worker, capital accumulation, and TFP growth for 174 countries across the world, including 45 Sub-Saharan African countries, from 1970 to 2014. The relationship between international trade integration and growth is estimated using the GMM-IV system estimator (Arellano and Bover 1995, Blundell and Bond 1998). This estimation method accounts for unobserved country and time fixed effects as well as the likely endogeneity (or reverse causality) of explanatory variables, thus providing evidence of a causal relationship between trade integration and growth. The GMM-IV estimation is also corrected for the likely downward-biased estimation of the asymptotic standard errors of the two-step GMM estimator in small samples (Windmeijer 2005) and the overfitting of endogenous variables due to the existence of too many instruments (Roodman 2009).

The econometric analysis finds a causal relationship from (the different dimensions of) trade integration to growth (including the sources of growth). The amount of trade is not the only dimension

[15] The estimated aggregate welfare gains mass the cross-country heterogeneity in the impact of the AfCFTA. Welfare gains by 2035 are estimated to range from 0.4 percent (Mozambique) to 19 percent (Togo). In this context, the welfare effects of the AfCFTA depend on the depth and extent to which the policy changes cover non-trade barriers and services (especially in transport and logistics) and on the structure of the export basket and the economy.

that matters for long-term growth. It also matters what (type of goods) you export and to whom you export. The evidence presented in this paper can be summarized by the following findings:

1. Higher trade volumes, greater export product diversification and lower natural resource export dependence help promote economic growth. The effects of international trade integration are transmitted significantly through faster accumulation of capital per worker and enhanced TFP growth. The impact of greater trade volumes and lower natural resource dependence is primarily driven by the TFP growth channel while that of export product diversification is transmitted mainly through faster capital accumulation.
2. Our regression estimates suggest that the diffusion of technology, managerial know-how, and competitive practices as well as enhanced allocative efficiency are likely channels through which greater trade volumes influences growth. Reduced resource misallocation and greater productivity of non-resource-based sectors will be the channels of transmission for lower natural resource export dependence. Greater investment across sectors of economic activity will be the channel through which export product diversification may affect growth.
3. We look at the impact on growth (and its sources) of trade volume by product (trade in primary goods vis-à-vis trade in manufactured goods) and trade volume by destination (inter-regional vis-à-vis intra-regional trade). In brief, we find that the composition of trade volume by either product of destination —as distinguished in this paper— matters for long-term growth.
4. When looking at the product composition of trade volume, we find that manufacturing trade fosters economic growth while trade in primary goods hinders it. The regression analysis suggests that doubling the manufacturing trade share in GDP would increase economic growth by 1.9 percentage points per year while a similar increase in the primary goods trade share in GDP would lower economic growth by 1 percentage point per year. The negative impact of trade in primary goods is transmitted through both slower capital accumulation and sluggish TFP growth, although the impact through decreased investments —especially, in non-resource-based sectors of economic activity— appears to be larger.
5. The assessment of the impact of the composition of trade volume by destination shows that both inter- and intra-regional trade have a positive, significant and causal impact on growth. Our empirical analysis suggests that doubling the inter-regional trade share in GDP would increase economic growth by 1.9 percentage points per year while a similar increase in the intra-regional share in GDP enhances growth by 0.6 percentage point per year. Inter-regional trade affects growth

significantly through faster capital accumulation and enhanced TFP growth. Intra-regional trade, on the other hand, influences growth mainly through the productivity channel. These findings suggest that the diffusion of technology, managerial know-how, and competitive practices as well as the operation of economies of scale and scope are the main channels of transmission of greater intra-regional trade. An expanded African market can play a key role in triggering other drivers of growth such as FDI entry, and the development or deepening of regional value chains.

Finally, trade policies that foster growth should highlight actions that accelerate export product diversification, product diversification, and trade not only outside but also within the Africa region. Recent evidence shows that when African countries trade with each other, they tend to exchange more manufactured and processed goods, have more knowledge transfer and create more value added. Manufactured goods represent a higher share of exports within the region than outside the region —42 and 15 percent in 2014, respectively (UNECA 2017). The test of the African Continental Free Trade Agreement (AfCFTA) is whether the scheduled tariff reduction and dismantling of non-tariff barriers help boost trade across the different regional economic communities (RECs) in Africa. The success of the AfCFTA may require complementing trade policies with national policies that make the gains from trade more inclusive —for instance, policies that may range from re-training workers for new tasks/jobs as a result of technological changes, adequate regulatory frameworks to promote investment and competition, to social protection of the most vulnerable to opening the trade account.

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