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Is export-led growth a mirage? The case of Kenya

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WIDER Working Paper 2019/115

Is export-led growth a mirage?

The case of Kenya

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Abstract: The role of exports in promoting economic growth has been widely acknowledged. This paper analyses the link between exporting and growth performance in Kenya using time series data. Despite trade liberalization and export promotion policies pursued over time, Kenya's export growth has been sluggish and its contribution to economic growth is still limited. Notwithstanding diversification efforts, exports are still strongly geared towards primary agricultural goods. Whereas the empirical results indicate a positive long-run relationship between exporting and output, the impact of exporting on output growth is found to be statistically insignificant in the short run. Nonetheless, analysis using disaggregated export data shows a statistically significant impact of manufactured exports on economic growth. The empirical results also indicate that compared to exports, imports have a relatively significant influence on short-run and long-run output growth. This signifies the import-dependent nature of the economy. There is a need to revamp export-led growth through enhanced competitiveness and value-addition avenues such as regional and global value chains.

Key words: trade, export-led growth, imports, import substitution, Kenya

JEL classification: F1, F13, F14

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1 Introduction

The role of exports in promoting economic growth has been brought to the fore by the new wave of openness to trade as an economic strategy for development. Ideally, increased openness enables domestic producers to access a larger market for domestic goods which enables them to achieve economies of scale in the production of goods and services (Pistoresi and Rinaldi 2012). Promoting exports encourages specialization and learning-by-doing, which increases productivity not only in the tradable sector but also in the entire economy (Krugman 1995; Kinuthia 2016). The improvement in productivity increases competitiveness of domestically produced goods and profitability of enterprises. This provides incentives for domestic producers to increase production. In this regard, increasing exports fosters economic growth.

However, export-led growth (ELG) in most low-income and developing African countries has arguably remained a mirage. Firstly, the reliance on free trade and exports as a catalyst of economic growth in developing countries has been impeded by the export of primary goods, which tend to be associated with little innovation and low productivity. As a result, factor earnings in the primary sector are low, and the sector militates against overall productivity improvement, given the spillover effects it has on other sectors in the economy (Krugman 1995; Krueger 1997).[1] Secondly, due to low prices and a high level of competition, primary exports tend to be associated with deteriorating terms of trade and a worsening balance of payments between developed and developing countries. Thirdly, primary goods have low income elasticity. Consequently, the quantity of exports does not increase in tandem with growth in trading partners' incomes. Fourthly, despite the tendency of tariff barriers reducing, non-tariff barriers and nationalistic sentiments have curtailed the rate of growth of exports to developing and developed economies. Thus, most developing economies have not realized expected economic growth by increasing volume of exports (Santos-Paulino and Thirlwall 2004; Were 2015). Nor has industrialization policy using export promotion strategies developed the industrial sector to increase the share of manufactured goods in exports and in national output (Krueger 1997; UNCTAD 2017).

Furthermore, anti-free-trade sentiments seem to be increasing globally. In particular, nationalistic sentiments and agitation for greater protectionism to create domestic employment or protect domestic industries are on the rise. Examples include the exit of the United Kingdom from the European Union, the protectionist trade policy followed by the current US administration, procrastination of some East Africa member countries to sign the Economic Partnership Agreements, and the slow pace of economic integration in the East African Community (EAC) trading blocks. Challenges to export growth are further compounded by domestic trade policies and supply-side constraints (UNECA 2017). In view of the challenges of exporting primary goods and the poor performance of developing countries in international trade, some analysts and policy makers are now calling for an inward-looking trade and industrialization policy.

Kenya, like most other developing countries shifted from import substitution (IS) to export promotion in the early 1990s and has significantly reduced restrictions to international trade (Adam et al. 2010). Furthermore, bilateral, regional, and continental integration efforts have increased liberalization and eased the mobility of goods and services. However, even with increased integration, extensive liberalization, and adoption of outward-oriented policy, Kenya's exports

[1] A sector producing under increasing returns to scale generates efficiency externalities to other sectors. The efficiency externalities augment long-run growth beyond resource endowment.

have not increased substantially and nor has a robust ELG been realized akin to Asian countries pursuing ELG policies (UNCTAD 2017). Instead, imports have not only grown in tandem with economic growth, they have also exceeded the export growth rate. Whereas importing transfers advance capital goods and technology into the economy and act as a catalyst for structural transformation, they should also improve competitiveness of exports and hasten economic growth (Kinuthia 2016; Mazumdar 2001). Although there is ample empirical evidence for ELG, there is scant evidence regarding the export–growth nexus with respect to African countries like Kenya.

It is against this background that this paper analyses the relationship between exports and growth in Kenya. Kenya is a good case because, firstly, it implemented inward- and outward-oriented policies for a significant period of time (Were et al 2006; Adam et al. 2010). This enables a robust analysis of the impact of exports and imports on growth. Secondly, increased trade integration initiatives such as the EAC and the Common Market for Eastern and Southern Africa (COMESA), and the on-going efforts to enhance volume of trade and output in Africa through the African Continental Free Trade Area makes the assessment of the relationship between export and growth even more pertinent. Thirdly, Kenya's long-term development plan for industrialization, dubbed 'Vision 2030' on the basis of which Kenya is envisaged to become an industrialized nation by 2030, is underpinned by an outward trade-oriented growth strategy. The export sector, in particular, is expected to contribute significantly to the economic transformation needed to achieve a targeted economic growth rate of 10 per cent annually. The emphasis on international trade, especially exports, as a catalyst of growth for realizing the Vision 2030 amid a declining share of Kenya's exports to the regional and world markets necessitates the analysis of the relationship between exports and growth.

In this regard, we estimate a growth model in the context of a Vector Error Correction Model (VECM) framework to establish the relative effect of exports and imports on growth. The analysis shows that, whereas there have been efforts towards diversification of exports over the years, exports mainly consist of primary agricultural goods with little value addition. Although the empirical results show that exports do not have a statistically significant impact on output growth in the short run, the analysis, using disaggregated export data, shows that agricultural and manufactured exports have a positive impact on growth. However, machinery imports still have a greater positive impact on growth relative to agricultural and manufactured exports. Imports affect output and export growth in so far as they generate productivity spillovers in the economy, which enhance export competitiveness and sustain short-run and long-run economic growth. These findings are consistent with Romer (1986, 1989) and Mazumdar (2001).

The rest of the paper is organized as follows. An overview of Kenya's trade policies and export performance is presented in Section 2. Section 3 presents a review of the literature on the relationship between exports and economic growth. A theoretical framework is presented in Section 4. Section 5 describes the empirical model and data used. The exploratory analysis and empirical results are reported in Section 6, while Section 7 provides the conclusion and policy implications.

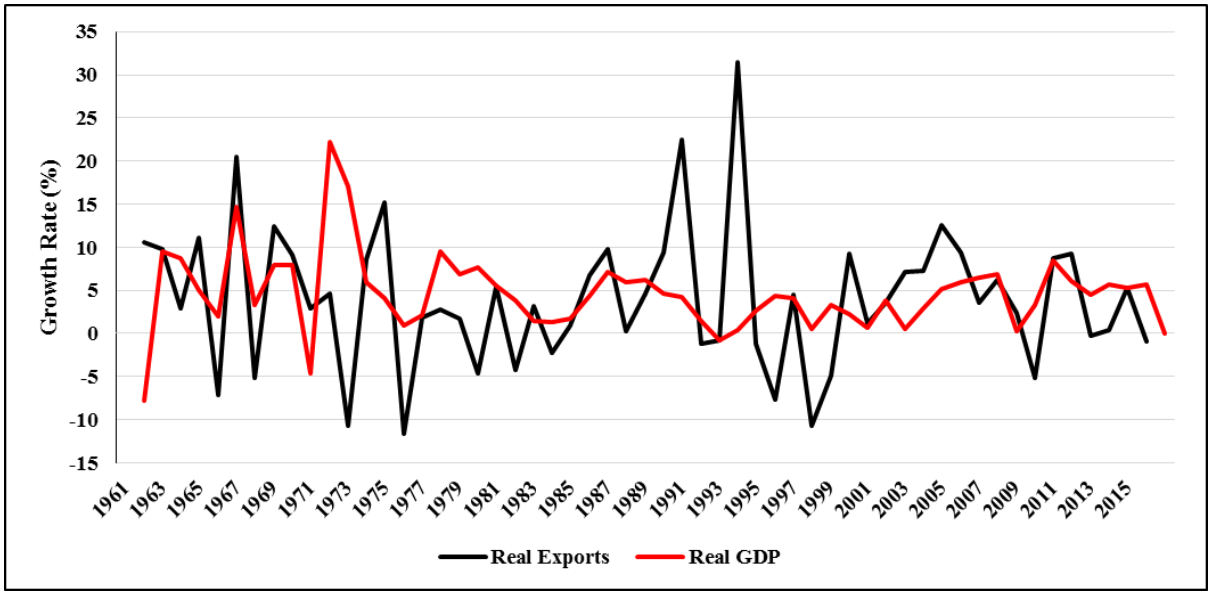
2 An overview of Kenya's trade policies and export performance

Kenya's trade policy transitioned from an IS strategy at independence to an export-promotion strategy in the 1990s. Protectionism of domestic industries and IS were first entrenched in the economy by the Foreign Investment Act of 1964. Key elements of this act were the sanctity of private property and protection from foreign competition of multinational corporations operating in Kenya. Thus, the Foreign Investment Act of 1964 anchored IS strategy as a trade policy in

Kenyan law. In addition to the Foreign Investment Act of 1964, sessional paper number 10 of 1965 on African Socialism and its Application for Planning in Kenya affirmed protection of private investment from state expropriation and protection of domestic investment from foreign competition. More importantly, the policy paper stipulated that the limited foreign reserves available were to be utilized to buy capital goods to produce hitherto imported goods and, if possible, export some of the output (Were and Makau 2006; Adam et al. 2010).

As a result of IS, manufacturing output averaged about 10 per cent between 1964 and 1970, while the Gross Domestic Product (GDP) growth rate was between 5 per cent and 8 per cent, implying that the manufacturing sector was contributing significantly to economic growth (Figure 1). This encouraged the government to increase tariff and non-tariff barriers to protect industries, coupled with investment incentives in order to enhance IS (KNBS 1971).

Figure 1: Export performance and economic growth



Source: Authors' illustration based on Kenya National Bureau of Statistics data (KNBS 2018).

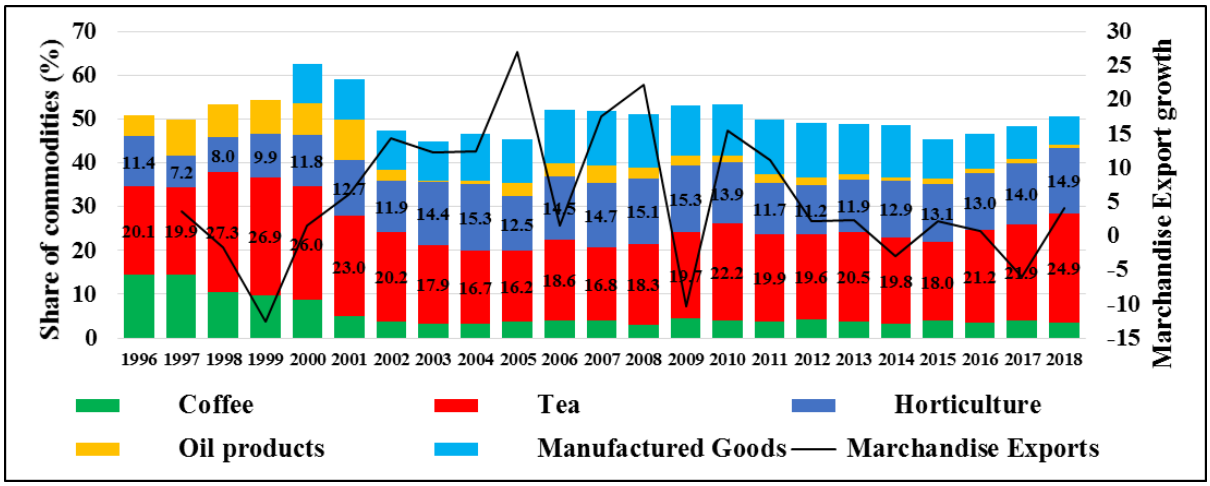
However, despite the incentives, enterprises failed to grow to realize their full potential. In fact, at some point, the IS strategy was counterproductive not only in the industrial sector but also in the agricultural sector, as inputs became expensive. This contributed to the decline in competitiveness of agricultural exports. Since, domestic firms were less exposed to foreign competition, firms neither had an incentive to innovate to produce competitively nor benefitted from foreign technological advancement. The loss of competitiveness was more pronounced in the manufacturing sector compared to the agricultural sector. The global shocks of the 1970s, including the oil crisis of 1973, exposed more weaknesses of the control regime. Manufacturing firms operated at less than 40 per cent of capacity, while the manufacturing sector's share of value-added output in GDP reduced from 10 per cent to 8 per cent between 1970 and 1992 (Reinikka 1996). The dismal performance of the manufacturing and agricultural sectors partly contributed to a slower GDP growth rate of 0.4 per cent in 1992 given their significant contribution to overall output (KNBS 1993).

In response to receding growth, there was an urgent need for policy reforms to resuscitate the economy. In addition, the pressure to liberalize the economy in line with structural adjustment programmes propagated by the Bretton Woods multilateral institutions—the IMF and World Bank—was mounting. The main economic reforms towards trade liberalization included price decontrols, removal of tariff and non-tariff barriers to trade, and adoption of export promotion

initiatives (Were and Makau 2006; Adam et al. 2010). In order to promote exports, incentives such as manufacturing under bond and export processing zones, investment incentives, and widening of the exports markets through regional integration and bilateral trade agreements were undertaken (Adam et al. 2010). Although the manufacturing sector's output growth rate increased from 1.2 per cent in 1992 to over 3.9 per cent in 1996 as the overall GDP growth rate increased to 4.6 per cent, the export supply response remained unsatisfactory (KNBS 1996).

Over the period from 1993 to 2000, the export sector performed poorly even with respect to commodity exports such as tea, coffee, and horticulture (Figure 2), in which Kenya had a comparative advantage. This may have been partly due to structural bottlenecks and non-tariff barriers that still constrained international trade despite extensive liberalization in the economy. Moreover, inconsistent implementation of trade policy over this period increased the risk profile of the economy, discouraging domestic and foreign direct investment (Reinikka 1996; Adam et al. 2010). The poor performance of the export sector also slowed down overall economic growth.

Figure 2: Total exports and major export commodities growth rate



Source: Authors' illustration based on Kenya National Bureau of Statistics data (KNBS 2018).

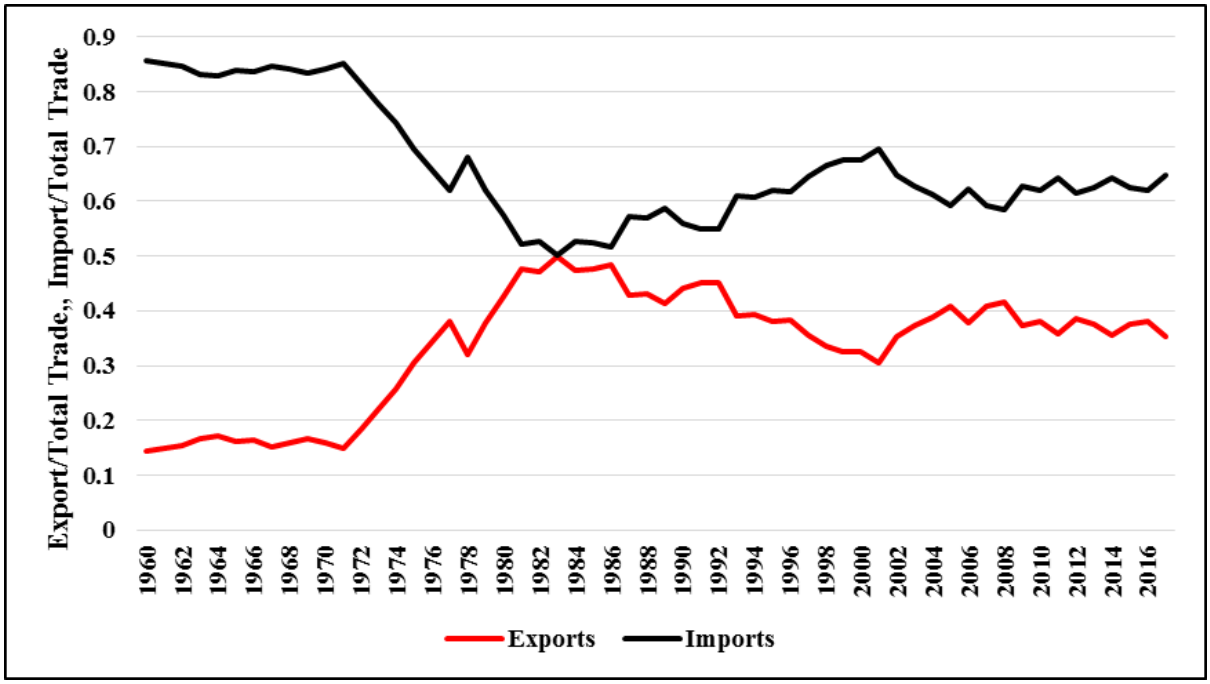
Following the economic downturn of the late 1990s and early 2000s, the Economic Recovery Strategy Paper on Wealth and Employment Creation for 2002–2007 was launched as a medium-term plan to restructure and revamp the economy. A major aspect of this strategy paper was the acknowledgement of the role of industry and trade in transforming the economy. Trade and industry, especially small and medium-sized enterprises and the export sector, were to be resuscitated. As a result, the nominal exports growth rate increased from an average of 4.1 per cent between 1990 and 1999 to 11 per cent between 2000 and 2009.

Despite export promotion strategies, such as the promotion of agricultural horticulture exports and manufactured exports under the African Growth Opportunity Act (AGOA),[2] and trade liberalization reforms, the overall performance of Kenya's exports has been dismal. Nonetheless, Kenya's garment manufacturing sector, in particular, has benefitted significantly from duty-free access to the US market under AGOA. In general, whereas the value of the export growth rate averaged 11 per cent, the quantity of exports grew by 1.6 per cent between 2000 and 2010. However, the value of imports increased at an average rate of 8.8 per cent, corresponding to a quantity growth rate of 2.8 per cent over the same period. The poor performance of export growth

[2] Launched in 2000, AGOA provides special market access to sub-Saharan African beneficiary countries for the export of a number of products to the USA.

vis-a-vis import growth widened the trade gap to an average growth rate of 8.3 per cent for the 2000–10 period, and that gap is still wide (Figure 3)

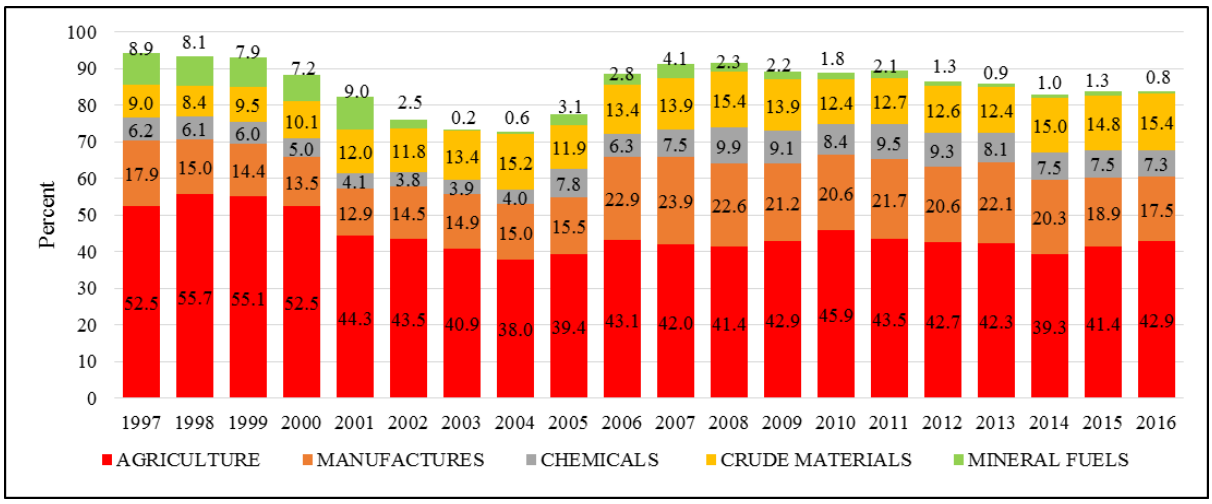
Figure 3: Trade gap



Source: Authors' illustration based on World Bank data (World Bank 2018).

Although there have been efforts to promote the diversification of exports, such as horticulture, there has been little export diversification of manufactured goods. The contribution of the agriculture sector to overall export merchandise has dominated Kenya's merchandise exports (Figure 4). The share of manufactured exports is relatively lower and has not changed significantly over time. For instance, in 2016, the share of manufactured exports was 17.5 per cent compared to 42.9 per cent for agriculture exports. Agricultural exports are comprised of tea, coffee, and animal products, which have low price and income elasticity. As a result, they yield relatively lower foreign exchange income and their contribution to productivity growth in the economy is minimal.

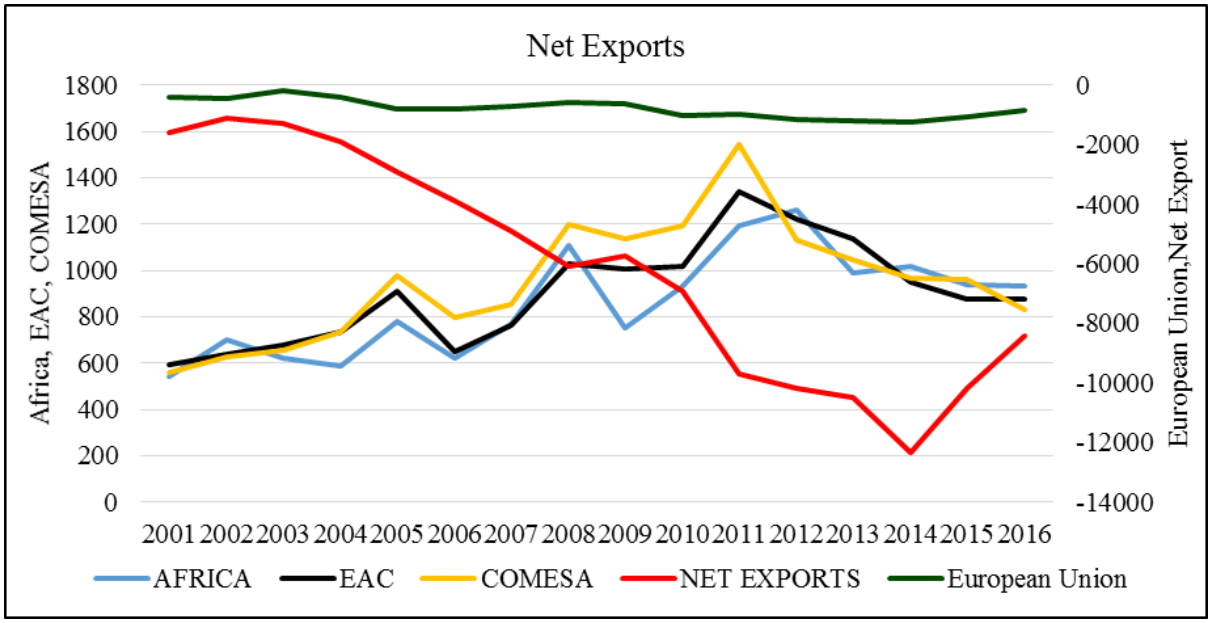
Figure 4: Composition of exports



Source: Authors' illustration based on Kenya National Bureau of Statistics data (KNBS 2018).

Net merchandise exports from Kenya to Africa, COMESA, and the EAC have declined since 2011, while net exports to the European Union have remained more or less stable, with a slight decline since 2001 (Figure 5). Kenya seems to be losing its share of the African market. This implies that Kenyan exports are becoming less competitive in the region, particularly in relation to cheaper imports from China and given the fact that most of the countries in these trade groupings produce and export similar commodities (Krugman 1980, 1995).[3] Furthermore, the loss of competitiveness is not only confined to the African continent but is also the case with respect to exports to rest of the world.

Figure 5: Export competitiveness, exports, and GDP growth

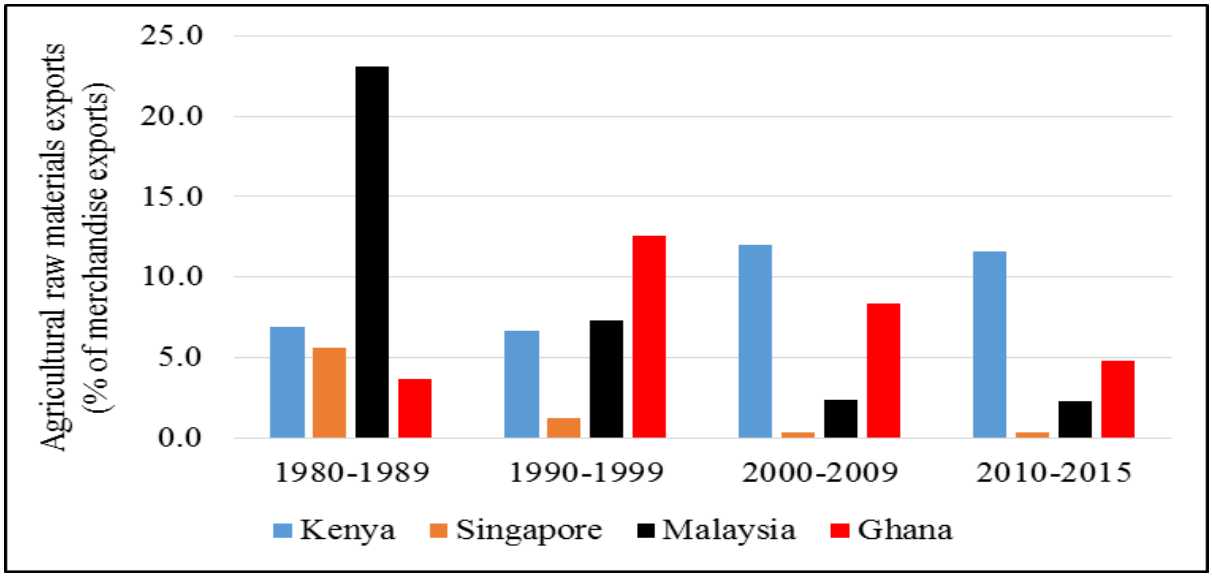


Source: Authors' illustration based on Kenya National Bureau of Statistics data (KNBS 2018).

Primary commodity exports account for about 75 per cent of Kenya's total exports compared to other countries that adopted ELG, such as Singapore where they account for less than 10 per cent of total exports (UNCTAD, 2017). For Singapore, agricultural raw exports as a proportion of total merchandise exports is significantly lower, almost negligible in comparison to Kenya's (Figure 6). Similarly, Malaysia, which adopted outward-oriented policies at the same time as Kenya and also benchmarked its export promotion strategies to Kenya's, has a lower proportion of raw agricultural exports in relation to total commodity exports. Ghana, a developing African country like Kenya, has been relatively less dependent on primary commodity exports than Kenya since around 2000. While Kenya is still dependent on commodity exports, some of the commodities are inefficiently produced due to lack of investment and innovation (Kinuthia 2016). Consequently, they induce negative production externalities in the economy which constrain growth. This partly explains the differences in the growth outcomes between Kenya and countries such as Singapore and Malaysia.

[3] If countries produce import-competing goods, a decline in net exports implies that the competitiveness of domestically produced goods is declining both in the domestic and foreign markets as intra-industry trade intensifies.

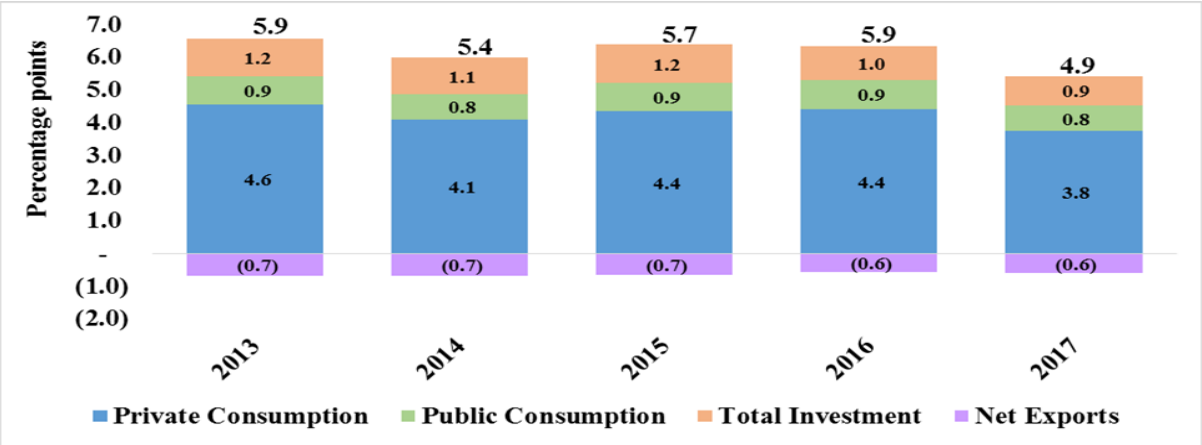
Figure 6: Dependency on agricultural raw materials



Source: Authors' illustration based on World Bank data (World Bank 2018).

Notwithstanding the sluggish performance of exports relative to imports, the current long-term development strategy, which envisages Kenya to be an industrialized economy by 2030, is underpinned by outward-oriented policies. The export sector is expected to contribute significantly to economic transformation to achieve a targeted annual income growth rate of 10 per cent. Although the country's development blueprint, Vision 2030, has been implemented since 2008, output growth averaged 4.9 per cent between 2008 and 2016, while export growth is still weak at an average of 4.8 per cent. Thus, the export sector has not grown substantially enough to contribute significantly to economic growth as envisaged, despite incentives to produce for export and export promotion efforts. In fact, given the trade gap, net exports drag economic growth by contributing -0.6 per cent to real GDP growth (Figure 7). As a result of export underperformance, economic growth has largely been supported by domestic consumption.

Figure 7: Contribution to real GDP growth, by component



Source: Authors' illustration based on Kenya National Bureau of Statistics data (KNBS 2018).

3 Literature on exports and economic growth

The relationship between economic growth and exports can be abstracted from a neoclassical aggregate production function in which technology, capital, and labour are inputs. Exports influence output in so far as they increase the level of technical progress and the quantity of capital. Increasing the level of exports, in particular, increases foreign exchange earnings that are used to import capital goods with advanced technology (Grossman and Helpman 1990; Mazumdar 2001). In this regard, exports augment the level of capital stock and accelerate the rate of technical progress, which influences long-run economic growth. Competition in the export market compels exporting firms to be innovative so that their products can be competitive. Innovation among exporting firms can be adopted by non-exporting firms and firms in the non-tradable sector. The technological spillovers augment total factor productivity in the aggregate production function (Grossman and Helpman 1990, 1991; Hausmann et al. 2007). Indeed, total factor productivity in the endogenous growth model enables an economy to produce under increasing returns to scale and realize comparative advantage beyond natural resource endowment. In this regard, exports facilitate technology transfer to firms in the non-export sector and the rest of the economy with less technological endowment

In addition to technical progress, a vibrant export sector can also transform the structure of the economy from producing primary products to high-value sophisticated products. This is because a strong export sector establishes and consolidates an economy's comparative advantage and rewards innovation in the form of profit, which encourages entrepreneurship. The prospect of profits coupled with entrepreneurship, as well as technology transfer and subsequent spillovers, motivates the establishment of industries that add value to primary products (Melitz 2003; Hausmann et al. 2007). The development of value-addition industries attracts supporting industries that provide essential goods and services. Lardy (1995) established that foreign trade hastened the rate of economic transformation for China through foreign direct investment and technological progress.

In the context of developing countries, a strong exporting sector facilitates the transition of the economy from being low skilled and low productivity to high skilled, high productivity sectors of industry and services. In this regard, an increase in exports leads to improvement in the quality of factors of production, given that the change in economic structure improves total factor productivity. A combination of high factor productivity and innovation increases the competitiveness of the products and improves their value and sophistication (Grossman and Helpman 1990, 1991; Hausmann et al. 2007). Hence, the relationship between exports and growth can be depicted by a neoclassical endogenous growth model in which total factor productivity is triggered by technological transfer through exports (Romer 1989; Grossman and Helpman 1990).

Although technical progress induced by outward-oriented trade policy can sustain long-run growth, it is the comparative advantage based on natural resource endowment that influences export propensity. Hence, it is the quantity of capital, labour, and natural resources in the production function that influence the competitiveness of goods produced, and therefore the volume of exports (Samuelson 1948; Helpman 1998). This implies that factor abundance determines the volume and type of exports as well as economic growth (Helpman and Krugman 1985; Krugman 1995). However, export and economic growth performance in some resource-abundant economies has been wanting, which has brought into focus the debate about the contribution of natural resources to exports and growth.

The existence of natural resources either provides a head start in terms of comparative advantage or a potential comparative advantage to be harnessed to realize export and economic growth.

Indeed, economic transformation associated with economic growth enhances effective utilization of economic resources and hastens the rate of technical progress. Rapid economic growth, in particular, increases resource utilization and enables investment in research and development, which yields new discoveries and technologies. However, economic growth hastens the rate of diffusion of the new technology. Consequently, the economy can effectively utilize its resources to produce goods and services competitively for the domestic and export markets (Bhagwati 1989; Hausmann et al. 2007). Therefore, growth leads to an increase in the volume of exports.

However, it is conceivable that exports grow in tandem with economic growth. Productivity gains in the economy can be realized as a result of a simultaneous increase in exports and economic growth. Technology gaps as well as capital goods that become obsolete due to economic growth can be filled by technological transfer and acquisition of advanced capital goods through trade. New capital goods with advanced technology can be purchased using foreign exchange earnings from exports (Awokuse 2007). In this case, the relationship between exports and economic growth depends on the economic framework.

Empirical studies, like theoretical models that attempt to explain the relationship between exports and economic growth, are incoherent. For instance, based on surveys of empirical evidence on the effect of export on economic growth by Giles and Williams (2000) and Awokuse (2007), studies either establish a positive, no effect, or negative correlation between exports and output growth. In the context of developed countries, Ramos (2001) employed a cointegration technique on Portuguese data from 1865 to 1998 to test for the long-run relationship between exports, imports, and output growth. The results indicated that output growth leads to growth in exports and imports, but there was no evidence for exports influencing growth in imports. In a related study, Pistoresi and Rinaldi (2012) examined the trade and economic growth nexus in Italy from 1863 to 2004 by estimating an autoregressive distributed lag model. The study established that an increase in intra-industry trade creates bi-directional causality between exports and imports. There was also evidence that imports provide an avenue through which technology is transfused in the economy, while intra-industry trade facilitates technology spillovers. This improves productivity in the export sector as well as the overall economy, which leads to long-run output growth. Hence, there is evidence for import-led growth (ILG).

Recent studies with regard to developing and emerging economies are also inconclusive. For instance, Pacheco-López's (2005) analysis of the effect of trade liberalization on economic growth found that trade liberalization increases imports faster than exports. As a result, an increase in the productive capacity of the economy is stifled due to an increase in consumer imports, and the resultant trade gap constrains economic growth. In addition, Pacheco-López (2005) showed that during an IS regime, the Mexican economy experienced stronger output growth than during trade liberalization. Contrary to Pacheco-López (2005), Siliverstovs and Herzer (2006) found that manufacturing exports affect output growth, which in turn causes growth in primary exports in Chile. Therefore, whereas there is evidence for ELG with respect to manufactured exports, output growth increases primary exports.

Empirical studies on Africa and Kenya have focused on either the effect of trade openness on growth or the effect of exports on growth. For example, Were (2015) and Musila and Yiheyis (2015) investigated the effect of trade openness on growth in developed, developing, and less-developed countries and in Kenya, respectively. Were (2015) established that trade has a positive effect on growth in developed and developing countries, but not in least-developed countries, while Musila and Yiheyis (2015) found that trade is negatively related to growth. On the effect of exports on growth, Fosu (1990) found that export growth affects economic growth positively, based on a sample of 28 less-developed countries in Africa. Onafowora and Owoye's (1998) analysis of the effect of exports on growth in 12 sub-Saharan African countries found evidence in

support of ELG. In Kenya, Kinuthia (2016), using firm-level data, found that exporting firms generate technological spillovers through a demonstration effect and competition, which affects long-run growth within and between industries.

In summary, the controversy about the role of exports in growth transcends empirical evidence. For example, Siliverstovs and Herzer (2006) and Yang (2008) established that exports influence growth, while (Tang 2006) showed that growth leads to export expansion. The impact of growth on export expansion emanates from the structural changes that growth induces in the economy, which stimulates productivity gains that improve competitiveness of exports in the international markets (Helpman and Krugman 1985; Giles and Williams 2000; Mazumdar 2001; Awokuse 2007). In addition to growth impacting exports, imports can also influence export growth, which in turn hastens the rate of growth. Mazumdar (2001) and Hausmann et al. (2007) showed that imported capital goods and foreign technology increase competitiveness of exports and, hence, the volume of exports. Therefore, there is arguably a nexus between exports, imports, and economic growth.

This paper enriches the literature on exports and growth by providing new empirical country evidence, taking into account the endogeneity between exports, imports, and output growth as well as productivity externality generated as a result of international trade and output growth.

4 Theoretical framework

Aggregate output Y consists of domestic production for non-export N and production for export X, produced using capital K, labour L, and imported intermediate inputs M. Hence aggregate production $Y = Af(K, L, M)$, where A is technology. The non-export sector utilizes capital K_N, labour L_N, and imported intermediate goods M_N. In addition, the exporting sector augments productivity in the non-export sector through technological spillovers, which are proportional to the volume of exports. Hence domestic production and export production functions can be specified as $N = \varphi X[H(K_N, L_N, M_N)]$ and $X = G(M_X, K_X, L_X)$ respectively.[4] In this specification, exports enter the aggregate production function directly through technological progress and indirectly by easing the foreign exchange constraint that allows acquisition of intermediate imports (Mazumdar 2001). Whereas the externality effect of exports may equalize productivity across the export and non-exporting sectors, export promotion strategies may create productivity differentials. In addition, exporting sectors are more innovative due to exposure to competition and risks in the export market. As a result, productivity differences may exist between the export and non-exporting sectors, which influences output growth. Let H_{KN}, H_{LN}, G_{KX}, and G_{LX} be the marginal productivity of capital and labour in the non-export and export sectors respectively, then the differential productivity can be denoted as:

$$\frac{\mathrm{H_K}}{\mathrm{G_K}} = \frac{\mathrm{H_L}}{\mathrm{G_L}} = 1 + \delta$$

where δ is a measure of differences in productivity between the exporting and non-exporting sectors.

[4] Then, the aggregate production function can be specified as: $Y = A(X)f(K, L, M)$

Differentiating the production function with respect to time yields (small letters represent growth rates):

$$n = H_{K_N} k_n + H_{L_N} l_n + H_{M_N} m_n + \varphi x \tag{1}$$

$$x = G_X k_x + G_{Lx} l_x + G_{M_N} m_n \tag{2}$$

From equations 1 and 2, changes in the export growth rate can be accounted for by taking changes in the growth rate of factor inputs in the export production function.

$$x = (1-\delta)\left[f_K(k-k_n) + f_L(l-l_n) + f_M(m-m_n)\right] \tag{3}$$

$$f_K k_n + f_L l_n + f_M m_n = -\frac{x}{(1-\delta)} + f_K k + f_L l + f_M m \tag{4}$$

When resources are fully employed $f_K k_n + f_L l_n + f_M m_n = H_{K_N} k_n + H_{L_N} l_n + H_{M_N} m_n$. Substituting $f_K k_n + f_L l_n + f_M m_n$ in equation 1 and using equation 4 non-export growth equation 5 is obtained.

$$n = -\frac{x}{(1-\delta)} + f_K k + f_L l + f_M m + \varphi x \tag{5}$$

where f_K, f_L and f_M denote productivities of capital, labour, and intermediate imported goods respectively. Equations 3 and 5 indicate that changes in the export and non-export growth rates can be explained by changes in the productivity of the export sector and factor inputs employed in the respective sectors.

Then, aggregating export and non-export growth to account for output growth yields

$$y + n = -x(1-\delta) + f_K k + f_L l + f_M m + \varphi x \tag{6}$$

Finally, collecting like terms and taking the growth rate of capital k over time to be investment I, the output growth equation below is obtained.

$$y + n = \left[\delta(1-\delta) + \varphi\right]x + f_K I + f_L l + f_M m \tag{7}$$

From equation 7, output growth is accounted for by productivity differences in the export sector and externality spillovers from the export sector to the rest of the economy. Growth in imported intermediate goods and labour, as well as an increase in investment, also influence the output growth rate. With respect to investment, while trade allows a flow of foreign capital into the economy, it reduces the risk of expropriation of private investment. This increases investment in the economy, which in the context of endogenous growth, together with technology, sustains long-run output growth (Rebelo 1991; Romer 1986).

5 Empirical model and data

From the output growth equation 7, a reduced form production function can generally be specified as follows:

$$y = f(\delta, \varphi, x, I, l, m,) \quad (8)$$

Equation 8 is not easily estimable, since it contains indicators of competitiveness, (productivity differentials δ across sectors and export productivity externalities φ) which are difficult to measure. However, changes in competitiveness as a result of productivity gains from export externalities can be measured by employing a proxy for productivity. Another modification to equation 8 is inclusion of life expectancy at birth to control for human capital development Φ. Therefore, the resultant empirical model can be specified as follows in terms of observable and estimable variables:

$$y = \alpha + \beta_1 productivity_t + \beta_2 x_t + \beta_3 I_t + \beta_4 l_t + \beta_5 m_t + \beta_6 \Phi_t + \varepsilon_t \quad (9)$$

This empirical model specified by equation 9, besides being consistent with Grossman's (1991) and Yang's (2008) analyses of output growth, is a standard specification in the growth and trade literature. Output in the growth model is measured by the GDP growth rate. The gross fixed capital formation represents physical capital accumulation in the economy, while labour force growth is the growth in the population between ages 15 and 65. Exports are included to test for the ELG hypothesis. An increase in exports has the dual effect of generating income, which provides purchasing power for domestic goods, and productivity improvement (Grossman 1991). Developing economies import capital goods and technology to increase capacity and efficiency to produce goods for domestic consumption and for export. Thus, imports are included to test the import-led hypothesis (Yang 2008).

However, relative changes in factor productivity underpin either ELG or growth-led exports. Improvement in productivity through learning-by-doing and acquisition of imported capital goods increases output without necessarily increasing the quantity of inputs. Hence, we include neutral technological progress to capture the productivity gains from growth and international trade (Grossman 1991; Lucas 1988). Total factor productivity is obtained by undertaking a Hicks decomposition of the constant returns to scale production function. Yang (2008) argued that improvement in productivity in the tradable sector leads to appreciation of the real exchange rate due to an increase in exports. According to Helpman and Krugman (1985), De Gregorio et al. (1994), and Yang (2008), productivity gains in the tradable sector, firstly, improve competitiveness of exports in the world market, thereby increasing foreign exchange inflow. Secondly, productivity improvement in the tradable sector either reduces or slows down domestic inflation relative to foreign inflation. As a result, the real exchange rate appreciates. Imports induce real exchange rate depreciation, initially through nominal exchange rate depreciation and the increase in prices of imports for final and intermediate use. Imported capital goods increase productivity of the non-tradable sector, which increases returns to factor payments engaged in the sector. This augments the propensity to spend on consumer imports, which leads to a nominal depreciation (Lucas 1988; Grossman and Helpman 1991). As a result, real depreciation due to nominal depreciation and an increase in domestic price relative to foreign price reflect an increase in demand for imports as well as an increase in productivity of the non-tradable sector due to utilization of imported inputs. Therefore, whereas the real exchange rate can be used as a proxy for productivity, the sign of its coefficient can distinguish productivity gains from either exports or imports (Harberger 1998;

Yang 2008).[5] Hence, we use the real exchange rate to check for robustness of productivity gains as a result of exports.

For robustness and a much richer analysis to gauge sectoral dynamics, equation 9 is also estimated at the sectoral level, that is agriculture, manufacturing, and services sectors, to establish the impact of the sector's exports on the sector's output. Analysing the effect of exports on sectoral output is motivated by the fact that, firstly, different sectors have different propensities to produce for export and for domestic consumption. Secondly, exports may have differential effects on the sectors, which can be easily masked by aggregation. Therefore, output is disaggregated into agricultural, industry, and services.

Data for exports, imports, output, labour force, and capital formation covering the period 1960 to 2016 were obtained from the World Development Indicators (World Bank 2018), while total factor productivity was obtained from the World Productivity database (UNIDO 2007).[6] Commodity exports and imports were obtained from the United Nations Comtrade database (UN COMTRADE 2018). The advantage of these databases is that they are harmonized and the series is amenable to long-run analysis.

5.1 Methodology

Estimating equation 9 poses two challenges. Firstly, most macro-economic variables tend to be time dependent, a phenomenon that can lead to spurious regression. Secondly, explanatory variables are potentially endogenous. Even though using the ratio of exports on the left-hand side purges the endogenous effect, as in equation 9, the contemporaneous correlation between the right-hand variables and the error term still exists. An increase in exports, in particular, may improve relative total factor productivity in the tradable and non-tradable sectors of the economy (De Gregorio et al. 1994). This leads to an increase in output, which accelerates the rate of economic growth. Conversely, a high growth rate is associated with high productivity in the tradable and non-tradable sectors as well as an increase in the demand for consumer and capital goods. Hence a high growth rate is correlated with a high volume of exports and imports (Yang 2008). Therefore, estimating such a model by ordinary least squares yields inefficient and inconsistent parameter estimates, which compromises the validity of the estimates and the hypothesis testing procedure.

The basic method of assessing the endogeneity status of a variable is the Granger causality test (Granger 2001). Granger causality is an F-test in which the dependent variable is regressed on the other variable plus the lag of the dependent variable. The more recent powerful test for causality is the Granger causality/Block exogeneity Wald test (Enders 2008). The test, by evaluating whether lags of one variable Granger causes other variables becomes essential in specifying the Vector Auto-Regression (VAR) model and Vector Error Correction Model (VECM). The null hypothesis for this test is that all the lags of one variable can be excluded for the equation. Thus, rejecting the null for the equation suggests that the variable is endogenous.

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[5] Productivity improvement in the non-tradable sector increases demand for domestically produced goods as well as imports. The increase in demand for imports leads to a real exchange rate depreciation. Productivity improvement in the tradable sector increases exports. Consequently, the real exchange rate appreciates due to an increase in foreign exchange earnings.

[6] The data on productivity were obtained from World Productivity databases and were based on Hicks neutral production technology. Missing data points for Total Factor Productivity were updated using Hicks production function

In as much as the VAR model yields impulse response and variance decomposition functions, which indicate relative effects of the variables on other variables, they do not show the existence of a long-run relationship and the adjustment of the short-run to long equilibrium. Hence the empirical estimations are conducted using VECM, which gives parameters and error correction terms that suggest how equilibrium between output and exports is related in the short run and in the long run. VECM can be represented as follows:

$$\Delta z_t = \sum_{i=1}^{p-1} \Gamma_i \Delta z_{t-i} + \prod z_{t-1} + \varepsilon_t$$

where Γ_i and $\prod$ are coefficient matrices and ε_t is a vector of Gaussian error terms. The number of independent columns determine the number of cointegrating vectors, which is the rank of $\prod$ matrix. If rank $(\prod) = r$, where r is the number of cointegrating vectors and the number of endogenous variables in the model is n, then $0 < r < n$. A cointegration test determines the rank r using a trace test and maximum Eigen value test. These two tests may show different cointegrating vectors. However, the maximum Eigen value test is more powerful than the trace test since it provides more definite results as cross terms are incorporated into the test. Hence, the number of cointegrating vectors suggested by the maximum Eigen prevails over the trace test (Johansen 1991; Enders 2008). p is the lag length. The optimal lag length is determined by the information criteria. However, different information criteria can indicate a conflicting number of lags (Lütkepohl 2005, 2011). In this case, the normality of residuals from the estimated model can be used to determine the optimal lag length as well as the normality test on the residual from the VECM model estimated (Lütkepohl 2011).

6 Empirical results

6.1 Granger causality test

The results of the Granger causality test for the variables are presented in Table A1 in the Appendix. Each pairwise correlation is estimated with three lags. The causality test indicates that exports influence output, while output does not influence exports. There is also a unidirectional effect from exports to productivity. Even though imports affect output, they have no effect on productivity. In as much as causality is implied, the relationship is not controlled for other explanatory variables, which is a key limitation of the Granger causality test. Hence, the need for a VECM to show the long-run and short-run relationship between output and exports.

6.2 Cointegration test and VECM estimates

Johansen's cointegration test indicates three cointegrating relationships in the aggregate equation (Appendix Table A2). Therefore, there is a long-run relationship between the variables in the output equation, but there are no a priori criteria to identify the three cointegrating relationships. However, plausible long-run equilibrium exists between output, exports, and imports. While a surplus in domestic production is sold as exports, output and exports are used to finance imports. However, capital imports augment the capacity of the economy to produce goods and services for the domestic and foreign markets. Hence, a long-run relationship exists between output, imports, and exports for sustainable growth. Parameter estimates for the three cointegrating relationships from the VECM model are presented in Table 1.

Table 1: Estimates from VECM

Long run	Output	Exports	Imports
Output(-1)	1	-	-
Exports(-1)	-	1	-
Imports(-1)	-	-	1
Productivity(-1)	5.956***	8.458***	6.772***
	(0.761)	(1.184)	(0.939)
GFCF(-1)	0.634***	1.138***	0.879***
	(0.126)	(0.196)	(0.156)
HCF(-1)	3.784***	-2.539***	2.009***
	(1.018)	(1.585)	(1.257)
C	5.078	22.921	7.297
Short-run adjustment coefficients			
	Output	Exports	Imports
ΔOutput	-0.532**	-0.047	0.577*
	(0.235)	(0.125)	(0.304)
ΔExports	0.032	-0.053	-0.074
	(0.268)	(0.142)	(0.346)
ΔImports	0.477*	0.375**	-0.809**
	(0.312)	(0.165)	(0.403)
ΔProductivity	-0.003	0.021	0.019
	(0.098)	(0.052)	(0.127)
ΔGFCF	0.586*	0.521**	-0.896*
	(0.367)	(0.194)	(0.473)
ΔHCF	0.007*	-0.006***	0.004
	(0.003)	(0.002)	(0.004)
Exogenous variable			
Labour	0.828	0.217	0.605
	(0.610)	(0.694)	(0.809)
C	-7.847	-2.194	-2.232
	(3.834)	(4.350)	(4.955)

Note: Output is real GDP, productivity is total factor productivity, GFCF is gross fixed capital formation, HCF life expectancy at birth is the proxy for human capital, and labour is the population between ages 15 and 65. The variables are logs. Δ denotes the variable is differenced. *10% ** 5% *** 1% denote levels of statistical significance.

Source: Authors' empirical analysis based on World Bank (2018) and UN COMTRADE (2018) data.

The results in Table 1 show parameter estimates for the long-run relationship in the upper panel, while the lower panel presents adjustment coefficients. The cointegrating results indicate that long-run equilibrium exists between output, exports, imports, productivity, and physical and human capital formation. The parameter estimates for the output equation show that there is a positive long-run relationship between output, fixed capital and human capital formation, and total factor

productivity, while the long-run relationship between export productivity and capital is positive. However, human capital formation is negatively correlated with exports. The negative impact of human capital formation on exports can be attributed to inadequate investment to augment the quality of labour to contribute effectively to improving the competitiveness of exports. However, total factor productivity augments physical capital formation in enhancing an increase in output and export.

The adjustment coefficient in the output equation indicates that 53.2 per cent of the deviations of output from the long-run equilibrium are restored or corrected in the same period. Imports correct 47.7 per cent of the deviations in output from the long-run equilibrium, while exports have no statistically significant impact on correcting disequilibrium in output. The positive adjustment coefficient for imports implies that if imports are higher relative to output in the previous period, output would have to rise in the current period to correct the disequilibrium error of the previous period. This is important for convergence to hold (Enders 2008). GFCF adjusts 58.6 per cent of short-term disequilibrium in output towards long-run equilibrium in the same period. Human capital formation has a very small effect on the output adjustment towards the long-run equilibrium. The impact of total factor productivity and labour on output adjustment in the short run is statistically insignificant. Therefore, changes in imports and physical capital formation account for most of the fluctuations in the output growth rate in the short run. These results are consistent with the prediction of the endogenous growth models of Romer (1989) and Grossman and Helpman (1990), in which capital formation and technical progress triggered by trade sustain long-run growth.

With respect to adjustment coefficients in the exports equation, imports and fixed capital formation correct about 37.5 and 52.1 per cent of export deviations from long-run equilibrium in one year, respectively, while productivity corrects only 2.1 per cent of the disequilibrium in exports. However, the latter is not statistically significant. The effect of fixed capital formation on exports is greater than that of imports as well as human capital formation. A possible channel through which imports influence exports is through imported intermediate and final goods that have embedded advanced technologies which augment competitiveness of exports and efficiency of the sector. Furthermore, physical capital accumulation also promotes export growth as it complements the productive capacity of human capital. However, labour has an insignificant effect on exports. This is consistent with the view that commodity exports in Kenya, as in many developing countries, consist of mainly agricultural products. Production of agricultural goods in developing economies is intensive in unskilled labour and is not competitive on the world market.

The imports equation has comparatively higher speeds of adjustment with respect to correction of disequilibrium resulting from imports, output, and capital formation in the previous period than adjustment coefficient in the exports equation. The adjustment coefficients show that changes in output corrects 57.7 per cent of the disequilibrium in imports, while imports and fixed capital formation correct 80.9 per cent and 89.6 per cent of the deviation in imports, respectively. This implies that fluctuations in fixed capital formation induce even larger fluctuations in imports. The over-shooting effect of output in the imports equation is not surprising given the relatively high import elasticity with respect to output. Higher output growth increases income and, hence, affordability and the propensity to import for consumption and utilization of intermediate or advanced imported goods, respectively. The insignificant effect of exports on imports implies that export earnings are insufficient to finance imports.

In general, the results show that changes in output have a stronger effect in stimulating an increase in imports and vice versa, relative to exports. Furthermore, short-run deviations in imports from the long-run equilibrium positively and significantly influence export growth. A possible channel through which imports influence exports and expansion of output is the importation of capital

and intermediate goods that are necessary for value addition and the production of goods and services. Kenya, like other developing economies, is heavily dependent on imported intermediate and capital goods. Demand for consumer and capital imports also increases as a result of higher national income. This leads to higher growth in imports relative to exports. The imports of final goods and services, intermediate goods, and advanced capital goods diffuse new technologies in the economy. This increases efficiency in production, which increases output as well as the competitiveness of goods and services. Thus, there is evidence for ILG.

However, the adjustment coefficient for exports in both the output and imports equations is statistically insignificant. Furthermore, exports have no influence on imports. These results are consistent with Kenya and other developing economies in which imports are substantially financed by foreign borrowing, aid or grants rather than exports (Esfahani 1991). In general, the results imply that imports have a greater impact and, hence, are a greater driver of output and export growth than exports. However, the question is whether such growth is transformative and desirable for job creation given that imports are a form of leakage with stronger linkages out of the domestic economy.

As a robustness check, we estimate the empirical model (equation 9) using real exchange rate instead of total factor productivity obtained from Hicks decomposition of the production function. The VECM estimates are presented in Table A3 in the Appendix. The long-run coefficients are quantitatively close to those in Table 1. The adjustment coefficients in the output equation indicate that output corrects 1.4 per cent of the deviations of output from the long-run equilibrium in the same period. Imports correct 2.9 per cent of the deviations in output from the long-run equilibrium, but exports have no influence on correcting disequilibrium in output. Unlike total factor productivity, the real exchange rate adjusts 50 per cent of short-term disequilibrium in output towards long-run equilibrium in the same period. Human capital formation has a small effect on the output adjustment towards the long-run equilibrium. Therefore, besides imports, productivity changes account for most of the fluctuations in the output growth rate in the short run (Romer 1989). These results are consistent with findings obtained with total factor productivity in Table 1 and the prediction of the endogenous growth models of Romer (1989) and Grossman and Helpman (1990), in which capital formation (both human and physical) and technical progress triggered by trade sustain long-run growth.

6.3 Exports and sectoral output growth

Table 2 presents VECM estimates with aggregate exports and sectoral output instead of aggregate output. The use of sectoral output allows the analysis of the effect of exports on different sectors, because exports may have differential effects that are likely to be concealed by changes in aggregate exports and aggregate output. In addition, the effect of exports on a sector can vary according to the volume of exports from the sector.

The results for the sectoral output for agriculture, manufacturing, and services sectors are presented in Columns A, B, and C in Table 2. There are two cointegrating vectors in agriculture and services, while in manufacturing output there are three cointegrating vectors. Column A of Table 2 shows the long-run relationship and short-run dynamics in the agricultural sector. The results show that there is a long-run relationship between agricultural output, imports, and fixed capital. The adjustment coefficient in the agricultural output cointegrating equation indicates that imports and total factor productivity growth have a statistically significant contribution to correcting the deviation of agricultural output from long-run equilibrium. Changes in human and fixed capital investment as well as exports have no statistically significant effect on disequilibrium in agricultural output. Disequilibrium in exports is corrected by changes in relative competitiveness as a result of productivity growth and human capital formation.

The implication of these results is that long-run changes in agricultural output emanate from imports and productivity growth. This is consistent with the finding that imports increase the productivity of the agricultural sector, while high labour intensity constrains growth of the agricultural sector's output in developing economies (Santos-Paulino and Thirlwall 2004). Furthermore, the productivity externality gains in the agricultural sector as a result of an increase in exports do not exist, even though agricultural output comprises a significant proportion of GDP and exports, especially for Kenya. This result also gives credence to the slow economic structural transformation and growth in economies that predominantly export primary commodities (UNCTAD 2017).

The short-run dynamics of the exports cointegrating equation indicate that agricultural output, total factor productivity, and human capital formation influence exports. Most of the exports are mainly agricultural commodities and hence the link between agricultural output and exports. However, productivity gains in the agricultural sector dissipate in the long run due to lack of investment in human capital relevant in the agricultural sector. This is consistent with intensive utilization of unskilled labour in agricultural production in developing economies (Admassie 2002).

Table 2: Sectoral output and export

	A		B		C	
	Agr	Exports	Manufacturing	Exports	Service	Exports
	1	2	4	5	6	7
Agr	-	-				
Exports	-	-				
	-					
Imports	-0.744***	-1.422***	-0.807***	-1.649***	-0.716***	-1.331***
	-(0.059)	(0.093)	(0.103)	(0.137)	(0.102)	(0.058)
Productivity	-0.431	2.985***	-0.229	3.880***		
	(0.373)	(0.589)	(0.546)	(0.722)	2.920***	4.044***
GFCF	0.218***	0.299***	-0.190*	0.311**	0.468***	0.477***
	(0.054)	(0.085)	(0.098)	(0.129)	(0.096)	(0.055)
HCF	-4.610***	5.692***	-0.644	5.682		
	(1.058)	(1.671)	(1.056)	(1.396)	3.215**	2.074**
Trend	0.012	-0.022*	-	-	(1.804)	(1.024)
	(0.009)	(0.014)			-0.095***	-0.022**
C			3.228	-8.001	(0.017)	(0.009)
Short run						
ΔAgr	-0.510	-0.030	-	-	-	-
	(0.338)	(0.233)				
ΔManufacturing	-	-	-1.242***	0.313***	-	-
			(0.227)	(0.108)		
ΔServices	-	-	-	-	-0.614***	0.293*
					(0.185)	(0.200)
ΔExports	0.494	0.619***	-0.408*	0.224**	-0.196	0.303
	(0.326)	(0.224)	(0.218)	(0.104)	(0.244)	(0.264)

ΔImports	0.794**	0.903***	-0.656**	0.232*	-0.657**	0.463
	(0.392)	(0.269)	(0.269)	(0.129)	(0.304)	(0.328)
ΔProductivity	-0.024	-0.089	0.028	-0.018	-0.053	-0.496**
	(0.129)	(0.089)	(0.089)	(0.043)	(0.049)	(0.053)
ΔGFCF	-0.720*	-0.244	-0.293	0.023	-1.269***	0.947**
	(0.510)	(0.351)	(0.347)	(0.166)	(0.268)	(0.289)
ΔLE	0.003**	0.001*	-0.001	-0.002***	-0.001**	0.000
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)
Exogenous variables						
Labour	2.478*	2.788*	3.655**	1.920**	-4.637	-0.345
	(1.471)	(1.417)	(0.866)	(0.833)	(2.225)	(2.935)

Notes: Columns A, B, and C present results for agriculture, manufacturing, and services sectors' output. The variables are Agr (agricultural output), manufacturing sector output, output from the services sector, total factor productivity, GFCF (gross fixed capital formation), HCF (life expectancy at birth). Labour is the population between ages 15 and 65. The variables are in logs except total factor productivity. The Δ preceding a variable indicates that the variable is differenced once. *10% ** 5% *** 1%.

Source: Authors' analysis based on World Bank (2018) and UNIDO (2007) data.

In the long run, the manufacturing value-added output is influenced by physical and human capital formation as well as imports. In the short run, imports correct about 65.6 per cent, while changes in physical capital formation adjust 29.3 per cent of the short-run disequilibrium in manufacturing output. Exports correct 40.8 per cent of the deviations in manufacturing output. Output from the manufacturing sector and productivity influence changes in exports. Therefore, the short-run dynamics in the manufacturing sector suggest that imports and productivity increase manufacturing output. In addition, the adjustment towards long-run equilibrium in the manufacturing sector as a result of imports is faster compared to exports. This implies that imports have a greater effect on manufacturing output relative to exports. Most of the production in the manufacturing sector relies on imported intermediate and capital goods. Imports may be associated with superior technology, which improves the competitiveness of manufactured goods. As a result, the quantity of domestically produced manufactured goods increases (Mazumdar 2001).

Output in the services sector also adjusts towards long-run equilibrium, with changes in imports accounting for 65.7 per cent of the adjustment, while exports have no effect. Productivity gains correct only 5.3 per cent of disequilibrium in services. However, productivity gains in the short run also sustain output in the services sector in the long run. Human and physical capital formation influence the adjustment of services to long-run equilibrium. Indeed, the contribution of services to national output has been increasing relative to manufactured and agricultural goods and has been resilient to shocks (KNBS 2018).

These results imply that import growth has a larger effect on growth in the output of the manufacturing and services sectors, mainly because of productivity improvements. The short-run VECM estimates for sectoral value-added output indicate that imports influence agricultural, manufacturing, and services output. Furthermore, capital accumulation and productivity growth are the main channels through which imports influence sectoral output. Hence, there is evidence for ILG across the sectors in the long run. The results are also consistent with aggregate output where imports are the main catalyst of economic growth.

In addition to disaggregating output, further analysis is undertaken by disaggregating exports and imports. Table A4 in the Appendix presents the results of the effects of main commodity exports

and imports on output growth. Whereas, manufacturing exports have the greatest effects on growth compared to manufactured imports, agricultural imports have a greater effect on output compared to agricultural exports. Machinery exports have no effect on output growth, while imports of machinery influence output as well as exports of other machinery. In addition, imports of machinery induce imports of other machinery. This indicates that imports of capital goods used to produce other goods augment export production and the productive capacity of the entire economy. However, the economy has no capacity to produce machinery or to increase local content of imported machinery. These results provide further evidence that exports have a small effect on growth compared to imports and are also consistent with the sectoral effect of exports on output growth.

7 Conclusion

This paper examines the relationship between exports and growth in Kenya in the context of endogenous growth models. While Kenya has implemented policies to diversify and increase exports, the country's export growth has been sluggish and predominantly consists of primary agricultural commodities. Empirical evidence indicates that there is a long-run relationship between exports and output. However, exports have no statistically significant effect on output growth in the short run; instead, output growth increases the growth rate of exports. Exports are also influenced by growth in imports and capital formation. The results also show that aggregate and sectoral output growth are influenced by growth of imports and total factor productivity. Hence, there is some evidence of ILG. Long-run output growth seems to be sustained by imports, with higher economic growth acting as a trigger for growth of imports. Additionally, imports influence agricultural, manufacturing, and services output. Like most developing and low-income African economies, Kenya's economy is heavily dependent on imported intermediate and capital goods. Arguably, growth in imports contributes to technology transfer from advanced economies to domestic economies, which is then diffused to other sectors of the economy. This improves total factor productivity in the economy and export competitiveness. However, the export sector does not seem to be competitive enough to significantly influence the transformation of the economy and contribute substantially to economic growth. This implies that, ELG is still elusive, notwithstanding the notable progress in trade liberalization and export promotion.

Notwithstanding the insignificant impact of aggregate exports on economic growth, analysis using disaggregated export data shows that agricultural and manufactured exports have a positive impact on growth in the short run. However, machinery imports still have a greater positive impact on output growth relative to agricultural and manufactured exports. The results are consistent with findings of similar studies. Nonetheless, these results imply that enhancing competitiveness through value addition of agricultural and manufactured exports is likely to enhance ELG. This could be achieved through effective utilization and acquisition of new and efficient technologies, by integrating the economy in regional and global value chains.

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Appendix

Table A1: Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob
Exports does not Granger cause output	54	4.095	0.023
Output does not Granger cause exports		0.042	0.959
Imports does not Granger cause output	54	4.757	0.013
Output does not Granger cause imports		1.858	0.167
Productivity does not Granger cause output	54	0.003	0.997
Output does not Granger cause productivity		0.711	0.496
GFCF does not Granger cause output	54	2.484	0.094
Output does not Granger cause GFCF		1.205	0.309
LE does not Granger cause output	53	0.79	0.460
Output does not Granger cause LE		18.453	0.000
Imports does not Granger cause exports	54	0.451	0.64
Exports does not Granger cause imports		4.189	0.021
Productivity does not Granger cause exports	54	0.257	0.774
Exports does not Granger cause productivity		4.632	0.014
GFCF does not Granger cause exports	54	1.239	0.299
Exports does not Granger cause exports		0.457	0.636
HCF does not Granger cause exports	53	1.313	0.279
Exports does not Granger cause HCF		16.281	0.000
Productivity does not Granger cause imports	54	0.523	0.596
Imports does not Granger cause productivity		1.476	0.239
GFCF does not Granger cause imports	54	2.958	0.061
Imports does not Granger cause GFCF		0.357	0.701
HCF does not Granger cause imports	53	0.807	0.452
Imports does not Granger cause HCF		18.236	0.000
GFCF does not Granger cause productivity	54	2.188	0.123
Productivity does not Granger cause GCFC		0.638	0.533
HCF does not Granger cause productivity	53	0.99	0.379
productivity does not Granger cause HCF		0.253	0.778
HCF does not Granger cause GFCF	53	0.517	0.599
GFCF does not Granger cause HCF		20.072	0.000

Source: Authors' computations based on World Bank (2018) and UNIDO (2007) data.

Table A2: Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	Critical Value 0.05	Prob.**
None *	0.936	273.259	117.708	0.000
At most 1 *	0.693	127.504	88.804	0.000
At most 2 *	0.432	64.932	63.876	0.041
At most 3	0.302	34.955	42.915	0.247
At most 4	0.152	15.907	25.872	0.500
At most 5	0.126	7.165	12.518	0.328

Note: Labour is exogenous. Trace test indicates 3 cointegrating equation(s) at the 0.01 level. * Denotes rejection of the hypothesis at the 0.01 level. Max-eigenvalue test indicates 2 cointegrating equation(s) at the 0.01 level.

Source:Authors' computations based on World Bank (2018) data.

Table A3: Estimates from VECM

	Output	Exports	Imports
	1	2	3
Output(-1)	-	-	
Exports(-1)	-	-	
	-		
Imports(-1)	-		
	-		
Real exchange rate(-1)	-1.244***	-1.963***	-1.745***
	(0.130)	(0.36)	(0.200)
GFCF(-1)	0.271***	0.624***	0.375***
	(0.083)	(0.229)	-0.127
LE(-1)	6.909***	9.745***	8.194***
	(0.304)	(0.842)	(0.466)
C	18.846***	14.972***	19.347***
	-1.522	-4.215	-2.334
Short-run adjustment coefficient			
	Output	**Exports**	**Imports**
∆Output	-0.014 *	0.056	0.775***
	(0.011)	(0.142)	(0.289)
∆Exports	-0.013	0.085	0.219
	(0.015)	(0.190)	(0.388)
∆Imports	-0.029*	0.725***	-0.938**
	(0.017)	(0.212)	(0.432)
∆Real exchange rate	0.493***	-0.224*	-0.138
	(0.188)	(0.119)	(0.242)
∆GFCF	0.483	0.711***	-1.270***
	(0.433)	(0.274)	(0.557)
∆HCF	-0.000***	-0.002	0.005
	(0.000)	(0.002)	(0.003)
Exogenous variable			
Labour	0.492***	0.196	0.172
	(0.115)	(0.154)	-0.293***

Note: Trace test of VAR model with real exchange rate as a proxy for productivity indicates that there are 3 cointegrating vectors. Output is the real GDP, productivity is real exchange rate, GFCF is gross fixed capital formation, and HCF is life expectancy at birth. Labour is the population between ages 15 and 65. The variables are logs except real exchange rate. The ∆ preceding a variable indicates that the variable is differenced once. *10% ** 5% *** 1%.

Source: Authors' analysis based on World Bank (2018) data.

Table A4: Commodity exports and growth

	A		B		C			
Number of cointegrating vectors	2		2		3			
Cointegrating Eq:	Output	MANUFEX	Output		Output	MACHEX	MACHIM	
Output	1	0	1		1	0	0	
MANUFEX	0	1			0	1	0	
MANUFIM	0.854	-5.355	4.57		0	0	1	
	(0.353)	(0.897)	(1.453)					
Productivity	1.19	-4.8	-9.655		-0.064	-0.901	0.54	
	(0.482)	(1.226)	(2.045)		(0.203)	(1.005)	(0.217)	
GFCF	-0.901	1.134	-19.339		-1.141	-3.99	-0.793	
	(0.100)	(0.254)	(3.934)		(0.130)	(0.646)	(0.140)	
Adjustment coefficients								
	CointEq1	**CointEq2**	**CointEq1**	**LABOUR**	**CointEq1**	**CointEq2**	**CointEq3**	**LABOUR**
∆Output	-0.09	-0.084	-0.053*	-0.231	-0.373***	0.111***	0.027	0.444**
	(0.146)	(0.068)	(0.043)	(0.416)	(0.179)	(0.049)	(0.205)	(0.256)
∆MANUFEX	-0.520*	-0.289						
	(0.310)	(0.144)						
∆MANUFIM	0.169**	0.190**						
	(0.209)	(0.097)						
∆AGRICEX			-0.201**	-0.545				
			(0.083)	(0.924)				
∆AGRICIM			-0.231**	1.401				
			-0.088	-0.754				
∆MACHINERYEX					1.998	-0.311	-0.319	-1.032
					(1.301)	(0.354)	(1.487)	(1.861)
∆MACHINARYIM					0.650**	0.154***	-1.460***	1.308
					(0.336)	(0.091)	(0.384)	(0.841)
∆Productivity	-0.178*	-0.011	-0.074**	-0.15	0.266**	-0.136**	0.087	-0.612**
	(0.118)	(0.054)	(0.011)	(0.325)	(0.132)	(0.036)	(0.151)	(0.189)
DGCFC	0.563	0.027	-0.021**	1.538**	0.573**	-0.05	0.037	-0.168
	(0.149)	(0.069)	(0.045)	(0.362)	(0.159)	(0.043)	(0.181)	(0.227)

Note: Columns A, B, and C presents results for VECM long-run and short-run coefficients for manufactured, agriculture, and machinery imports and exports, respectively. Respective cointegrating vectors as identified by Trace test are indicated in row 2. MANUFEX – manufactured export, MANUFIM – manufactured import, AGRICIM – agricultural imports, AGRICEX – agricultural exports, MACHINARYIM – machinery imports, MACHINARYEX – machinery exports, productivity – real exchange rate, GFCF – gross fixed capital formation. Labour is the population between ages 15 and 65. The variables are logs except real exchange rate. The ∆ preceding variable indicates that the variable is differenced once. *10% ** 5% *** 1%.

Source: Authors' analysis based on UNIDO (2007) data.