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# Differential effects of trade on economic growth and investment: A cross-country empirical investigation☆

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## Abstract

The paper empirically examines the differential effects of trade on economic growth and investment based on cross-country data. In general, the results are largely consistent with the positive impact of trade on economic growth as found in the literature. However, the empirical results based on different categories of countries show that whereas trade has positively impacted economic growth in developed and developing countries, its effect is insignificant for least developed countries (LDCs), which largely include African countries. Nonetheless, additional results suggest that trade is a key determinant of foreign direct investment (FDI) across all country groups including LDCs, as well as domestic investment in both developing countries and the LDCs. Consequently, first, the structure and pattern of trade in LDCs and African countries in particular should be transformed in order to obtain larger growth benefits as in the case of the other country groups. Second, trade, particularly via the investment channel, is an avenue through which LDCs, including African countries, can adopt new technologies and attract FDI to unlock their potential, e.g., by active integration into regional and global value chains.

## 1. Introduction

The debate on trade-growth nexus is not new. The view that trade enhances economic growth and welfare has a long history. As far back as the 16th century, Smith (1776) emphasised trade as a vent for surplus production and a means of widening the market. In the same vein, Marshall (1890) acknowledged that causes which determine economic progress of nations belong to the study of international trade. The topic has since remained a key subject of debate in research and policy discourses, leading to ample theoretical and empirical literature on the link between trade and economic growth.

So why revisit the role of trade? The renewed interest in the role of trade is largely underpinned by the latest wave of globalization that has been characterised by not just intensive trade integration and trade openness, but has also been associated with technological revolution. International trade has grown steadily over the last three decades. On average, the value of world merchandise trade increased by more than 7% per year (fourfold increase in volume terms) between 1980 and 2011 (WTO, 2013). Advances in technology, telecommunications and transport have created opportunities for a reorganisation of global production and distribution systems around "value chains". The other key feature of this evolving global landscape is the increased role of trade in services, which grew even faster than merchandise trade.[1] It is believed that due to the challenges in recording services transactions, the traditional measures of services trade underestimate their importance in global trade (Subramanian and Kessler, 2013; WTO, 2013).

The global trade topography has also been shaped by an increased participation of developing economies in international trade beginning with the industrialising East Asian Tigers who from as early as 1960s pursued an outward-oriented trade policy leading to export-led growth, followed by China and more recently by India. Developing economies' share of world exports increased from 34% in 1980 to nearly half (47%) of the total in 2011 (WTO, 2013).

The quest for further trade expansion is partly exemplified by the increased proliferation of regional trade agreements and mega trading partnerships across the world. Given the fiscal constraint challenges that many countries are facing around the world, trade is envisaged to be a critical pillar of economic growth and development. A discussion of the global development agenda that fails to take cognizant of the global trade dynamics is, thus, bound to be incomplete. That notwithstanding, the differential trade impacts can easily get masked by the changing global dynamics and the general focus on the global picture. For instance, although in general the share of developing countries in world trade has been increasing, Africa as a continent still accounts for a very low share of world trade—only 2.8% of world's exports over the decade 2000–2010 (UNCTAD, 2013). The Least Developed Countries (LDCs), most of which are in Africa, remain particularly vulnerable—LDCs' share of the world exports is only about 1%, and as a group, LDCs have systematically recorded a trade deficit except for 2006–2008 cycle of high commodity prices (Escaith and Tamenu, 2013).

This paper re-examines the role of trade and makes a contribution to the literature by empirically analysing the differential impact of trade on economic growth and investment based on cross-country data. The empirical evidence is based on a sample of 85 countries using data over the last two decades (1991–2011). The differential effects of trade are analysed across three categories of countries, that is, developing, developed, and the LDCs, which largely comprise African countries. Most cross-country studies hardly take into consideration the differing effects of trade on economic growth and, even where

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[1] The initiative of measuring trade in value-added as opposed to gross terms has also confirmed the rising role of services in total trade, accounting for about 45% of total trade in 2008 (almost twice the corresponding share measured in gross terms). The World Trade Organization (WTO), which has been part of the driving force behind this initiative observes that the traditional trade statistics misleadingly attribute the full value of traded goods and services to the last economy in the production process when in fact inputs may have come from many different countries (WTO, 2013).

such attempts are made, the LDCs are often lumped as part of the developing countries despite their distinct economic characteristics and challenges in effectively participating in global trade.

The rest of the paper is organised as follows. Section 2 surveys the empirical evidence on trade and growth, while Section 3 examines the channels through which trade contributes to growth. Section 4 provides the empirical cross-country evidence and discussion of the results, followed by conclusion and policy insights in Section 5.

## 2. Empirical evidence on impact of trade on growth

There is a general consensus that trade positively contributes to growth. The evidence spans from both the vast empirical literature on trade and growth, as well as the growth episodes witnessed in different parts of the world over the past decades. Generally, most of the cross-country studies overwhelmingly find a positive and statistically significant relationship between trade openness and growth. Although there have been some criticism regarding the data and statistical methods employed (Rodriguez and Rodrik, 2001), the positive effect is obtained even after controlling for endogeneity of trade (e.g. Frankel and Romer, 1999; Irwin and Tervio, 2002). For instance, Frankel and Romer (1999) found no evidence that Ordinary Least Squares (OLS) estimates overstate the effects of trade and concluded that trade has a quantitatively large and robust positive effect on income. A rise in ratio of trade to GDP by one percentage point was found to raise income per person by 1 to 2 percent depending on the estimation method employed.

Harrison (1996) provides an overview of the cross-country studies conducted in the 1980s and early 1990s, while the reviews by Giles and Williams (2000), and Lewer and Van den Berg (2013) mostly cover the empirical studies undertaken in the 1990s. The latter examined the previous empirical literature to establish whether the statistically significant trade–growth relationship was economically significant. They found consistence across many studies in terms of the size of the relationship—on average, a one percentage increase in the growth of trade (exports) was associated with a one-fifth percentage point increase in economic growth. The consistence was robust across samples and the different statistical methods employed.

Studies in the 1990s include Edwards (1992); Fosu (1990a); Dollar (1992); Fosu (1996); Greenaway (1998); Sachs and Warner (1995); Frankel and Romer (1999), among others. For instance, Fosu (1990a) found that export growth impacted on economic growth positively based on a sample of 28 less developed countries in Africa. Onafowora and Owoye (1998) also found a significant positive effect of exports on economic growth for a sample of 12 Sub-Saharan Africa (SSA) countries, and concluded that it was possible to stimulate growth through an outward-oriented growth strategy. Sachs and Warner (1995) developed a speed of integration measure[2] and found that fast integrators mostly included the East Asian exporting economies while the weak and slow integrators included mostly the low income countries of SSA and some middle income countries of Latin America. The integration indicator has been used in subsequent studies that analyse the impact of trade. Analysis by Greenaway et al. (1998, 2002) suggested a J-curve effect whereby growth at first falls and then increases after liberalization. A number of studies also found evidence showing that on average countries grew faster after trade liberalization (Thirlwall, 2000; Wacziarg and Welch, 2008; Favley et al., 2012; Salinas and Aksoy, 2006; and Salinas et al., 2015). According to a survey by Singh (2010), however, not all trade reforms have been successful.

Winters and Masters (2013) provide a compact review of recent empirical studies on trade openness and growth. Although the emphasis in the earlier literature was on exports, subsequent

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[2] Categorized as fast, moderate, weak and slow integrators based on ratio of exports and imports to GDP, ratio of FDI to GDP, share of manufactures in total exports and a country's credit rating.

literature has also shown that trade (both imports and exports) are important for economic progress and importing is just as important as exporting (see Rodrik, 1999). Savvides (1995), for example, estimated for African countries a positive effect of trade, which includes both exports and imports. Using different measures of trade openness (trade volumes and trade restrictions), Yanikkaya (2003) found strong evidence in support of the positive relationship between trade and growth through channels such as technology transfers, scale economies and comparative advantage. However, trade barriers (import duties, export taxes, taxes on international trade) were surprisingly, positively and, in some specifications, significantly associated with growth, especially for developing countries. However, the author acknowledged the limitations of trade barrier measures and the fact that interpretation of protection provided by tariffs is considerably difficult. Kim (2011) also found strong beneficial effects of trade openness on growth and real income for the developed countries but surprisingly negative effects for the developing countries.

Instead of the volume of trade as a measure of trade orientation, Busse and Groizard (2008) used imports of Research and Development (R&D)-intensive capital goods in a bid to capture technology diffusion, and showed that technology imports had a positive impact on per capita incomes. They found that technology diffusion through imports accounted for much of the variations in technological levels across countries. Earlier studies by Lee (1995) and Schneider (2005) also found that imported inputs or capital goods increased efficiency of capital accumulation and domestic innovation both in developing and developed countries in the case of the latter.

Recent studies on Africa include those by Menyah et al. (2014) and Nicita et al. (2014). Menyah et al. (2014) examine the causal relationships between financial development, trade openness and economic growth for 21 SSA countries for the period 1965–2008. Their findings show limited support for trade-led growth hypothesis for the SSA countries studied. Nicita et al. (2014) examine and measure pro-poor bias in the structure of trade protection of six SSA countries (Burkina Faso, Cameroon, Cote d'Ivoire, Ethiopia, Gambia and Madagascar). The results suggest that protection increases the prices of agricultural goods sold by African households. In other words, elimination of the existing structure of protection would largely benefit the rich more than the poor households. In a case study focusing on Kenya, Musila and Yiheyis (2015) find a negative effect of trade openness on economic growth. Although there is some positive impact on investment, they conclude that it is not large enough to lead to higher economic growth. Ahmed and Suardi (2009) show that trade liberalization is associated with greater output and consumption growth volatility in SSA.

This paper complements the previous literature on trade and growth by providing new cross-country empirical evidence, taking into consideration the differential effects of trade across different categories of countries, that is, developed, developing and LDCs (Appendix B). Moreover, other than just focusing on the direct effect of trade on growth, the paper also goes further to explore other channels through which trade affects economic progress, i.e. via impact on domestic investment and Foreign Direct Investment (FDI). With the growing importance of Global Value Chains (GVCs) and their relationship with FDI, the role of trade is becoming increasingly critical. Merely focusing on the direct impact of trade on economic growth can conceal the full picture.

## 3. Conceptual framework: channels through which trade can contribute to growth

The trade-growth nexus is no doubt a complex relationship. The evolving dynamics in global trade including GVCs, the high technological diffusion and increased mobility of factors add to the complexity as new channels emerge and past theories of trade based on comparative advantage become weaker.

According to the traditional (static) trade theory, the welfare improvements from trade liberalization arise from specialization gains (i.e. increased efficiency due to production associated with the comparative advantage) and consumption gains in the form of increased choice of goods at lower or competitive prices. The dynamic trade theory on the other hand focuses on dynamic gains that are caused by an accelerated accumulation of physical capital and human capital, which may arise due to higher rate of savings and enhanced technological transfer (Nowak-Lehmann, 2000; Baldwin, 1992). Other indirect gains arise from forward and backward linkages from the expanding sectors and improvements in X-efficiency—e.g. improved managerial skills. The new trade theory relaxes the restrictive assumption of perfect competition and suggests that gains from trade can arise from a number of fundamental sources, i.e. differences in comparative advantage and economy-wide increasing gains, including positive spillovers or externalities. The dynamic gains provide a crucial link between trade and growth in the medium and long-term.

Notwithstanding the changing dynamics in global trade, the endogenous growth theories that emerged in the 1980s and 1990s still offer some insights about the link between trade and economic growth. The endogenous growth theories emerged after it became clear that the standard neoclassical exogenous growth models (e.g. Solow, 1956, 1957) were theoretically unsatisfactory in explaining the long-run growth. For instance, they ignored technological change and predicated that economies could eventually converge to a steady state with zero per capita growth. The endogenous growth theory, on the other hand, recognises the fact that technological progress and innovation are part of the economic system (see Romer (1986, 1990); Grossman and Helpman (1991a,b); Rebelo (1991); Lucas (1988); Dollar (1992)). Thus, the theory provides a good framework for understanding the relationship between trade and growth.

For instance, in the context of the AK model which assumes absence of diminishing returns to capital (Rebelo, 1991), trade policies can promote growth in the long run by impacting on savings/ investment rate and capital accumulation. The positive externalities that are linked to capital accumulation, i.e. physical investment (Romer, 1986) and human capital accumulation (Lucas, 1988) also enable permanent increases in the growth rate of output. These externalities can be trade-induced or can be enhanced by trade policies (e.g. aid for trade programmes that target investment in infrastructure in LDCs), and are likely to be larger in open economies.

Trade provides access to technological advances thus facilitating technological transfer and spillovers. This in turn enhances technical progress, which in turn makes the long run growth permanent. Access to bigger markets and competition encourages innovation and development in R&D. It facilitates more investment and productivity growth e.g. through the learning-by-doing and technological spillovers, particularly through the rapidly growing global and regional supply chains. Higher efficiency resulting from increased competitiveness and innovation is associated with increased productivity which should spur growth. Trade is an avenue for the acquisition of investment and intermediate goods that are crucial for development, particularly for the developing and LDCs. This is exemplified by the fact that 60% of merchandise trade is intermediate products.

In sum, the effects of trade and trade policies on the economic growth process can emerge from a variety of channels and work both directly and indirectly. Some of the indirect channels include for instance, improvements in the quality of institutions and macroeconomic policy (Wacziarg, 2001). Institutional differences determine transaction costs depending on ease of trading and doing business and how trade-related policies are set and negotiated. For example, bureaucracy and cumbersome customs and border procedures increase trading costs and inefficiency. International trade is a determinant of institutional development (property rights, efficient regulation, etc). Unfortunately most of the indirect channels are not amenable to empirical modelling and testing. Moreover, it is also possible that the interaction between trade and growth can work in both directions—where trade spurs growth and in turn growth boosts trade. In this paper, an attempt is made to empirically assess the

direct impact of trade on economic growth, as well as the impact of trade on domestic investment and FDI as part of the key channels through which trade affects economic progress.

## 4. Empirical analysis and discussions

The paper employs the most commonly used measures of trade openness in the empirical literature, that is, trade (exports plus imports), as well as exports and imports each taken separately as a share of GDP.[3] Following similar studies, a standard growth regression is specified as follows:

$$y_{g_i} = \alpha + \delta \text{trade}_i + \lambda' X_i + \varepsilon_i$$

Where $y_{gi}$ is the average GDP per capita growth rate for country $i$, $trade_i$ is the trade openness measure for country $i$, $X_i$ is a vector of conditional or control variables and $\varepsilon$ is the error term. The control variables include the initial GDP per capita (Ln_init), which is normally included to control for convergence. However, it can also be interpreted as a proxy for stock of capital for a country (Yanikkaya, 2003).[4] In addition, life expectancy at birth (Ln_LE) was included to capture the impact of human capital. The other control variables are population growth (pop_g) and inflation rate (Infl). The latter was included as a proxy for macroeconomic stability. Ln_LE and Ln_init are in log form. The three trade measures with each measured as a share of GDP are denoted as *trade*, *export* and *import*, respectively. The data used is from the *World Economic Indicators*, averaged over the period 1991–2011 to obtain a long-term view as is often the case in these types of studies. Given that the impact of trade also works via the investment channel, separate equations based on the above specification were estimated for FDI inflows and domestic investment (gross fixed capital formation) as ratios of GDP, in a bid to assess the impact of trade on investment.

The empirical results for trade effects on economic growth using the three measures of trade openness are reported in Tables 1, 2 and 3 respectively. The summary statistics are given in Appendix A (Table 1A). All the regressions were estimated taking into account the heterogeneity of countries, and hence the reported t-values are based on the robust standard errors. The results are consistent across all the three measures considered. In general, trade has a positive and significant impact on economic growth, which is consistent with the evidence in the empirical literature. A one percent rise in the average trade to GDP ratio leads to an increase in the average GDP per capita growth by about one-half (0.47) percentage point. However, exporting has a higher impact on growth (1.02) than importing (0.76). Moreover, this global picture conceals variations across different categories of countries and, hence, the disaggregated results by level of development are more revealing.

The results clearly show that whereas trade has significantly contributed to economic growth in developed and developing countries on average, it has not significantly done so for the LDCs, which are largely composed of African countries. Regardless of the trade openness measure used, the impact of trade on LDCs' GDP per capita growth is statistically insignificant. The factors that explain these results range from structure and composition of LDCs' trade that is less diversified, coupled with low value addition and little share of manufacturing exports, to limited market access. Fosu (1990b) found that while primary export sector exhibited little or no effect on GDP growth in less developed countries, there is a differential positive impact by the manufacturing sector. Morris and Fessehaie (2014) show that the extent of export concentration in Africa is high, not only at the sectoral level but

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[3] Although average tariffs have been used in some studies in the past, variation in average tariffs may not be big enough to draw conclusions, especially given the vast trade liberalization witnessed in the last few decades.

[4] Although telephone lines per 100 people was initially considered as a proxy for physical capital, it was found to be very highly correlated with life expectancy and initial GDP per capita.

Table 1
Regression results for trade share and economic growth.

|  | All countries | Developed | Developing | LDCs |
|---|---|---|---|---|
| Trade | 0.465*** | 0.349* | 0.466** | 0.420 |
|  | (3.24) | (1.95) | (2.14) | (0.46) |
| Ln_init | −1.027*** | −0.394** | −1.021*** | −1.027 |
|  | (−5.08) | (−2.61) | (−3.71) | (−1.74) |
| Ln_LE | 8.547*** | −8.828 | 7.953*** | 7.785** |
|  | (5.25) | (−1.64) | (3.84) | (2.24) |
| Infl | −0.001*** | −0.097** | −0.001*** | −0.002*** |
|  | (−3.54) | (−2.32) | (−2.32) | (−5.28) |
| Pop_g | −0.396** | 0.836*** | −0.878*** | 0.187 |
|  | (−2.09) | (3.01) | (−3.22) | (0.26) |
| Constant | −26.15*** | 41.03* | −22.77*** | −24.55* |
|  | (−4.50) | (1.78) | (−3.00) | (−1.78) |
| Obs | 85 | 23 | 45 | 17 |
| $R^2$ | 0.61 | 0.69 | 0.66 | 0.63 |

Notes: Ln_init = initial GDP per capita in logs, Ln_LE = Life expectancy in logs, pop_g = population growth, infl = inflation rate. Obs = number of observations. *** ** * indicate significance at 1%, 5% and 10% levels, respectively.

also at the product level. African countries' trade largely consists of export of primary commodities that fetch comparatively low prices and are subject to price volatility in the international markets, in comparison to imports of high value products and manufactured goods. Other factors such as poor infrastructure, limited human and physical capital and, poor quality of institutions also contribute to the low competitiveness of the LDCs' exports in the world markets, and limit their ability to reap the maximum benefits of trade. However, the results show that exporting has a significant and higher impact on the developing countries' economic growth compared to developed countries'. Additionally, exporting is more beneficial than importing—in the case of LDCs and developing countries, the impact of importing is positive but not significant. The results contrast with some earlier findings of a negative effect of trade for developing countries (e.g. Kim, 2011) but are consistent with the improved participation of developing countries in global trade. The latter can be attributed to the shifting patterns of trade that have been associated with the rapid industrial growth for a range of developing countries, particularly the emerging

Table 2
Regression results for export share and economic growth.

|  | All countries | Developed | Developing | LDCs |
|---|---|---|---|---|
| Export | 1.017*** | 0.672** | 1.043*** | 0.355 |
|  | (3.71) | (2.05) | (2.62) | (0.17) |
| Ln_init | −1.050*** | −0.414*** | −1.039*** | −0.974 |
|  | (−5.23) | (−2.92) | (−3.78) | (−1.37) |
| Ln_LE | 8.404*** | −8.419 | 7.893*** | 7.666** |
|  | (5.24) | (−1.62) | (3.87) | (2.22) |
| Infl | −0.001*** | −0.095** | −0.001*** | −0.002*** |
|  | (−3.61) | (−2.30) | (−4.99) | (−5.28) |
| Pop_g | −0.433** | 0.826*** | −0.906*** | 0.073 |
|  | (−2.20) | (3.13) | (−3.32) | (0.11) |
| Constant | −25.34*** | 41.63* | −22.38*** | −23.91 |
|  | (−4.41) | (1.79) | (−3.01) | (−1.70) |
| Obs | 85 | 23 | 45 | 17 |
| $R^2$ | 0.62 | 0.70 | 0.66 | 0.63 |

Notes: Ln_init = initial GDP per capita in logs, Ln_LE = Life expectancy in logs, pop_g = population growth, infl = inflation rate. Obs = number of observations. *** ** * indicate significance at 1%, 5% and 10% levels, respectively.

Table 3
Regression results for import share and economic growth.

|            | All countries | Developed | Developing | LDCs      |
|------------|---------------|-----------|------------|-----------|
| Import     | 0.763**       | 0.708*    | 0.766      | 0.784     |
|            | (2.43)        | (1.81)    | (1.55)     | (0.61)    |
| Ln_init    | −1.008***     | −0.374**  | −1.003***  | −0.973*   |
|            | (−4.91)       | (−2.32)   | (−3.65)    | (−1.78)   |
| Ln_LE      | 8.693***      | −9.358    | 8.045***   | 7.920**   |
|            | (5.27)        | (−1.65)   | (3.84)     | (2.26)    |
| Infl       | −0.001***     | −0.100**  | −0.001***  | −0.002*** |
|            | (−3.44)       | (−2.34)   | (−4.94)    | (−5.21)   |
| Pop_g      | −0.361*       | 0.852***  | −0.851***  | 0.267     |
|            | (−1.91)       | (2.89)    | (−3.10)    | (0.35)    |
| Constant   | −26.90***     | 30.36*    | −22.38***  | −25.62*   |
|            | (−4.60)       | (1.78)    | (−3.01)    | (−1.83)   |
| Obs        | 85            | 23        | 45         | 17        |
| $R^2$      | 0.60          | 0.68      | 0.65       | 0.64      |

Notes: Ln_init = initial GDP per capita in logs, Ln_LE = Life expectancy in logs, pop_g = population growth, infl = inflation rate. Obs = number of observations. *** ** * indicate significance at 1%, 5% and 10% levels, respectively.

economies in Asia and Latin America that have shifted from agricultural or primary production to manufacturing, coupled with rising growth of global trade associated with value chains. Additionally, the 2000s were characterized by a growing share of South–South trade, which increased from 11% in 2000 to 18% in 2008 (Escaith and Tamenu, 2013).

The results further show that unlike developing countries and LDCs, the developed countries significantly benefit from both exporting and importing, although the statistical significance of the former is relatively stronger than the latter. This is possibly due to their enhanced capacity and ability to process and add higher value to imports.

The variations across levels of development are also manifested by the variations in the impact of the other variables on economic growth across the three categories of countries. Human capital gains as measured by higher life expectancy have a high and statistically significant impact on economic growth in general. However, a disaggregated analysis shows that whereas improvements in life expectancy have a high and significant positive impact on the per capita GDP growth of both LDCs and developing countries, for the developed countries, the coefficient is negative and insignificant, which is intuitive given the economic burden of an ageing population in the latter. If anything, the results suggest that developed countries stand to gain from positive population growth. In contrast, higher population growth in developing countries has a negative impact on economic growth. Population growth has an insignificant impact in the case of the LDCs. On the other hand, the effect of inflation is negative and significant across all the sub-categories, which signifies the importance of a stable macroeconomic environment for economic growth. Based on the results, what has significantly contributed to the GDP per capita growth for the LDCs are improvements in human capital and macroeconomic stability. The negative coefficient for initial per capita GDP is consistent with the convergence hypothesis in the literature, although it is not statistically significant in the case of LDCs except in the regression in which import ratio is used as indicator of trade openness.

One of the contentious issues in the empirical literature on trade and growth is the possibility of the endogeneity of trade share as a measure of trade openness. Instrumental variable (IV) techniques are often employed in a bid to address the endogeneity problem. However, in practice the challenge lies in finding good instruments for trade share if the variable is proven or intuitively believed to be endogenous. With the changing global trade dynamics and revolutions in technology, capacity to trade may not necessarily be directly correlated with some of the instrumental variables (i.e. land size

Table 4
Regression results for FDI using trade, export and import shares.

|  | All countries | Developed | Developing | LDCs |
|---|---|---|---|---|
| Trade | 0.059*** | 0.093*** | 0.047*** | 0.065*** |
|  | (5.25) | (3.86) | (4.98) | (5.26) |
| Cons | −0.010 | −0.038** | −0.003 | −0.010 |
|  | (−1.28) | (−2.05) | (−0.39) | (−1.38) |
| $R^2$ | 0.53 | 0.66 | 0.50 | 0.63 |
| Export | 0.103*** | 0.181*** | 0.078*** | 0.115*** |
|  | (4.73) | (4.49) | (4.05) | (2.83) |
| Cons | −0.002 | −0.036** | 0.005 | 0.002 |
|  | (−0.25) | (−2.28) | (0.62) | (0.23) |
| $R^2$ | 0.47 | 0.71 | 0.40 | 0.42 |
| Import | 0.119*** | 0.183*** | 0.104*** | 0.091*** |
|  | (5.74) | (3.24) | (5.66) | (7.85) |
| Constant | −0.013 | −0.036* | −0.009 | −0.003 |
|  | (−1.74) | (−1.70) | (−1.22) | (−0.61) |
| $R^2$ | 0.53 | 0.59 | 0.57 | 0.56 |
| Obs | 114 | 35 | 56 | 23 |

*** ** * indicates significance at 1%, 5% and 10% levels, respectively. Obs = number of observations.

and population density) that have traditionally been used in the past. Indeed, an attempt was made to use these instruments in the estimations for this paper but their validity and exogeneity was rejected based on the respective tests. However, active population aged 15–64 years as a ratio of total population was found to be a valid instrument for all the sub-samples and was hence used in the IV estimations (IV regression results are reported in Appendix Table 2A). Arguably, the use of this variable makes sense especially in the case of developing countries where demand for imported goods such as electronics and information technology (IT) products by this category is bound to be high. Additionally, this is the age category likely to be more innovative in production of goods and services for both domestic and export markets. The IV results are consistent with the OLS results and, like in the case of the findings by Frankel and Romer (1999), show no evidence that OLS estimates overstate the effects of trade. If anything, the latter shows an underestimate of the trade effects—the IV coefficients are higher and more than double the OLS coefficients for all the indicators of trade.

A further examination of the effects of trade through the other channels, i.e. on FDI and domestic investment was also undertaken.[5] The empirical results are reported in Tables 4 and 5, respectively. The results indicate a positive and significant trade impact, though the magnitude of the impact is smaller compared to the direct impact of trade on growth. However, the most revealing and notable difference with respect to the results reported earlier for growth is that trade is a highly significant determinant of FDI in all the three categories of countries including LDCs. This is true for all the three indicators of trade including imports. In most of the equations, trade as a variable on its own accounts for over 50% of the variations in FDI inflows, with a relatively more pronounced effect for the developed countries. The other variables such as population growth, inflation and life expectancy were all found to be statistically insignificant, which may be taken to imply that whereas these factors determine long-term growth, they are not significant determinants of FDI.[6] Notwithstanding the

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[5] Note that the fully specified investment equations contain similar covariates as those for the growth equation; however, only the parsimonious results are reported.

[6] Although the FDI equations are based on a slightly larger sample as a result of excluding the insignificant variables, the results reported were found to be similar and consistent with those obtained by restricting the sample to the original 85 countries. In fact, the R-squared obtained in the latter case was higher for all the equations.

Table 5
Regression results for impact of trade share on domestic investment.

|  | All countries | Developed | Developing | LDCs |
|---|---|---|---|---|
| Trade | 0.030*** | −0.002 | 0.025*** | 0.184*** |
|  | (2.68) | (−0.26) | (4.16) | (5.19) |
| Ln_init | −0.019*** | −0.016 | −0.021** | −0.058** |
|  | (−3.42) | (−1.47) | (−2.30) | (−2.68) |
| Ln_LE | 0.185*** | 0.440* | 0.218*** | 0.144 |
|  | (3.11) | (1.70) | (2.88) | (1.41) |
| Infl | −0.00002** | 0.002 | −0.00001** | −0.00004*** |
|  | (−2.09) | (0.70) | (−1.58) | (−4.03) |
| Constant | −0.448** | −1.57 | −0.571** | −0.165 |
|  | (−2.00) | (−1.38) | (−2.06) | (−0.37) |
| Obs | 85 | 23 | 45 | 17 |
| $R^2$ | 0.31 | 0.18 | 0.41 | 0.74 |

Notes: Ln_init = initial GDP per capita in logs, Ln_LE = Life expectancy in logs, infl = inflation rate.
Obs = number of observations. *** ** * indicate significance at 1%, 5% and 10% levels, respectively.

possible bias in the results given the likelihood of endogeneity between trade and investment, the results generally indicate the importance of the trade-FDI nexus, and are consistent with the emerging patterns of trade, particularly the emergence of GVCs that are linked to investment. For instance, Asiedu (2002) found that openness to trade promotes FDI to SSA and non-SSA countries, even though the marginal benefit for the former was less.

The results further show that trade also has a positive and significant impact on domestic investment in developing countries and LDCs, with a relatively higher marginal impact for the latter. Thus, although the direct growth effects of trade for LDCs are not statistically significant, trade appears to have a significant role to play in promoting domestic investment and FDI in those economies. Arguably, the investment channel is stronger because it provides more opportunities for value addition and transfer of technology through learning-by-doing. The feedback effects are also likely to be more enhanced. Generally however, compared to the LDCs, the developed and developing countries have reaped relatively higher economic gains from trade—evidence of export-led growth is stronger for developing countries while the impact of trade on FDI is relatively higher for developed countries. The results for the developing countries are likely to be driven by the significant Asian exporters such as China, South Korea, India, Singapore, Indonesia and Thailand, as well as the emerging Latin American countries such as Brazil and Mexico.

## 5. Conclusion

Although trade-growth debate is not new, the last two decades have witnessed intense trade integration and expansion, coupled with a changing global trade landscape. The paper complements the existing literature and provides new cross-country evidence on the effects of trade on economic growth, taking into consideration the differential effects of trade. The latter is analysed by categorizing countries by the level of economic development, including LDCs as a sub-category of its own. The results on LDCs are particularly germane to African countries, which constitute the bulk of this group of countries.

In general, the empirical analysis supports the increasing role of trade in economic development. For all the trade indicators considered, the results show a positive and significant impact of trade on economic growth. However, a disaggregated analysis shows that effects of trade differ by the level of development—whereas the effect of trade particularly exporting has had a significant positive impact on economic growth in developed and developing countries, the impact is not significant for LDCs. The lack of significance among this group of countries, most of which are in Africa, suggests that the structure and pattern of trade need to be upgraded toward that in the other developing countries.

However, a further examination of other channels through which trade influences economic progress shows a positive and statistically significant effect of trade on FDI for all categories of countries including LDCs. The results further show that trade also plays a significant role in promoting domestic investment in LDCs and developing countries. Thus, despite the challenges that LDCs and African countries in particular face, trade still remains an avenue through which LDCs can adopt new technologies and attract FDI as well as improve domestic investment.

In general, the results are consistent with the emerging patterns of trade, including the increasing link of trade to FDI and the increasing participation of developing countries in global trade, especially the emerging countries in Asia and Latin America. With the growing influence of regional and GVCs, trade is poised to play an even greater role in economic development. The challenge, however, lies in how countries position themselves to reap maximum benefits from global trade, and how the multilateral trading system can be levelled and enhanced to ensure that the gains are shared by all, including LDCs and other low income countries that are still lagging behind, particularly in Africa.

Effective trade integration is predicated on an effective multilateral trading system and a level-playing field. In reality, however, this is often not the case and this is an area where WTO, despite its efforts to level the playing field, still has a challenge. Effective multilateral disciplines are essential to ensure that the benefits of trade liberalization are shared by all. The issue is no longer whether to trade or not, but how to trade better and make trade beneficial for all. Additionally, the expected benefits of trade are likely to be enhanced when supported by conducive institutional framework and complementary national policies that are trade and growth-enhancing. These include lower costs of doing business, investment in infrastructure, human capital development, technological innovation and promotion of entrepreneurship. In particular, Africa still lags behind both in intra and inter-trade, despite the regional trade integration initiatives. The continent remains heavily dependent on the export of a narrow range of goods, mostly primary commodities with less value addition, most of which are also subject to price fluctuations in the world market. Africa should take advantage of regional and global supply chains to unlock its trade and growth potential.

Notwithstanding the vast literature on the subject, there are still gaps and areas for further research. For instance, measurement and quantification of trade policies, openness and trade liberalization are still subject to debate. With the emerging patterns of trade, including the focus on value addition and supply chains, the standard indicators of trade and trade openness are unlikely to capture the depth and full impact of global trade. The dearth and lack of accuracy of such statistics are demonstrated by Jerven (2014). Moreover, although world average tariff rates have come down considerably in the last three decades, non-tariff trade barriers and measures have become more fundamental than tariff barriers, and hence more analysis is needed in this area. Future research should also explore the rising role of services, including the impact of different types or categories of services on economic growth, especially as more data on measurement of trade in terms of value added becomes available.

## Appendix A

Table 1A
Summary statistics.

| Variable | Mean | Minimum | Maximum |
|---|---|---|---|
| Trade ratio | 0.83 | 0.22 | 3.68 |
| Export ratio | 0.40 | 0.08 | 1.94 |
| Import ratio | 0.43 | 0.12 | 1.74 |
| GDP_g | 1.85 | −3.12 | 9.48 |
| LE | 67.82 | 44.4 | 81.1 |
| Ln_init | 7.43 | 4.81 | 9.82 |
| FDI | 3.98 | −0.20 | 29.3 |
| Infl * | 17.1 | 0.30 | 388 |
| Pop_g | 1.54 | −0.19 | 3.08 |

LE = Life expectancy, GDP_g = average GDP per capita growth rate, Infl = inflation rate.
Ln_init = initial GDP per capita (log), FDI = FDI % of GDP, pop_g = population growth.
  * The mean is much higher when countries that have experienced hyperinflation like Zimbabwe are included.

Table 2A
A GDP per capita growth (IV results): All countries.

|  | Trade | Export | Import |
|---|---|---|---|
| Trade indicator | 1.887*** | 3.177*** | 4.646*** |
|  | (2.87) | (3.12) | (2.47) |
| Ln_init | −1.04*** | −1.15*** | −1.035*** |
|  | (−7.36) | (−8.08) | (−6.11) |
| Ln_LE | 7.455*** | 7.342*** | 7.621*** |
|  | (4.86) | (5.16) | (4.34) |
| Infl | −0.001*** | −0.001*** | −0.001** |
|  | (−2.77) | (−3.08) | (−2.31) |
| Pop_g | −0.605** | −0.657*** | −0.531* |
|  | (−2.46) | (−2.81) | (−1.93) |
| Cons | −21.83*** | −20.64*** | −23.58*** |
|  | (−3.62) | (−3.63) | (−3.47) |
| Observations | 85 | 85 | 85 |
| LM statistic | 12.06 | 16.70 | 8.171 |
|   (p-value) | (0.004) | (0.000) | (0.004) |

*** ** * indicates significance at 1%, 5% and 10% levels, respectively.
The instrument for the trade indicator is active population aged 15–64 years as a ratio of total population.

## Appendix B. List of countries

| Developed | Developing | | LDCs [a] |
|---|---|---|---|
| Australia | Bahamas | Malaysia | Bangladesh |
| Austria | Bolivia | Mauritius | Benin |
| Belgium | Botswana | Mexico | Burkina Faso |
| Bulgaria | Brazil | Mongolia | Burundi |
| Canada | Cameroon | Peru | Cape Verde |

Appendix B (*continued*)

| Developed | Developing | | LDCs [a] |
|---|---|---|---|
| Czech Republic | Chile | Namibia | Central African Republic |
| France | China | Nicaragua | Democratic Republic of Congo |
| Finland | Colombia | Pakistan | Zambia |
| Denmark | Costa Rica | Panama | Ethiopia |
| Germany | Cote d'Ivoire | Paraguay | Gambia |
| Greece | Dominican Republic | Morocco | Guinea |
| Hungary | Ecuador | Philippines | Lesotho |
| Iceland | Egypt | Saudi Arabia | Mali |
| Ireland | El Salvador | Zimbabwe | Mauritania |
| Italy | Gabon | South Africa | Mozambique |
| Japan | Ghana | Sri Lanka | Nepal |
| Luxembourg | Grenada | St. Lucia | Papua New Guinea |
| Macedonia, FYR | Guatemala | St. Vincent and Grenadines | Senegal |
| Malta | Honduras | Swaziland | Sudan |
| Netherlands | Hong Kong | Thailand | Tanzania |
| New Zealand | Jordan | Tonga | Togo |
| Norway | Indonesia | Tunisia | Uganda |
| Portugal | Israel | Turkey | Congo, Republic |
| Romania | India | Uruguay | |
| United States | Kenya | Uzbekistan | |
| United Kingdom | Korea, Rep | Venezuela | |
| Slovak Republic | Lebanon | Singapore | |
| Slovenia | Brunei Darussalam | | |
| Spain | Macao SAR, China | | |
| Sweden | | | |
| Switzerland | | | |
| Ukraine | | | |
| Lithuania | | | |
| Russian Federation | | | |
| Belarus | | | |

[a] The LDC category of countries is consistent with the UN/WTO classification except for Republic of Congo and Papua New Guinea. Cape Verde was initially classified as an LDC before it graduated from the LDC status in 2007.

# References

Ahmed, A.D., Suardi, S., 2009. Macroeconomic volatility, trade and financial liberalization in Africa. World Dev. 37 (10), 1623–1636.

Asiedu, E., 2002. On the determinants of foreign direct investment to developing countries: is Africa different? World Dev. 30 (1), 107–119.

Baldwin, R.E., 1992. Measurable dynamic gains from trade. J. Polit. Econ. 100, 162–174.

Busse, M., Groizard, J.L., 2008. Technology trade in economic development. World Econ. 31 (4), 569–592.

Dollar, D., 1992. Outward-oriented developing economies do grow more rapidly: evidence from 95 LDCs, 1976–1985. Econ. Dev. Cult. Chang. 40, 523–544.

Edwards, S., 1992. Trade orientation, distortions and growth in developing countries. J. Dev. Econ. 39, 31–57.

Escaith, H., Tamenu, B., 2013. Least Developed Countries' Trade During the "Super-Cycle" and the Great Trade Collapse: Patterns and Stylized Facts. Staff Working Paper ERSD-2013-12. World Trade Organization.

Favley, R., Foster, N., Greenaway, D., 2012. Trade liberalization, economic crises and growth. World Dev. 40 (11), 2177–2193.

Fosu, A.K., 1990a. Exports and economic growth: the African case. World Dev. 18 (6), 831–835.

Fosu, A.K., 1990b. Export composition and the impact of exports on economic growth of developing economies. Econ. Lett. 34 (1), 67–71.

Fosu, A.K., 1996. Development level, trade and economic growth: comparative evidence from the more developed countries. Econ. Int./Int. Econ. 49 (2), 221–234.

Frankel, J.N., Romer, D., 1999. Does trade cause growth? Am. Econ. Rev. 89, 379–399.

Giles, J.A., Williams, C.L., 2000. Export-led growth: a survey of the empirical literature and some noncausality results. Part 1. J. Int. Trade Econ. Dev. 9 (3), 261–337.

Greenaway, D., 1998. Does trade liberalisation promote economic development? Scott. J. Polit. Econ. 45 (5), 491–511.

Greenaway, D., Morgan, C.W., Wright, P., 1998. Trade reform, adjustment and growth: what does the evidence tell us? Econ. J. 108 (September), 1547–1561.

Greenaway, D., Morgan, C.W., Wright, P., 2002. Trade liberalization and growth in developing countries. J. Dev. Econ. 67, 229–244.

Grossman, G., Helpman, E., 1991a. Innovation and Growth in the Global Economy. MIT Press, Cambridge, MA.

Grossman, G., Helpman, E., 1991b. Trade, Knowledge Spillovers and Growth Innovation and Growth in the Global Economy. MIT Press, Cambridge, MA.

Harrison, A., 1996. Openness and growth: a time-series, cross-country analysis for developing countries. J. Dev. Econ. 48 (2), 419–447.

Irwin, D.A., Tervio, M., 2002. Does trade raise income? Evidence from the Twentieth Century. J. Int. Econ. 58, 1–18.

Jerven, M., 2014. On the accuracy of trade and GDP statistics in Africa: errors of commission and omission. J. Afr. Trade 1 (1), 45–52.

Kim, D., 2011. Trade, growth and income. J. Int. Trade Econ. Dev. 20 (5), 677–709.

Lee, J.-W., 1995. Capital goods imports and long-run growth. J. Dev. Econ. 48 (1), 19–110.

Lewer, J.J., Van den Berg, H., 2013. How large is international trade's effect on economic growth? J. Econ. Surv. 17 (3), 363–396.

Lucas, R., 1988. On the mechanics of economic development, Marshall Lectures, 1985 [reed. J. Monet. Econ. 22, 3–42.

Marshall, A., 1890. Principles of Economics. 8st ed. Macmillan, London (1920 [repr. in 1974]).

Menyah, K., Nazlioglu, S., Wolde-Rufael, Y., 2014. Financial development, trade openness and economic growth in African countries: new insights from panel causality approach. Econ. Model. 37, 386–394.

Morris, M., Fessehaie, J., 2014. The industrialisation challenge for Africa: towards a commodities based industrialisation path. J. Afr. Trade 1 (1), 25–36.

Musila, J.W., Yiheyis, Z., 2015. The impact of trade openness on growth: the case of Kenya. J. Policy Model 37, 342–354.

Nicita, A., Olarreaga, M., Porto, G., 2014. Pro-poor trade policy in Sub-Saharan Africa. J. Int. Econ. 92, 252–265.

Nowak-Lehmann, D.F., 2000. Trade Policy and its Impact on Economic Growth: Can Openness Speed up Output Growth? Georg-August-Universität Göttingen. Ibero-America institute for economic research (IAI, Göttingen

Onafowora, O.A., Owoye, O., 1998. Can trade liberalization stimulate economic growth in Africa? World Dev. 26 (3), 497–506.

Rebelo, S., 1991. Long run policy analysis and long-run growth. J. Polit. Econ. 99 (3), 500–521 (University of Chicago Press).

Rodriguez, F., Rodrik, D., 2001. Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence. In: Bernanke, B., Rogoff, K. (Eds.), NBER Macroeconomic Annual. MIT Press, Cambridge, MA.

Rodrik, D., 1999. The New Global Economy and Developing Countries: Making Openness Work. Overseas Development Council, Washington, DC.

Romer, P.M., 1986. Increasing returns and long-run growth. J. Polit. Econ. 94 (5), 1002–1038.

Romer, P.M., 1990. Endogenous technological change. J. Polit. Econ. 98.

Sachs, J.D., Warner, A., 1995. Economic reforms and the process of global integration. Brook. Pap. Econ. Act. 1, 1–118.

Salinas, G., Aksoy, A., 2006. Growth before and after Trade Liberalisation. World Bank Policy Research, Working Paper No. 4062, Washington, DC.

Salinas, G., Gueye, C., Korbut, O., 2015. Impressive growth in Africa under peace and market reforms. J. Afr. Econ. 24 (1), 101–127.

Savvides, A., 1995. Economic growth in Africa. World Dev. 23 (3), 449–458.

Schneider, P.H., 2005. "International trade, economic growth and intellectual property rights: a panel data study of developed and developing countries". J. Dev. Econ. 78, 529–547.

Singh, T., 2010. Does international trade cause economic growth? A survey. World Econ. 33 (11), 1517–1564.

Smith, A., 2015. An Inquiry into the Nature and Causes of the Wealth of Nations (tradução portuguesainquérito sobre a natureza e as causas da riqueza das nações). Fundação Calouste Gulbenkian, Lisbon (1981).

Solow, R., 1956. A contribution to the theory of economic growth. Q. J. Econ. 70, 65–94.

Solow, R., 1957. Technical progress and aggregate production function. Rev. Econ. Stud. 39, 312–320.

Subramanian, A., Kessler, M., 2013. The Hyper Globalization of Trade and its Future. Working Paper No. 3. Global Citizen Foundation.

Thirlwall, A.P., 2000. Trade, Trade Liberalization and Economic Growth: Theory and Evidence. Economic Research Papers No. 63. African Development Bank.

United Nations Conference on Trade and Development (UNCTAD), 2013. Economic Development in Africa Report 2013. Intra-African Trade: Unlocking Private Sector Dynamism. United Nations, Geneva.

Wacziarg, R., 2001. Measuring the dynamic gains from trade. World Bank Econ. Rev. 15, 393–429.

Wacziarg, R., Welch, K., 2008. Trade liberalisation and growth: new evidence. World Bank Econ. Rev. 22 (2), 187–231.

Winters, L.A., Masters, A., 2013. Openness and growth: still an open question? J. Int. Dev. 25, 1060–1070.

World Trade Organization (WTO), 2013. World Trade Report. WTO, Geneva.

Yanikkaya, H., 2003. Trade openness and economic growth: a cross-country empirical investigation. J. Dev. Econ. 72, 57–89.