

## Growth-enhancing Effect of Openness to Trade and Migrations: What is the Effective Transmission Channel for Africa

Dramane Coulibaly, Blaise Gnimassoun & Valérie Mignon

### Highlights

- We investigate the growth-enhancing effect of openness to trade and to migration in Africa.
- We show a varying impact of openness for Africa depending on the type of the partner country.
- Only trade between Africa and industrialized countries has a clear and robust positive impact on Africa's standards of living, operating through an improvement in total factor productivity.



## Abstract

This paper investigates the growth-enhancing effect of openness to trade and to migration by focusing on African countries. Relying on robust estimation techniques dealing with both endogeneity and omitted variables issues, our results show a varying impact of openness for Africa depending on the type of the partner country. Specifically, while trade between Africa and industrialized countries has a clear and robust positive impact on Africa's standards of living, trade with developing countries fails to be growth-enhancing. Moreover, our findings show that migration has no significant effect on per capita income in Africa regardless of the partner. Finally, exploring the trade openness transmission channel, we establish that the growth-enhancing effect of Africa's trade with industrialized countries mainly occurs through an improvement in total factor productivity.

## Keywords

Trade, International migration, Income per person, Africa.

## JEL

F22, F4, O4, O55.

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RESEARCH AND EXPERTISE  
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## Growth-enhancing effect of openness to trade and migrations: What is the effective transmission channel for Africa?<sup>1</sup>

Dramane Coulibaly\*, Blaise Gnimassoun† and Valérie Mignon‡

### 1. Introduction

While a vast literature exists on the link between income and openness to trade,<sup>2</sup> Frankel and Romer (1999) were the first to offer a convincing causality analysis regarding the income-enhancing effect of trade openness. The authors use the geographic characteristics as an instrument in a gravity-type model to demonstrate a positive effect of trade on per capita income; the main argument being that these factors are plausibly uncorrelated with other determinants of income per person. These findings were confirmed by several subsequent works (see among others Frankel and Rose, 2002; Dollar and Kraay, 2003; Noguer and Siscart, 2005; Freund and Bolaky, 2008), including across different time periods (see for example Irwin and Terviö, 2002).

However, consensus is far from clear on this issue. Rodriguez and Rodrik (2000) highlight the non-robust nature of these results once controlled for omitted variables such as distance from the equator or institutions. More recently, Ortega and Peri (2014) go a step further, and argue that the geographical factors used by Frankel and Romer (1999) can also impact income through migration. Geographic characteristics may raise income through the interactions between countries (exchange of ideas, technological diffusion, innovation, investment) and these interactions would be reflected in the mobility of goods (trade) and of people (migration). Thus, trade is not the sole vehicle of globalization through which interactions between countries promote economic growth. Acknowledging that openness to trade and openness to migration may be both considered as determinants of income,<sup>3</sup> Ortega and Peri (2014) find evidence of a strong positive effect of openness to migration on long-run per capita income but fail to do so for trade openness.

Despite the abundance of the literature, the debate is still open regarding the relationship between income and openness. Indeed, previous studies indiscriminately examine the growth-

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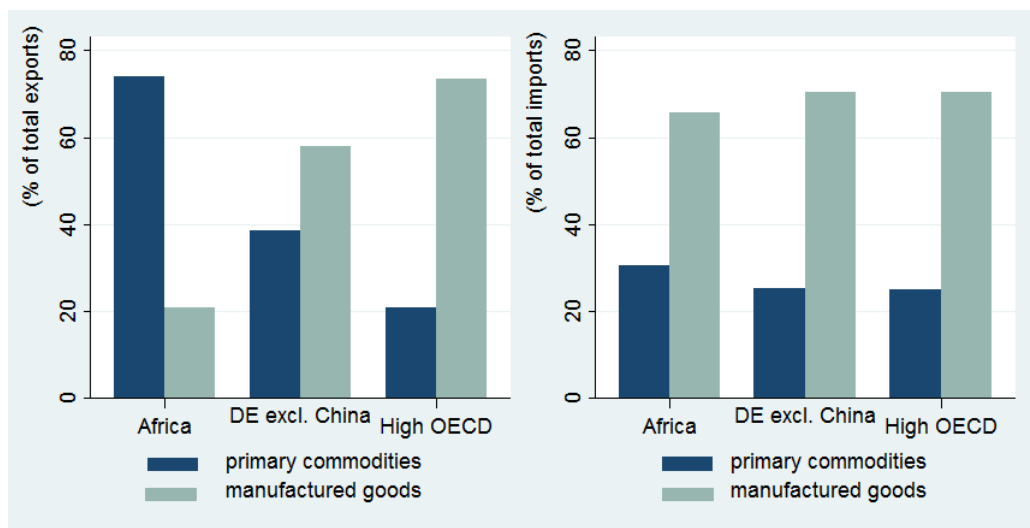
<sup>2</sup>For a survey, see Edwards (1995) and Rodrik (1995) among others.

<sup>3</sup>More precisely, openness to trade and openness to migration are jointly introduced in the income equation, being instrumented by the same geographical factors.

enhancing effect of openness without accounting for the heterogeneity of countries regarding the benefits or costs of openness. This paper fills this gap and focuses on the specific case of Africa. We aim at studying the overall effect of openness on long-term growth in Africa by paying particular attention to the type—African, over developing, developed—of partner countries. To this end, we retain the general trade-growth identification setting of Frankel and Romer (1999)<sup>4</sup> and follow Ortega and Peri (2014) in considering that intensity of openness between two countries should be captured by both bilateral trade and bilateral migration. Such a framework is even more relevant in the case of Africa, where openness to global finance is still in its infancy.

The choice of Africa and its singularity deserve some comments. Firstly, by scrutinizing the architecture of international trade, the case of Africa stands out as unique. As shown in Figure 1, unlike the rest of the world exports of African countries largely focus on commodities, while their imports are dominated by manufactured goods with a similar overall structure to that of developing and industrialized economies. Furthermore, as illustrated by the right side of Figure 2, Africa’s trade (imports and exports) is mainly realized with developed countries. Although this trade orientation could be beneficial for long-term growth in Africa—particularly through improvement in total factor productivity<sup>5</sup>—this growth is subject to the ups and downs of the terms of trade due to the high concentration of exports on commodities.

**Figure 1 – Comparative structure of international trade**

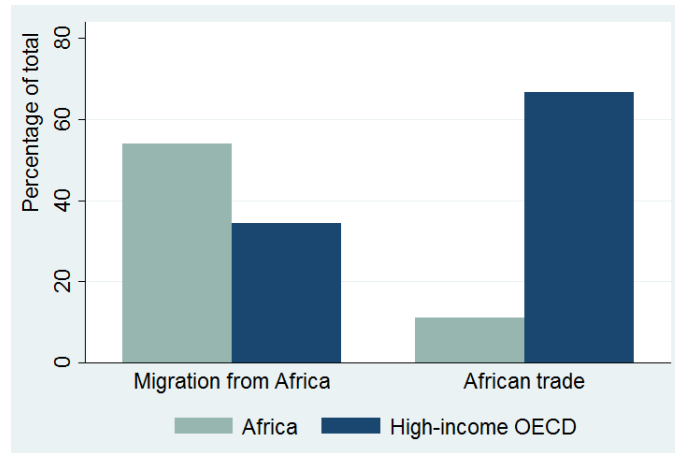


Notes: The left-hand side (resp. right-hand side) figure reports the percentage of primary commodities and manufactured goods in the total exports (resp. imports) for each region. DE = Developing Economies. Data source: UNCTAD (mean values over the 1995-2014 period).

Secondly, statistics on international migration underline that Africa is characterized by (i) strong

<sup>4</sup>Recall that this framework is based on the gravity model of trade in which countries’ geographic characteristics are used to obtain instrumental variables estimates of trade effect on income.

<sup>5</sup>See among others Edwards (1998) and Miller and Upadhyay (2000). See also our analysis in Section 5.

**Figure 2 – Openness of Africa (in 2000)**

Notes: Trade is measured by the sum of imports and exports. Migration from Africa is measured by the stock of African nationals living abroad. Data sources: UNCTAD (trade data) and World Bank (migration data).

intra-continental migration, and (ii) emigration to industrialized OECD countries. As shown in Figure 2, Africa's openness to migration in 2000 was more than half intra-African, while one-third was directed towards the industrialized OECD countries. This migration structure of Africa can be seen somewhat dichotomous. On the one hand, it may be viewed as detrimental because "brain drain" (emigration of relatively highly educated individuals) could hamper economic development in Africa. On the other hand, it may be considered as an enhancer factor of development in the sense that African nationals living in industrialized countries are vectors of transmission of human and technological capital (education and experience), but also vectors of transmission of financial capital (migrants' remittances) and better institutions.

Finally, despite the strong dominance of developed countries in Africa's trade, some developing economies such as China are gaining more and more market share in Africa since the beginning of the 2000s. If the growth-enhancing effect of openness between Africa and its new developing partners is debatable (see, among others, Lyons and Brown, 2010; He, 2013; Kaplinsky, 2013), this dynamics brings back the old question about the impact of South-South and North-South openness on growth and productivity in the southern countries. Addressing this hot-debated issue is thus worthy of investigation due to the continuously increasing role played by China in African trade.

Falling into the strand of the literature initiated by Frankel and Romer (1999) and Ortega and Peri (2014), our contribution is threefold. First, while the previous literature is mainly done at a global level, we pay particular attention to countries' specificities and heterogeneity in the face of openness by focusing on a panel of African economies. Second, we go further than previous studies by highlighting the importance of the trading partner. We investigate whether the effect of openness to trade and to migration on growth is sensitive to the type (African,

other developing, industrialized) of the partner country. In doing so, we also contribute to the very topical debate concerning China–Africa trade links. Third, in addition to the detailed study of the openness–income nexus, we identify the transmission channel through which trade affects growth.

Our main results can be summarized as follows. First, we establish a mitigated overall impact of openness on income in Africa. While trade seems to exert a positive effect on income, this impact is not robust to the inclusion of control variables. The influence of immigration is also fragile and depends on the method used to predict the geographic component of openness. Second, we put forward the importance of accounting for the type of the trading partner. Indeed, we find evidence of a clear and robust partner-varying impact of openness for Africa: only trade with industrialized countries has a strong and robust positive impact on income. Compared to Ortega and Peri (2014)'s contribution—which is the closest paper to ours and which insists on the dominant role of migration—we thus rehabilitate the growth-enhancing effect of trade, provided that Africa's trade partner country is an advanced one. Third, the positive impact of migration from African economies to industrialized countries (emigration for Africa) is not robust. This probably reflects the confrontation between the “brain drain” negative effect and the “productivity transfer” positive impact of emigration for Africa. Moreover, we find that Africa's openness (both to trade and to migration) with developing and emerging countries—including China—fails to improve per capita income.<sup>6</sup> Finally, exploring the openness transmission channel thanks to the income decomposition of Hall and Jones (1999), we establish that the growth-enhancing effect of African trade with industrialized countries mainly occurs through an improvement in total factor productivity. Various sensitivity analyses are provided to assess the robustness of all our findings.

The rest of the paper is organized as follows. Section 2 describes our empirical strategy. Section 3 is devoted to the presentation of data. In Section 4, we present and discuss our main results, and provide some robustness checks. Section 5 is dedicated to examining the transmission channel through which openness impacts income. Finally, Section 6 concludes the paper.

## 2. Empirical strategy

Our empirical framework is inspired from Ortega and Peri (2014) which, in turn, extends the specification proposed by Frankel and Romer (1999). To overcome the well-known endogeneity issue in the trade–income relationship, Frankel and Romer (1999) rely on the instrumental variable technique based on a gravity model. They estimate the causal effects of trade on income using cross-country variation in trade flows due to bilateral geography. According to Ortega and Peri (2014), Frankel and Romer (1999)'s specification suffers from a potential omitted-variables problem because trade and migration openness are both influenced by geography. Thus, country's geographic characteristics can affect income not only through trade but also through

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<sup>6</sup>It would be interesting to reevaluate this effect in a few years (especially for China), when more—recent—observations will be available to better capture a potential medium to long-term growth-enhancing impact.

migration. Indeed, geographical proximity and accessibility raise income through the interactions between countries (exchange of ideas, technological diffusion, innovation, investment) which would be reflected in the mobility of goods and of people (Ortega and Peri, 2014). In other words, trade is not the sole channel through which interactions between countries increase income. Therefore, to fully identify the impact of trade openness, these two vehicles of globalization should be jointly considered.

## 2.1. Baseline specification

Our empirical model is given by:

$$\ln Y_i = \alpha_0 + \alpha_T T_i + \alpha_M M_i + \alpha_P \ln Pop_i + \alpha_A \ln Area_i + \beta' \mathbf{X}_i + u_i \quad (1)$$

where  $Y_i$  denotes per capita income in country  $i$ ,  $T_i$  and  $M_i$  represent openness to trade and openness to migration, respectively,  $Pop_i$  and  $Area_i$  stand for population and area which capture the impact of country size,  $\mathbf{X}_i$  collects control variables, and  $u_i$  is the error term.

The rationale behind this empirical model is as follows. Classical international trade theory has highlighted that openness to trade increases output through specialization based on comparative advantages. New trade theory has documented the growth-enhancing role of trade by focusing on the exploitation of increasing returns to scale and network effects (Grossman and Helpman, 1991a,b; Helpman and Krugman, 1985).

The joint impact of trade and migration on income is explained by Ortega and Peri (2014) in a simple multi-country model that features trade and migration flows both across country borders and across regions within the same country. In this model—which extends Alesina et al. (2000)—aggregate production is a function of varieties for intermediate goods and human capital; and each region is endowed with a differentiated good and a differentiated type of labor. Intermediate goods and labor being mobile across regions of different countries but subject to iceberg-type costs, this model derives income per worker as a function of theoretical measures of trade and migration openness which are, respectively, inverse measures of trade and migration costs. Their empirical counterparts are respectively trade flows (exports+imports) as share of GDP, and immigration rate (foreign-born) as share of total population.

The income-enhancing impact of openness to migration in the theoretical model of Ortega and Peri (2014) operates through an increase in total factor productivity reflecting growing diversity in productive skills caused by immigration. At a first sight, this channel is not very relevant for African economies which are net labor-sending countries: brain drain might negatively affect income per capita by depriving African economies of valuable talents. However, there are many channels through which emigration can promote economic performance in home countries. Foremost, remittances for emigrants can compensate for the loss of workers by enabling households and entrepreneurs to overcome credit constraints and providing an alternative way to finance investment in human and physical capital (Giuliano and Ruiz-Arranz, 2009). Besides,

home countries can benefit from human capital of returning migrants (Stark et al., 1997; Beine et al., 2008) and the transfer of knowledge through the diaspora (Ortega and Peri, 2014). Furthermore, since there is strong evidence of the role of institutions in economic development,<sup>7</sup> emigration can be profitable to economic growth in the home country by improving the quality of institutions. Indeed, many recent studies in international migration literature highlight the role of emigration in improving institutions (Spilimbergo, 2009; Docquier et al., 2016). Using an international dataset, Spilimbergo (2009) shows that foreign-educated individuals play an important role in fostering democracy in the home country, but only if foreign education is acquired in democratic countries. Based on cross-section and panel analyses for a large sample of developing countries, Docquier et al. (2016) also find that general emigration has a positive effect on the quality of institutions in the home country.

Acknowledging the econometric concerns discussed above, Ortega and Peri (2014) propose to instrument both trade openness and openness to migration by their gravity-based predictors. This geography-based prediction of bilateral trade or bilateral migration stock is obtained by estimating the following pseudo-gravity model:

$$\begin{aligned}
 \ln W_{ij} = & \gamma_0 + \gamma_1 \ln Dist_{ij} + \gamma_2 \ln Pop_i + \gamma_3 \ln Pop_j + \gamma_4 \ln Area_i \\
 & + \gamma_5 \ln Area_j + \gamma_6 (Landlocked_i + Landlocked_j) + \gamma_7 Border_{ij} \\
 & + \gamma_8 Colony_{ij} + \gamma_9 ComLang_{ij} + \gamma_{10} Comcur_{ij} \\
 & + \gamma_{11} Time_{ij} + \gamma_{12} \ln Dist_{ij} \times Border_{ij} \\
 & + \gamma_{13} \ln Pop_i \times Border_{ij} + \gamma_{14} \ln Pop_j \times Border_{ij} \\
 & + \gamma_{15} \ln Area_i \times Border_{ij} + \gamma_{16} \ln Area_j \times Border_{ij} \\
 & + \gamma_{17} (Landlocked_i + Landlocked_j) \times Border_{ij} + e_{ij}
 \end{aligned} \tag{2}$$

where  $W_{ij}$  is either bilateral trade—i.e., the value of trade (exports + imports) between countries  $i$  and  $j$  divided by the GDP of origin country  $i$ —or bilateral migration (emigration)—i.e., the stock of migrants born in country  $j$  ( $i$ ) and living in country  $i$  ( $j$ ) as share of country  $i$ 's population,  $Dist_{ij}$  is the distance between country  $i$  and country  $j$ ,  $Pop$  and  $Area$  are the same variables defined in (1) and they are included to account for country size,  $Landlocked$  is a dummy variable for landlocked countries,  $Border$  is a dummy variable to indicate whether countries  $i$  and  $j$  share a common border,  $Colony$  is a dummy for colonial relationship, and  $ComLang$  is a dummy for sharing a common official language. Our specification includes an additional variable ( $Comcur$ ) compared to Ortega and Peri (2014). This variable aims at capturing the sharing of a common currency and might play an important role since the impact of currency unions on bilateral trade was frequently relayed in related studies (Rose, 2000, 2001; Frankel and Rose, 2002). As argued by the literature on the endogeneity of optimum currency area criteria, sharing a single currency may set motion forces that promote economic integration and then facilitate migration. Following Ortega and Peri (2014), we include time

<sup>7</sup>See the influential papers of Hall and Jones (1999), Acemoglu et al. (2001) and Rodrik et al. (2004).









































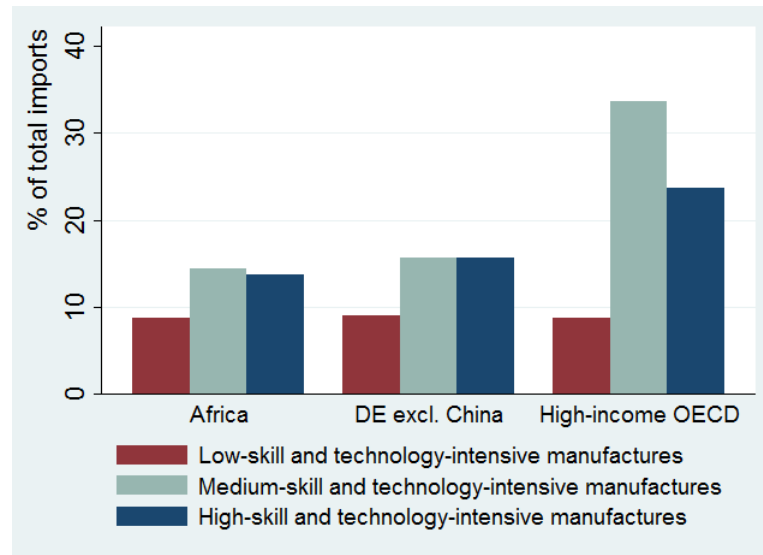










**Appendix****Figure A-1 – Composition of Africa's imports**

Notes: Data are extracted from UNCTAD and correspond to mean values over the 1995-2014 period.

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