Growth-enhancing effect of openness to trade and migrations: What is the effective transmission channel for Africa?

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\textit{WIDER Development Conference: Migration and Mobility}

Accra, 5-6 October 2017
Trade and income
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- Theory

- Classical international trade theory: Trade may increase output through:
  - Specialization based on comparative advantages
  - Differences in production technology (Ricardian model)
  - Differences in input endowments (Heckscher-Ohlin-Samuelson model)

- New international trade theory: Trade may increase output through:
  - Exploitation of increasing returns to scale (Helpman and Krugman, 1985)
  - Transfer of knowledge (Grossman and Helpman, 1991a,b)
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Empirical evidence

▶ Endogeneity issue: bidirectional causality between trade and growth

⋆ Countries whose incomes are high for reasons other than trade may trade more

▶ Frankel and Romer (1999) were the first to offer a convincing causality analysis regarding the income-enhancing effect of trade openness.

⋆ Instrumental Variable (IV) technique using geographic characteristics as instruments in a gravity-type model:

- Geographic factors may affect income through the interactions between countries (exchange of ideas, technological diffusion, innovation, investment)
- These interactions may be reflected by the mobility of goods (trade)

▶ Evidence of a positive effect of trade on growth, on world sample

These finding of Frankel and Romer (1999) was confirmed by several works (Frankel and Rose, 2002; Irwin and Terviä, 2002; Dollar and Kraay, 2003)
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Trade, migration and income

Motivation


Theory: openness to migration may promote growth through an increase in total factor productivity reflecting growing diversity in productive skills caused by immigration.

The mobility of goods (trade) is not the sole vehicle of globalization through which geographic characteristics may impact income, there is also the mobility of people (migration).

Empirical evidence on world sample: once geographic characteristics are used to instrument both trade and migration, there is no significant impact of trade, while a strong positive effect of migration.
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The empirical study of Ortega and Peri (2014) does not account for the heterogeneity of countries. This paper focuses on the specific case of Africa.

▶ Africa’s trade is mainly realized with developed countries, intra-continental trade is low.

▶ Strong intra-continental migration and emigration to industrialized countries.
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  - Strong intra-continental migration and emigration to industrialized countries.
Partner-varying impact of openness on African economies

The impact of openness on African growth may depend on the type of partner.

- New trade theory = a country can obtain advanced technology from its trading partners through trade.
- Africa can receive more benefit from trade with developed countries.

Partner-varying impact of openness to migration

- The theoretical channel (growing diversity in productive skills) of Ortega and Peri (2014) is not very relevant in the case of Africa:
  - South-South perspective (intra-African migration): relative homogeneity of skill between immigrants and natives
  - North-South perspective (emigration to developed countries): two ambivalent effects on African economies, adverse effect of brain drain and positive effect of “diaspora transfers” (remittances, human capital of returning migrants, transfer of knowledge, transfer of norms in improving institutions)
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Empirical strategy

Model specification
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- Impact of total openness (with the world)

\[ \ln Y_i = \alpha_0 + \alpha_T T_i + \alpha_M M_i + \alpha_P \ln \text{Pop}_i + \alpha_A \ln \text{Area}_i + \text{DistEqua}_i + \beta' X_i + u_i \]
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- \( DistEqua_i \) = distance from the equator to proxy for institutions’ quality (Hall and Jones, 1999; Rodriguez and Rodrik, 2000)
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- \( DistEqua_i \) = distance from the equator to proxy for institutions’ quality (Hall and Jones, 1999; Rodriguez and Rodrik, 2000)
- \( X_i \) = set of control variables
- \( u_i \) is the error term.
Empirical strategy

Model specification

\[ \ln Y_i = \alpha_0 + \alpha_S T S_i + \alpha_M M S_i + \alpha_P \ln Pop_i + \alpha_A \ln Area_i + \text{DistEqua}_i + \beta' X_i + u_i \]

- \( S \) may be the subset of African partners, the subset of partners among developing countries, or the subset of partners among industrialized countries.
- \( T S \) = trade openness with the subset \( S \) of partners
- \( M S \) = migration with the subset \( S \) of partners

- \( \text{Intra-African} \) = Immigration received by a African country from other African countries
- \( \text{Africa with non-industrialized countries} \) = Immigration received by an African country from non-industrialized countries (including African countries)
- \( \text{Africa with industrialized countries} \) = Emigration from an African country to industrialized countries
Empirical strategy

Model specification

- Impact of openness with a subset of partners

\[ \ln Y_i = \alpha_0 + \alpha_T^S T_i^S + \alpha_M^S M_i^S + \alpha_P \ln \text{Pop}_i + \alpha_A \ln \text{Area}_i + \text{DistEqua}_i + \beta' X_i + u_i \]
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- \( T^S \) = trade openness with the subset \( S \) of partners
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- Intra-African = Immigration received by a African country from other African countries
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  - Africa with non-industrialized countries: Immigration received by an African country from non-industrialized countries (including African countries)
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Empirical strategy

Gravity-based instruments

\[ \ln W_{ij} = \gamma_0 + \gamma_1 \ln \text{Dist}_{ij} + \gamma_2 \ln \text{Pop}_i + \gamma_3 \ln \text{Pop}_j + \gamma_4 \ln \text{Area}_i + \gamma_5 \ln \text{Area}_j + \gamma_6 (\text{Landlocked}_i + \text{Landlocked}_j) + \gamma_7 \text{Border}_{ij} + \gamma_8 \text{Colony}_{ij} + \gamma_9 \text{ComLang}_{ij} + \gamma_{10} \text{Comcur}_{ij} + \gamma_{11} \text{Time}_{ij} + \gamma_{12} \ln \text{Dist}_{ij} \times \text{Border}_{ij} + \gamma_{13} \ln \text{Pop}_i \times \text{Border}_{ij} + \gamma_{14} \ln \text{Pop}_j \times \text{Border}_{ij} + \gamma_{15} \ln \text{Area}_i \times \text{Border}_{ij} + \gamma_{16} \ln \text{Area}_j \times \text{Border}_{ij} + \gamma_{17} (\text{Landlocked}_i + \text{Landlocked}_j) \times \text{Border}_{ij} + e_{ij} \]

\( W_{ij} \) = bilateral trade (exports + imports) between countries \( i \) and \( j \) divided by the GDP of origin country \( i \), or bilateral immigration (emigration) the stock of migrants born in country \( j \) and living in country \( i \) as share of country \( i \)'s population

\( \text{Dist}_{ij} \) = distance between country \( i \) and country \( j \)

\( \text{Pop} \) and \( \text{Area} \) = population and area and are included to account for country size

\( \text{Landlocked} \) = dummy variable for landlocked countries

\( \text{Border} \) = dummy variable to indicate whether countries \( i \) and \( j \) share a common border

\( \text{Colony} \) = dummy for colonial relationship

\( \text{ComLang} \) = dummy for sharing a common official language

\( \text{Comcur} \) = dummy capturing the sharing of a common currency

\( \text{Time}_{ij} \) = time zone differences between the two countries
Gravity-based instruments

- Gravity regression

\[
\ln W_{ij} = \gamma_0 + \gamma_1 \ln \text{Dist}_{ij} + \gamma_2 \ln \text{Pop}_i + \gamma_3 \ln \text{Pop}_j + \gamma_4 \ln \text{Area}_i \\
+ \gamma_5 \ln \text{Area}_j + \gamma_6 (\text{Landlocked}_i + \text{Landlocked}_j) + \gamma_7 \text{Border}_{ij} \\
+ \gamma_8 \text{Colony}_{ij} + \gamma_9 \text{ComLang}_{ij} + \gamma_10 \text{Comcur}_{ij} \\
+ \gamma_11 \text{Time}_{ij} + \gamma_12 \ln \text{Dist}_{ij} \times \text{Border}_{ij} \\
+ \gamma_13 \ln \text{Pop}_i \times \text{Border}_{ij} + \gamma_14 \ln \text{Pop}_j \times \text{Border}_{ij} \\
+ \gamma_15 \ln \text{Area}_i \times \text{Border}_{ij} + \gamma_16 \ln \text{Area}_j \times \text{Border}_{ij} \\
+ \gamma_17 (\text{Landlocked}_i + \text{Landlocked}_j) \times \text{Border}_{ij} + \epsilon_{ij}
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- **Gravity regression**

\[
\ln W_{ij} = \gamma_0 + \gamma_1 \ln \text{Dist}_{ij} + \gamma_2 \ln \text{Pop}_i + \gamma_3 \ln \text{Pop}_j + \gamma_4 \ln \text{Area}_i \\
+ \gamma_5 \ln \text{Area}_j + \gamma_6 (\text{Landlocked}_i + \text{Landlocked}_j) + \gamma_7 \text{Border}_{ij} \\
+ \gamma_8 \text{Colony}_{ij} + \gamma_9 \text{ComLang}_{ij} + \gamma_{10} \text{Comcur}_{ij} \\
+ \gamma_{11} \text{Time}_{ij} + \gamma_{12} \ln \text{Dist}_{ij} \times \text{Border}_{ij} \\
+ \gamma_{13} \ln \text{Pop}_i \times \text{Border}_{ij} + \gamma_{14} \ln \text{Pop}_j \times \text{Border}_{ij} \\
+ \gamma_{15} \ln \text{Area}_i \times \text{Border}_{ij} + \gamma_{16} \ln \text{Area}_j \times \text{Border}_{ij} \\
+ \gamma_{17} (\text{Landlocked}_i + \text{Landlocked}_j) \times \text{Border}_{ij} + e_{ij}
\]

- \( W_{ij} = \) bilateral trade (exports + imports) between countries \( i \) and \( j \) divided by the GDP of origin country \( i \), or bilateral immigration (emigration) the stock of migrants born in country \( j \) (\( i \)) and living in country \( i \) (\( j \)) as share of country \( i \)'s population

- \( \text{Dist}_{ij} = \) distance between country \( i \) and country \( j \)
Empirical strategy

Gravity-based instruments

- Gravity regression

\[
\ln W_{ij} = \gamma_0 + \gamma_1 \ln \text{Dist}_{ij} + \gamma_2 \ln \text{Pop}_i + \gamma_3 \ln \text{Pop}_j + \gamma_4 \ln \text{Area}_i \\
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- \( \text{Pop} \) and \( \text{Area} \)= population and area and are included to account for country size
Gravity-based instruments

- Gravity regression

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\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 (\text{Landlocked}_i + \text{Landlocked}_j) + \gamma_7 \text{Border}_{ij} \\
+ \gamma_8 \text{Colony}_{ij} + \gamma_9 \text{ComLang}_{ij} + \gamma_{10} \text{Comcur}_{ij} \\
+ \gamma_{11} \text{Time}_{ij} + \gamma_{12} \ln Dist_{ij} \times \text{Border}_{ij} \\
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Gravity-based instruments

- Gravity regression

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Empirical strategy

Gravity-based instruments

- Gravity regression

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- \( \text{Colony} \) = dummy for colonial relationship
Gravity-based instruments

- Gravity regression

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- Time

Dramane Coulibaly - Growth-enhancing effect of openness to trade and migrations: What is the channel for Africa ?
Empirical strategy

Gravity-based instruments

- Gravity regression

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- \( \text{ComLang} \) = dummy for sharing a common official language
- \( \text{Comcur} \) = dummy capturing the sharing of a common currency
- \( \text{Time}_{ij} \) = time zone differences between the two countries
Empirical strategy

Gravity-based instruments

Gravity-based predictor as instrument for total openness

\[ \hat{T}_i = \sum_{j \neq i} \exp(\hat{\Gamma}_T Z_{ij}) \] 
\[ \hat{\Gamma}_T = \text{vector of estimated coefficients in gravity regression for trade} \]

Instrument for Trade:

Gravity-based predictor as instrument for openness with a subset of partners

Instrument for Trade with a subset of partners:

\[ \hat{T}_S i = \sum_{j \in S} \exp(\hat{\Gamma}_T Z_{ij}) \] 

Instrument for Migration:

\[ \hat{M}_i = \sum_{j \neq i} \exp(\hat{\Gamma}_M Z_{ij}) \] 
\[ \hat{\Gamma}_M = \text{vector of estimated coefficients in gravity regression for migration} \]

Instrument for Migration with a subset of partners:

\[ \hat{M}_S i = \sum_{j \in S} \exp(\hat{\Gamma}_M Z_{ij}) \]
Empirical strategy

Gravity-based instruments

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\( \hat{\Gamma}_T \) = vector of explanatory variables in gravity regression

Instrument for Migration:
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Gravity-based instruments

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Gravity-based instruments

- Gravity-based predictor as instrument for total openness
  - Instrument for Trade: $\hat{T}_i = \sum_{j \neq i} \exp(\hat{\Gamma}_T Z_{ij})$
    - $Z$ = vector of explanatory variables in gravity regression
  - Instrument for Migration: $\hat{M}_i = \sum_{j \neq i} \exp(\hat{\Gamma}_M Z_{ij})$
    - $\hat{\Gamma}_T$ = vector of estimated coefficients in gravity regression for trade
    - $\hat{\Gamma}_M$ = vector of estimated coefficients in gravity regression for migration
Gravity-based instruments

- Gravity-based predictor as instrument for total openness

  - Instrument for Trade: \( \hat{T}_i = \sum_{j \neq i} \exp(\hat{\Gamma}_T Z_{ij}) \)

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  - Instrument for Migration with a subset of partners: 
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Empirical strategy

Gravity-based instruments

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Dramane Coulibaly - Growth-enhancing effect of openness to trade and migrations: What is the channel for Africa?
Gravity-based instruments

- Gravity-based predictor as instrument for total openness
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Gravity-based instruments

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- Gravity-based predictor as instrument for openness with a subset of partners
Gravity-based instruments

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- Gravity-based predictor as instrument for openness with a subset of partners
  - Instrument for Trade with a subset of partners: $\hat{T}_i^S = \sum_{j \in S} \exp(\hat{\Gamma}_T Z_{ij})$
Gravity-based instruments

- Gravity-based predictor as instrument for total openness
  - Instrument for Trade: \( \hat{T}_i = \sum_{j \neq i} \exp(\hat{\Gamma}_T Z_{ij}) \)
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Estimation methods for gravity

- Linear OLS estimator
- Linear Predicted (LP) gravity-based instrument
- Non-linear Poisson Pseudo Maximum Likelihood (PPML) (Silva and Tenreyro, 2006)
  - It allows to deal with observations of the dependent variable with zero value
  - Heteroskedasticity-related issues.
- Non-Linear Predicted (NLP) gravity-based instrument
Empirical strategy

Estimation methods for gravity

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  - Linear Predicted (LP) gravity-based instrument

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Empirical strategy

Data

- 200 countries in the world, including 52 African countries, year=2000
- Bilateral trade from IMF Direction of Trade Statistics (DOTS)
- Bilateral migration from Docquier et al. (2010)
- Geographic variables from CEPII's gravity database
- Dependent variable: Real PPP-adjusted GDP per person from Penn World Tables
- Population (World bank)
- Colonial controls from Acemoglu et al. (2001)
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## Impact of total openness (with the world)

<table>
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<tr>
<td><strong>Dependent variable</strong></td>
<td>log (income per capita)</td>
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<td><strong>African openness with the world</strong></td>
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<tr>
<td>Trade</td>
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<td>(0.73)</td>
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<td>Constant</td>
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<td>7.57***</td>
<td>5.27***</td>
<td>6.37***</td>
</tr>
<tr>
<td></td>
<td>(0.49)</td>
<td>(0.60)</td>
<td>(0.81)</td>
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<td>Observations</td>
<td>52</td>
<td>44</td>
<td>52</td>
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</tr>
<tr>
<td>Colonial controls</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Geo/climate controls</td>
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<td>No</td>
<td>Yes</td>
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<tr>
<td>K-P F-stat</td>
<td>0.81</td>
<td>4.30</td>
<td>0.77</td>
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<tr>
<td>SW F-stat for Trade</td>
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<td>11.92</td>
<td>3.28</td>
<td>0.34</td>
</tr>
<tr>
<td>SW F-stat for Mig.</td>
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<td>4.47</td>
<td>2.41</td>
<td>0.35</td>
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<tr>
<td>SY 10% max IV size</td>
<td>7.03</td>
<td>7.03</td>
<td>7.03</td>
<td>7.03</td>
</tr>
<tr>
<td>SY 25% max IV size</td>
<td>3.63</td>
<td>3.63</td>
<td>3.63</td>
<td>3.63</td>
</tr>
</tbody>
</table>

Notes: LP (NLP) = linear (non-linear) predicted trade and migration based on the OLS (PPML) gravity estimates. *, **, and *** denote significance at the 10%, 5% and 1% confidence level, respectively. K-P F-stat = Kleibergen and Paap (2006) rk Wald F-stat test of jointly weak identification. SW F-stat = Sanderson and Windmeijer (2015) F-stat test of weak identification for each endogenous regressor separately. SY 10% max IV size and SY 10% max IV size are the Stock and Yogo (2005) critical values.
### Identifying partner-varying impact of openness

<table>
<thead>
<tr>
<th>Dependent variable=log (income per capita)</th>
<th>Intra-African</th>
<th></th>
<th>Africa with non-industrialized countries</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LP (1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>LP (5)</td>
<td>(6)</td>
</tr>
<tr>
<td><strong>Trade</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.28 (10.26)</td>
<td>13.97 (13.00)</td>
<td>0.86 (2.85)</td>
<td>4.86 (3.90)</td>
<td>4.44 (2.87)</td>
<td>3.50 (3.40)</td>
</tr>
<tr>
<td><strong>Immig.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.10 (4.69)</td>
<td>3.40 (4.56)</td>
<td>4.94 (5.20)</td>
<td>6.14 (4.03)</td>
<td>5.36 (6.00)</td>
<td>12.33** (5.22)</td>
</tr>
<tr>
<td><strong>Ln pop.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-0.45** (0.21)</td>
<td>-0.39* (0.22)</td>
<td>-0.34** (0.14)</td>
<td>-0.27** (0.13)</td>
<td>-0.30* (0.16)</td>
<td>-0.15 (0.14)</td>
</tr>
<tr>
<td><strong>Ln area</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.15 (0.16)</td>
<td>0.27 (0.19)</td>
<td>0.07 (0.10)</td>
<td>0.17 (0.11)</td>
<td>0.09 (0.11)</td>
<td>0.16 (0.10)</td>
</tr>
<tr>
<td><strong>Dist. equator</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.05*** (0.02)</td>
<td>0.06*** (0.02)</td>
<td>0.05*** (0.01)</td>
<td>0.06*** (0.01)</td>
<td>0.06*** (0.01)</td>
<td>0.07*** (0.02)</td>
</tr>
<tr>
<td><strong>Constant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.08*** (1.24)</td>
<td>5.14*** (1.25)</td>
<td>6.65*** (0.64)</td>
<td>5.73*** (0.62)</td>
<td>5.63*** (0.71)</td>
<td>4.93*** (0.95)</td>
</tr>
<tr>
<td><strong>Observations</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>50</td>
<td>52</td>
<td>50</td>
<td>52</td>
<td>50</td>
</tr>
<tr>
<td><strong>Colonial/geo controls</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>K-P F-stat</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.953</td>
<td>0.847</td>
<td>6.171</td>
<td>4.468</td>
<td>1.814</td>
<td>2.123</td>
</tr>
<tr>
<td><strong>SW F-stat for Trade</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.905</td>
<td>1.751</td>
<td>9.866</td>
<td>8.120</td>
<td>7.467</td>
<td>7.938</td>
</tr>
<tr>
<td><strong>SW F-stat for Mig.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.659</td>
<td>15.56</td>
<td>5.727</td>
<td>7.168</td>
<td>2.139</td>
<td>3.164</td>
</tr>
<tr>
<td><strong>SY 10% max IV size</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.03</td>
<td>7.03</td>
<td>7.03</td>
<td>7.03</td>
<td>7.03</td>
<td>7.03</td>
</tr>
<tr>
<td><strong>SY 25% max IV size</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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## Empirical results

### Identifying partner-varying impact of openness

<table>
<thead>
<tr>
<th>Dependent variable = log (income per capita)</th>
<th>Africa with industrialized countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>LP (1)</td>
<td>LP (2)</td>
</tr>
<tr>
<td>Trade</td>
<td>2.08**</td>
</tr>
<tr>
<td></td>
<td>(0.89)</td>
</tr>
<tr>
<td>Emig.</td>
<td>34.52**</td>
</tr>
<tr>
<td></td>
<td>(16.45)</td>
</tr>
<tr>
<td>Ln pop.</td>
<td>-0.26*</td>
</tr>
<tr>
<td></td>
<td>(0.15)</td>
</tr>
<tr>
<td>Ln area</td>
<td>0.29</td>
</tr>
<tr>
<td></td>
<td>(0.19)</td>
</tr>
<tr>
<td>Dist. equator</td>
<td>0.03*</td>
</tr>
<tr>
<td></td>
<td>(0.02)</td>
</tr>
<tr>
<td>Constant</td>
<td>4.86***</td>
</tr>
<tr>
<td></td>
<td>(1.10)</td>
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<tr>
<td>Observations</td>
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</tr>
<tr>
<td>Colonial/geo controls</td>
<td>No</td>
</tr>
<tr>
<td>K-P F-stat</td>
<td>3.738</td>
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<td>SW F-stat for Trade</td>
<td>19.40</td>
</tr>
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<td>SW F-stat for Mig.</td>
<td>9.958</td>
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<td>SY 10% max IV size</td>
<td>7.03</td>
</tr>
<tr>
<td>SY 25% max IV size</td>
<td>3.63</td>
</tr>
</tbody>
</table>

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The channels of growth-enhancing impact of trade with developed countries

Empirical results

The Hall and Jones, 1999 output decomposition

\[ Y_i = K_i^{\alpha_i} \left( H_i A_i \right)^{1-\alpha_i} \]

\[ Y_i = \text{output in country } i; \]

\[ K_i = \text{physical capital}; \]

\[ H_i = \text{human capital}; \]

\[ A_i = \text{productivity term}; \]

\[ \alpha = \text{labor share in income} \]

Production per worker

\[ \ln y_i = \alpha_i (1-\alpha_i) \ln \left( K_i Y_i \right) + \ln h_i + \ln (A_i) \]

\[ y_i = \frac{Y_i}{L_i} = \text{output per worker}; \]

\[ h_i = \frac{H_i}{L_i} = \text{human capital per worker} \]

Human capital is assumed to be a function of returns to schooling as estimated in a Mincerian wage regression

\[ \alpha = \frac{1}{3} \text{ in line with standard neoclassical approach} \]
The channels of growth-enhancing impact of trade with developed countries

- How trade with industrialized countries promote growth in Africa?
The channels of growth-enhancing impact of trade with developed countries

- How trade with industrialized countries promote growth in Africa?
  - Transfer of technologies?
The channels of growth-enhancing impact of trade with developed countries

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- The Hall and Jones, 1999 output decomposition
The channels of growth-enhancing impact of trade with developed countries

- How trade with industrialized countries promote growth in Africa?
  - Transfer of technologies?

- The Hall and Jones, 1999 output decomposition
  - Production function $Y_i = K_i^\alpha (H_i A_i)^{1-\alpha}$
The channels of growth-enhancing impact of trade with developed countries

- How trade with industrialized countries promote growth in Africa?
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- The Hall and Jones, 1999 output decomposition

  - Production function \( Y_i = K_i^\alpha (H_i A_i)^{1-\alpha} \)
    - \( Y_i \) = output in country \( i \); \( K_i \) = physical capital; \( H_i \) = human capital

Dramane Coulibaly - Growth-enhancing effect of openness to trade and migrations: What is the channel for Africa?
Empirical results

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    \( Y_i \) = output in country \( i \); \( K_i \) = physical capital; \( H_i \) = human capital
    
    \( A_i \) = productivity term; \( \alpha \) = labor share in income
The channels of growth-enhancing impact of trade with developed countries

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  - Production function $Y_i = K_i^{\alpha} (H_i A_i)^{1-\alpha}$
    - $Y_i =$ output in country $i$; $K_i =$ physical capital; $H_i =$ human capital
    - $A_i =$ productivity term; $\alpha =$ labor share in income
  - Production per worker $\ln y_i = \frac{\alpha}{(1-\alpha)} \ln \left( \frac{K_i}{Y_i} \right) + \ln h_i + \ln (A_i)$
The channels of growth-enhancing impact of trade with developed countries

- **How trade with industrialized countries promote growth in Africa?**
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    - \( A_i \) = productivity term ; \( \alpha \)=labor share in income
  - **Production per worker** \( \ln y_i = \frac{\alpha}{1 - \alpha} \ln \left( \frac{K_i}{Y_i} \right) + \ln h_i + \ln (A_i) \)
    - \( y_i = Y_i/L_i= \) output per worker; \( h_i = H_i/L_i= \) human capital per worker
Empirical results

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    - Human capital is assumed to be a function of returns to schooling as estimated in a Mincerian wage regression
  - \( \alpha = 1/3 \) in line with standard neoclassical approach
The channels of growth-enhancing impact of trade with developed countries

<table>
<thead>
<tr>
<th></th>
<th>( \ln Y / L )</th>
<th>( \frac{\alpha}{1-\alpha} \ln K / Y )</th>
<th>( \ln H / L )</th>
<th>( \ln A )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade</td>
<td>3.54**</td>
<td>-0.37</td>
<td>0.58</td>
<td>4.00***</td>
</tr>
<tr>
<td></td>
<td>(1.52)</td>
<td>(0.48)</td>
<td>(0.63)</td>
<td>(1.54)</td>
</tr>
<tr>
<td>Ln pop.</td>
<td>-0.26**</td>
<td>-0.08*</td>
<td>-0.05</td>
<td>-0.16</td>
</tr>
<tr>
<td></td>
<td>(0.13)</td>
<td>(0.05)</td>
<td>(0.04)</td>
<td>(0.15)</td>
</tr>
<tr>
<td>Ln area</td>
<td>0.07</td>
<td>-0.00</td>
<td>0.02</td>
<td>0.07</td>
</tr>
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<td>(0.09)</td>
<td>(0.03)</td>
<td>(0.03)</td>
<td>(0.11)</td>
</tr>
<tr>
<td>Dist. equator</td>
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<td>-0.00</td>
<td>0.00</td>
<td>0.05***</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Constant</td>
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<td>0.26</td>
<td>-0.99***</td>
<td>-4.42***</td>
</tr>
<tr>
<td></td>
<td>(0.47)</td>
<td>(0.17)</td>
<td>(0.18)</td>
<td>(0.49)</td>
</tr>
</tbody>
</table>

Observations | 45               | 45                              | 47              | 44             |
Colonial/geo controls | Yes            | Yes                            | Yes            | Yes            |
K-P F-stat     | 19.373          | 9.373                           | 15.35           | 9.246          |
SW F-stat      | 9.373           | 9.373                           | 15.35           | 9.246          |
SY 10% max IV size | 16.38          | 16.38                           | 16.38           | 16.38          |
SY 25% max IV size | 5.530          | 5.530                           | 5.530           | 5.530          |

Notes: The explained variables are normalized by the value of the US. The predicted values of trade, exports and imports are those based on the non-linear estimation. *, **, and *** denote significance at the 10%, 5% and 1% confidence level, respectively. K-P F-stat = Kleibergen and Paap (2006) rk Wald F-stat test of jointly weak identification. SW F-stat = Sanderson and Windmeijer (2015) F-stat test of weak identification for each endogenous regressor separately. SY 10% max IV size and SY 10% max IV size are the Stock and Yogo (2005) critical values.
The impact of openness on African economies depends on the type of openness (trade vs migration) and on partner. No impact of migration (immigration and emigration), whatever the partner. Trading more with developed countries helps to promote growth in Africa, through the transfer of technologies.
The impact of openness on African economies depends on the type of openness (trade vs migration) and on partner.

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Conclusion

- The impact of openness on African economies depends on the type of openness (trade vs migration) and on partner
  
  - No impact of migration (immigration and emigration), whatever the partner
Conclusion

- The impact of openness on African economies depends on the type of openness (trade vs migration) and on partner

  ▶ No impact of migration (immigration and emigration), whatever the partner

  ▶ Trading more with developed countries helps to promote growth in Africa, through the transfer of technologies
THANKS


Monetary Economics 50, 133-162.


