REVIEW

The impacts of institutional quality and infrastructure on overall and intra-Africa trade

Objective:
how institutions, border, transport, physical and communication infrastructure impact African trade (total trade and intra-trade)

Significance:
- comprehensive analysis: more indicators, longer time period, intra-regional trade
- account for economic and governance institutions
- two-step Heckman model
- account for omitted multilateral resistance (trade costs)
- robustness check for endogeneity

Method:
- PCA to derive aggregate indices
- Gravity model
- 44 African countries, 173 partners, 2000-2014

Results:
- positive impact on trade flows (intensive margins) and participation (extensive margins) in intra-regional and international trade
- GDP per capita: increases the trade impact of institutions, physical and communication infrastructure, but decreases the impact of border and transport
- Simulation of improving each indicator to the best performer (distance-equivalence)

General comments

The paper provides an interesting addition to the overall literature on how to improve the trade environment in Africa and contribute to improve the continent stance in the global trade. As tariffs have been reduced to historically low levels, the issue is how to deal with the trade infrastructure that tend to be unfriendly. The results provide a clear indication of the trade benefits of improving the quality of institutions, border and transport, and communication.

The following comments need to be accounted for in order to add to the quality of the paper:

- The discussion of the problem could be broaden to mention (i) the regional integration processes that aim to reinforce trade ties among African countries, as well as the proposed continent-wide FTA, (ii) go beyond the continent intra-trade average of 11% and show some differences across the regional blocks (see the 2017 WTO's "World Trade Statistical Review", page 12; or the 2018 report), and (iii) the WTO's trade

facilitation agreements of 2013 that aim to improve the trade environment and to which a large number of African countries have adhered.

- The literature review section is too short (only three references have been cited), and tend to be repetitive of the more detailed discussion of the literature in the introduction (more than a dozen papers cited). The authors may consider dropping the literature section. Alternatively, the discussion in the introduction can be reduced and properly summarized, and the literature section will then offer in-depth discussions.

- The invoked literature could include the paper by Seck (2017). Most of what the authors aim to do have been addressed in the paper which tends to be more comprehensive: impact of various soft and hard infrastructure from both the exporter and importers perspectives (measured in terms of tariff and distance equivalence), both total and intra-regional trade, a comparison between Africa and the rest of the developing world, a simulation exercise, in addition to trade composition (agricultural vs. manufacturing commodities), in the context of a gravity model

- The discussion of the gravity model could start with the standard non-linear form, and then show why the variables are, in the final reduced form, specified in log terms.

- A more careful interpretation of the interaction terms is warranted. See the paper by Brambor et al. (2005).

- Additional variables o be considered: common currency, tariffs (to the extent that they are not highly correlated with RTA – they allow for instance in the simulation to obtain tariff-equivalences)

- In addition to PPML and a selection model, negative binomial model can also be used to address the issue of zero trade. It compares with PPML with respect to the dispersion of the data. The author need to mention this, and possibility explain why the negative binomial approach may be ruled out.

- The Heckman-type selection model also need to be compared with *hurdle*-type model, the difference being whether the DGPs modeled in the first stage (probability of trading) and second stage (trade flows) are independent. The Heckman repression output show also include the LR test for independence, which the authors need to report and discuss.

- The estimation results tables need to include additional statistics: total number of obs., Wald statistic for joint significance, etc. (in addition to LR test of independence). The footnotes under the tables should rather read "Notes" instead of "Sources", and the it would be interesting to remind the reader what the explained variable is and how it is specified.

- In discussing the results ("variables of main interest"), it is important to compare with the findings in the previous literature: significance, sign, magnitude, etc.

- Why the three infrastructure variables have been included separately in the regression analyses, why not account for them simultaneously? Is there any issue of multicolinearity? The authors need to show that.

- The IV regression results should also include various test results: endogeneity, weak instrument, over-identification, etc.

- In the end, the authors need to tell which one the three dimensions of the trade environment matters the most. This is particularly important from a policy standpoint, as government may need to prioritize among the reforms aiming at boosting trade.

Better than the distance equivalence measures, the authors may consider rescaling the variables so that they become comparable, and then the estimated coefficients will provide such information.

Minor comments

- Paragraph 1 (page 2): provide data supporting the claim "(…) African countries are among those having the least trade share compared to other regions in the world market"; also add intra-regional trade data from elsewhere to be compared with the intra-trade figure of 11%
- Paragraph 2, page 2: provide some references in support of the claim "Some literatures indicate that tariff and non-tariff barriers are responsible for high cost of trade and the lower performance of developing countries in the world trade."
- Paragraphs are relatively too long. (e.g.: paragraph 2, page 2). Think of breaking them up and organize around key ideas
- A careful reading is required to correct many typos and improve the writing
- List of countries in the appendix: instead of the abbreviations, use the entire spellings of countries' name.
- It is customary to denote the significance level by *** (1%), ** (5%) and * (10%). The authors may want to follow suit.

References

Seck, A. (2017). How facilitating trade would benefit trade in sub-Saharan Africa, *Journal of African Development* 19(1): 1-26.

Brambor, T., W.R. Clark, and M. Golder (2005). Understanding Interaction Models: Improving Empirical Analyses, *Political Analysis* 13:1–20