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Value-Added Gains from Trade Facilitation: Evidence from Sub-Saharan Africa

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Africa's poor export performance has long attracted interest of researchers and policy makers alike (e.g., Page, 2012). Even as market access to developed countries considerably improved through preferential access, African countries still lag behind other regions in export performance, especially in manufacturing (UNCTAD, 2008). It is often argued that Africa's exports are most constrained by poor trade logistics. Freund and Rocha (2011), for example, find that a one-day increase in inland transport reduces gross exports by 7%. This is echoed in trade policy. Already in 2003, the WTO initiated talks on the Trade Facilitation Agreement, which came into force in 2017. This agreement is meant to streamline border procedures to decrease trade costs, bearing great hopes in developing countries.

Given this prominence of trade facilitation, it is important to evaluate the expected benefits. This is the goal of this paper focusing on three African low-income countries (Ethiopia, Kenya, Senegal) in comparison to a set of Asian ones. While there are a number of studies on trade facilitation (e.g., Djankov et al., 2010; Freund and Rocha, 2011), this paper seeks to contribute by studying trade facilitation in the context of production fragmentation, addressing potentially misleading results with respect to the net impact and to the distribution of impacts across sectors.

In recent decades, production increasingly fragmented within and across countries (e.g., Hummels et al., 2001; Johnson and Noguera, 2017; Pahl and Timmer, 2019). Products used to be fully finalised within single countries and typically even by single firms. Today, a finalised product embodies contributions from multiple firms in multiple sectors within the producing country and similarly from firms in multiple sectors in other countries. This has three main implications for the evaluation of trade effects. Firstly, gross trade figures no longer accurately reflect a country's benefits as exports potentially embody a large share of foreign value added. Secondly, a country's product-level exports do not only generate value added in the exporting sector but due to linkages potentially in multiple other sectors. To understand the sectoral dynamics, one must therefore take linkages into account. Lastly, GVCs give rise to indirect trade effects via third countries. That is, trade barriers between country *i* and *j* might affect country *k* if it supplies intermediates to country *i* that are further exported to country *j*.

All three implications are of relevance in the African context. The foreign value added content in total exports of the three African countries ranges between 20 and 35 percent since 1995 (Foster-McGregor et al., 2015), indicating that predictions on gross exports may yield misleading expectations on the net impact. Furthermore, the sectoral dimension is of major importance and often motivated trade policies, because well-paying, productive jobs remain scarce in many African countries. A key challenge remains to foster structural transformation (e.g., McMillan et al., 2015; Page, 2012). Lastly, African countries are argued to engage as upstream suppliers in global value chains, which makes them potentially dependent on trade effects further downstream in the value chain.

To evaluate trade facilitation in this context, we combine novel estimates of sectoral trade elasticities to trade facilitation with the inter-sectoral and inter-country structure of global input-output tables. Based on the input-output structure, we derive changes in sectoral value added from predicted first-order changes of gross exports, which can further be split into changes from direct exports, and changes from indirect exports via other sectors and via third countries. This approach is consistent with Vandebussche et al. (2019) who develop a sector-level input-output model of trade to analyse Brexit. This is a love-of-variety model where similar inputs in production can be sourced from different countries, which generates network effects. The comparative statics of the model depict first-order trade effects and effects through general equilibrium adjustments. Our approach of deriving value added from first-order gross-trade effects reflects the first-order effects of the model. To obtain our estimates, we need sectoral trade elasticities with respect to trade facilitation, changes in measures of trade facilitation, sectoral value added in gross output shares, sectoral input-output linkages, and sectoral export flows.

We obtain sectoral trade elasticities from a fully specified sectoral structural gravity equation in the spirit of Yotov et al. (2016). Previous studies were lacking information on internal trade at the sectoral level, which either led to less rigorously specified gravity equations (e.g., Djankov et al., 2010) or to only analysing aggregate trade flows (e.g., Oberhofer et al., 2018). We are able to overcome this problem because our data is obtained from a panel data set of global input-output tables that fully model internal markets. These tables come from newly constructed global input-output tables in Pahl et al. (2019), which importantly includes low-income countries. They are particularly suited for our analysis as they are built up from a host of country-specific information (supply and use tables among other sources), which is typically scarce for the studied countries. In particular, this source provides country and sector specific information on value added to gross output ratios and inter-sectoral linkages (besides the widely available but required bilateral trade flows).

To measure trade facilitation, we use the widely used summary indicator of the World Bank's Trading Across Borders (TAB) dataset (World Bank, 2018), which indicates the time it takes to import and export (e.g., used in Djankov et al., 2010). This indicator measures different aspects

of the efficiency of getting goods from the factory through the border, and is based on surveys of trade-forwarding professionals around the world.

For the evaluation of trade facilitation, we predict first-order effects for a set of hypothetical scenarios. We firstly investigate unilateral changes in trade facilitation. We investigate by how much sectoral value added would be higher if Senegal, Kenya, or Ethiopia continued to improve as they did between 2006 and 2014 and if they adopted best practices. Secondly, we investigate changes in trade facilitation across all countries in our sample. We report the total value-added changes and the implications for structural change in the set of low-income African and Asian countries.