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Estimating the fiscal impact of tariff reform in Uganda using TRIST

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I. Introduction

Unlike industrialized nations, developing countries source a significant share of their government revenue from taxing imports.[2] Uganda is no exception: Out of 14 456 billion Uganda Shilling in net revenues that the country collected in fiscal year 2017/18, taxes levied on imports contributed about 6 202 billion or almost 43 percent to this figure (Uganda Revenue Authority 2018).[3]

Beyond being important from a revenue perspective, trade is also a highly dynamic field of economic policy. Tariff changes, often specific to individual products and groups of trading partners, are frequent and sometimes implemented in an ad-hoc manner. Uganda specifically currently partakes in the review of the *Common External Tariff* (CET) of the *East African Community* (EAC). Established in 2005 by Uganda, Kenya and Tanzania and with Rwanda and Burundi joining the union in 2007, the CET defines a common tariff regime on goods imported by EAC members from countries outside of the customs union.[4] For the currently ongoing review, member states are negotiating new tariff rates on a product level to align the region's tariff policy with its development goals.[5] Beyond the comprehensive review, Uganda also frequently deviates unilaterally from the CET through *Stays of Application* on individual products.[6]

Against the background of the importance of trade taxes from a revenue perspective and a vibrant trade policy environment, an important question is how tariff reform affects government revenue

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[2] For example, according to the World Bank (2020), in 2018 "customs and other import duties" contributed 23.1% to overall tax revenue in the Philippines, 33.3% in Namibia, 21.2% in Ethiopia and 19.8% in Sri Lanka. In contrast, the same figures were 3.7% for Australia, 0.6% for Iceland, 2.5% for Turkey and 2.7% for the USA.

[3] Beyond duties, this figure also includes VAT, excise, the petroleum duty and other taxes and fees collected on imports. Taxes on exports play a negligible role in Uganda. As of 2019, the country only levies a 15% export tax on hides and skins, 0.2 USD per kg on tobacco exports, 0.02-0.05 USD per kg on fish exports, as well as a 1% and a 2% cess on coffee and cotton exports, respectively. The rationale of these taxes is to encourage local value addition (WTO 2019, 374).

[4] South Sudan joined the EAC in 2016, but does not yet implement the CET. Notably, in addition to the Customs Union of the EAC, Uganda is also part to the COMESA *Free Trade Area*. This means that for COMESA members (e.g., Malawi or Zambia) more preferential rates apply than for countries outside of both the EAC as well as COMESA (e.g., the EU or India and China). It should be noted, however, that COMESA countries are not an important source of imports for Uganda: In 2017 all COMESA countries together accounted for less than 2 percent of Uganda's overall import volume (UNComtrade 2020).

[5] For the CET review, two key proposals are under consideration. First, the introduction of a new peak tariff rate of 30 or 35%. Second, an increase in the number of tariff bands. Specifically, EAC members are considering to move away from the current three band system (0% for imports of raw materials; 10% for imports of semi-processed goods; and, 25% for finished goods) and to a four or five band system including not only the aforementioned new peak rate of 30-35%, but also a 5% tariff band. In addition, member states wish to maintain the institution of the *List of Sensitive Items*, offering excessive rates of protection of 35% or above for a small number of products (see Frazer and Rauschendorfer (2019) for more information).

[6] *Stays of Applications* allow EAC members to individually set tariffs different from those defined by the CET for the duration of a fiscal year and on a product basis. Uganda and other EAC members frequently make use of this mechanism. For example, in fiscal year 2017/18, Uganda implemented tariffs different from CET rates for a total of 59 products through this mechanism.

in Uganda. Crucially, tariff changes not only affect revenues collected from imports through lower or higher duties charged on imported goods, but also have an effect on the volume and origin of imports, thereby decreasing or increasing the tax base for other taxes on imports. A key observation is that duties are not the most important tax levied on imports: Out of a total revenue of 6 202 billion Uganda shilling collected from taxing imports in fiscal year 2017/18, only 1 234 billion were collected through import duties. Other taxes on imports, notably VAT, the petroleum duty, excise duties and other fees and charges account for far more than half of all revenues collected on imports.[7] Consequently, when considering the effects of tariff reform on revenue from taxing imports it is paramount to take into account how tariff changes will affect the collection of other import taxes as well. This paper documents the development of a *Tariff Reform Impact Simulation Tool* (TRIST) for Uganda that allows to model the overall revenue impact of tariff changes resulting from tariff reform. Beyond being of immediate relevance to Uganda's trade negotiations, the model can also be used to estimate the fiscal cost of tariff exemptions in a non-static way (e.g., due to the country's *Duty Remission Scheme* or because of free imports granted to international organizations). Here, our simulation results suggest that the total cost of Uganda's tariff exemptions can be approximated as 246 Billion Uganda Shilling (ca. 79.4 million USD) annually.

The remainder of this paper is organized as follows: Section two introduces TRIST, a partial equilibrium model that allows to simulate the impact of tariff reform on revenue collected from taxing imports. Section three describes the data and presents how the model was customized for Uganda. Section four provides simulation examples to demonstrate the functioning of the model.

II. The Tariff Reform Impact Simulation Tool

TRIST was developed by Brenton et al (2009) in response to increased government demand to assess the potential impact of trade reforms on revenue. TRIST allows users to overcome three distinct limitations of other tools and models.

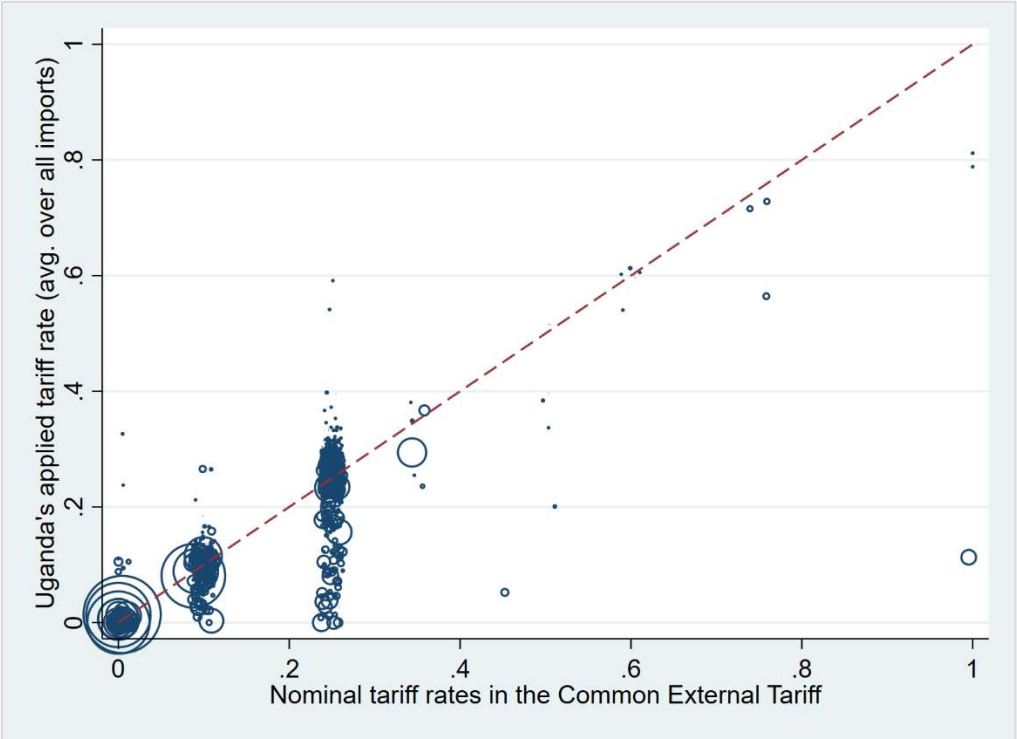
- **No reliance on statutory tariff rates**

Most existing models combine statutory tariff rates (tariff rates that are set "on paper") with recorded import flows to make predictions about the impact of tariff reform on duty revenues (Brenton et al 2009: 3-4). This is likely to lead to a substantial overestimation of the impact of tariff changes: Uganda (as most other developing countries) has a widely used system of exemptions in place (e.g. for NGOs or international agencies, but also for companies importing inputs under the CET's *Duty Remission Scheme*). This means that the applied tariff rate per product (duty actually collected on a shipment/value of the shipment) will often be much lower than the nominal tariff rate set for the imported product. TRIST allows to account for differences between applied and statutory rates by exploiting the availability of duty revenue collected per each transaction in the Ugandan customs data.

[7] This is well in line with the experience of other countries: In general, duty revenues contribute less than 50% of all revenue collected from taxing trade in developing countries (Brenton et al 2009: 5).

Figure 1 illustrates the importance of taking into account the substantial differences between applied and nominal tariff rates. Employing the transaction level customs data presented in the next section of this paper, we map nominal tariff rates in the CET against applied tariff rates, per product in fiscal year 2015/16.[8] As evident from this graphical presentation, for many products Ugandan importers, on average, pay much lower tariffs than those postulated in the CET. At the extreme, sugar, which is an important input for the food industry and which is taxed at 100 percent *ad Valorem* in the CET, on average attracts an applied tariff rate of around 15 percent (circle in the right lower corner of Figure 1).

Figure 1: Nominal versus applied CET tariff rates in Uganda.



Notes: Author's illustration using transaction level customs data and data on statutory tariff rates in the CET combined with Uganda's *Stays of Application* for fiscal year 2015/16. Each dot represents one imported product line (8-digit level in the *Harmonized System*). The size of circles is proportional to the volume of imports per product over the course of the fiscal year.

- **Interplay between tariffs and other taxes collected on imports**

Duty revenues typically make up less than half of all the taxes collected on imports. According to figures available from the *Uganda Revenue Authority*, duty revenues accounted for about 21.8% of all revenues collected from imports over the course of fiscal year 2017/18.[9] It is therefore crucial that any model considering the impact of tariffs on government revenue takes into account also the impact of tariff reform on other taxes collected on imports (most notably VAT and excise).

[8] The CET regulates tariffs on almost all of Uganda's taxable imports: Within EAC trade is for free and imports originating from COMESA members (the only other FTA that Uganda is a member of) excluding the EAC are negligible.
[9] Brenton et al (2009: 5) report the indicator for Bolivia (20%), Kenya (25%), Mozambique (32%) and Burundi (39%).

TRIST incorporates duties collected from other taxes on imports in its model setup, again exploiting the information contained in customs data (cf. Brenton et al 2009: 5-6).

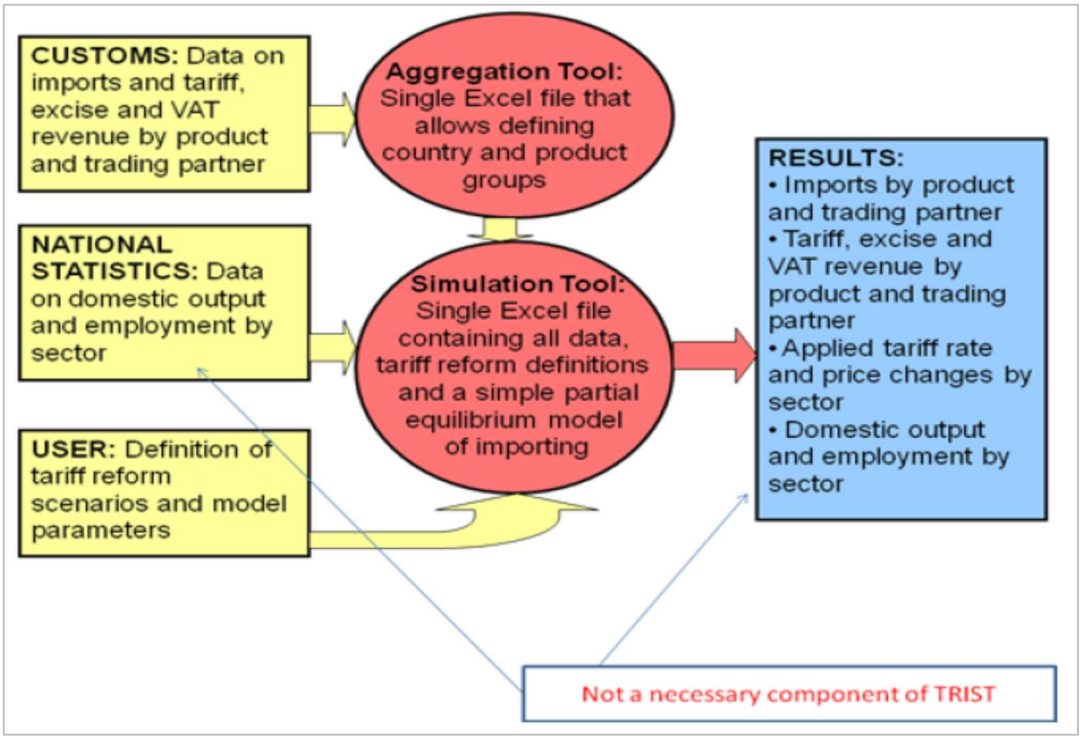
- **Adaptability to changing scenarios, transparency and level of detail**

In a country like Uganda, new proposals for trade policy emerge frequently. Additionally, discussions between trading partners almost always concern specific products, like the contents of the *Sensitive Items List* in the CET, specific goods under consideration for tariff increases, or EPA exclusion lists (cf. Brenton et al 2009: 6). TRIST employs customs data at the 8-Digit level of the *Harmonized System*, which allows to run simulations not only at an aggregate level (e.g. cutting all tariffs against South Sudan to zero due to the county's accession to the EAC-Customs Union), but also to simulate a new tariff rate on a single product line. Section III of this paper demonstrates this quality of the model.

Over the years TRIST has arguably become the work horse model to analyse the impact of trade reform on revenue and has been applied in a wide range of policy setting and countries. To illustrate, the government of Nigeria used the model to analyse the revenue implications of an EPA with the EU (Andriamananjara et al. 2009), an analysis also undertaken by De Melo and Regolo (2014) for Rwanda and Uganda. TRIST is also used by the COMESA secretariat to estimate revenue losses from trade liberalization for compensation purposes (Brenton et al. 2009: 7). As of 2018, TRIST models have been used to analyse tariff reform in Albania, Bolivia, Ethiopia, Jordan, Kenya, Madagascar, Malawi, Mauritius, Morocco, Mozambique, Nigeria, Seychelles, Syria, Tanzania, Tunisia, and Zambia (World Bank 2018).

TRIST consists of two separate tools: A *Data Aggregation Tool* and a *Simulation Tool*. The *Data Aggregation Tool* is used to organize customs data at the HS 8-Digit level into a format that allows to run simulations for the effect of tariff reforms on revenues. With respect to data, the model requires a complete fiscal year of customs data at the transactional level, containing information on the origin of an import, the customs procedure code defining the regime under which the import enters the country (e.g. temporary or permanent), information on duties, VAT, excise and other taxes levied on the transaction, the import value of the transaction as well as statutory and applied tariff rates (we discuss the customs dataset used to populate TRIST for Uganda below). The aggregation tool also allows the user to define useful product groups (e.g., exclusion or sensitive items lists) and country groups (e.g. members of the EAC, COMESA, EU etc.). The *Simulation Tool* employs the data from the *Data Aggregation Tool* and allows the user to define tariff reform scenarios. The following Figure 2 summarizes the functioning of TRIST graphically.

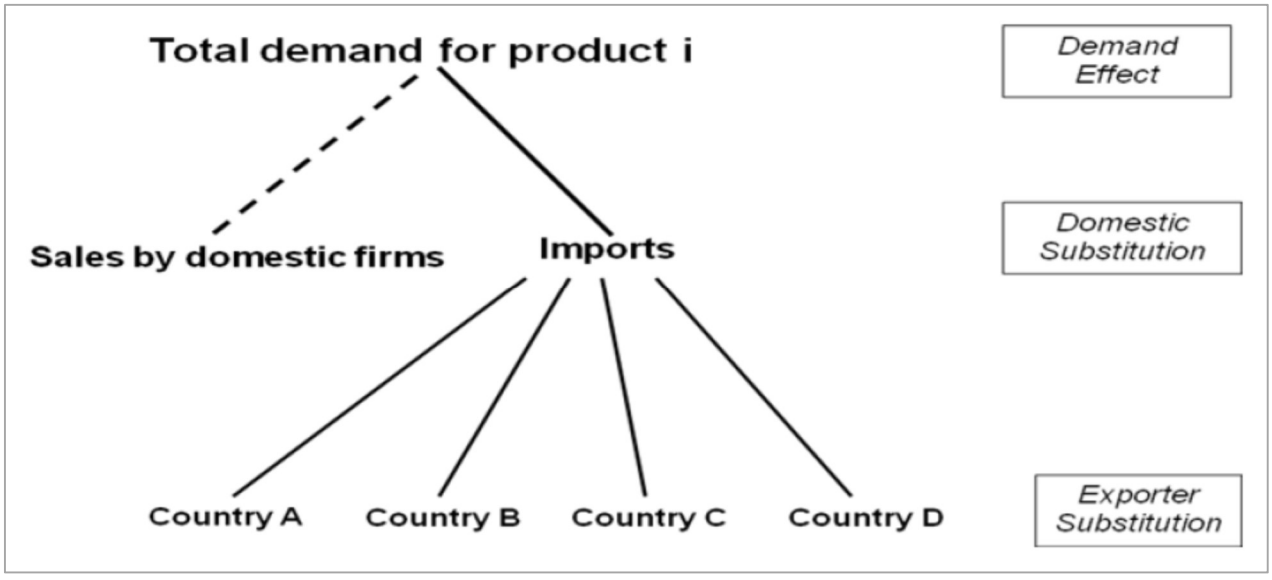
Figure 2: The components of TRIST.



Notes: Figure taken from Brenton et al (2009).

The model contained in the *Simulation Tool* of TRIST is a partial equilibrium model of importing.[10] At the core of TRIST, three substitution effects model how the importing behaviour of the economy is affected by tariff changes (Figure 3).

Figure 3: The trade model behind TRIST.



Notes: Figure taken from Brenton et al (2009).

[10] The following discussion is incomplete and only aims at providing a basic intuition for the functioning of the model. A formal discussion can be found in Brenton et al (2009).

To explain the basic mechanisms of the model, consider a tariff increase on product "i" against country "A". The following are the calculation steps performed in the *Simulation Tool* of the model. First, the *Exporter Substitution Effect* defines how imports of "i" coming from country "A" are substituted for by imports from Country "B" (or any other trading partner): Following the tariff increase on product "i", goods from "B" will be relatively cheaper than prior to the tariff increase. The magnitude of this effect depends on a defined exporter substitution elasticity incorporated in the model. In a second step, the model translates the increase of the average price of imports due to the tariff increase on product "i" into a *Domestic Substitution Effect.* This effect accounts for the possibility that foreign imports are likely to be partly substituted for with local production after the price increase. Again the strength of this mechanism depends on a pre-defined domestic substitution elasticity.[11] The first two steps hold overall demand for product "i" constant. The final step in the model is the *Demand Effect* accounting for the fact that the tariff induced increase of the average price of domestic consumption for product "i" will translate in a reduction of demand for the product altogether. As for the first two steps, the strength of the *Demand Effect* depends on a user defined import demand elasticity (cf. Brenton et al 2009: 10-11). The choice of elasticities is a core ingredient of the model. The simulations shown in this draft are based on the standard elasticities provided by Brenton et al (2009).

III. Customizing TRIST for Uganda

This section provides a detailed description of how the data set used in the TRIST model for Uganda was constructed. The description is fairly detailed to facilitate transparency and reveal potential weaknesses of the data used in the model.

The transaction level dataset employed to populate TRIST for Uganda covers the fiscal year 2015/16 and was provided by the *Uganda Revenue Authority*.[12] The dataset provides transaction level data on imports entering Uganda. Upon deleting all transactions that do not eventually enter the Ugandan economy in free circulation (e.g. temporary imports or transits), the raw, uncleaned dataset consists of a total of 520,465 transactions, corresponding to a total import volume of 23,340 Billion Uganda Shilling in 2015/16.

The central limitation of our dataset is that it does not contain information on statutory tariff rates on the country-product level:[13] Neither the statutory tariff rates themselves, nor a variable of the form "tariff revenue foregone" or "statutory tariff revenue" that would allow us to calculate statutory tariff rates on the country-product level from combining this information with the actual tariff revenue collected is available in the data.[14] We solve this issue as follows: First, we obtain data on the current CET schedule (HS version 2012) from the *Uganda Revenue Authority* at the HS

[11] This step is only calculated when data on domestic production in highly disaggregated form is available and incorporated into the data underlying the model.

[12] We chose a fiscal year rather than a calendar year in order to adequately incorporate exemptions as discussed below. These are normally granted on the basis of fiscal years.

[13] In this description, a "product" always refers to a good identified by an 8 Digit Code in the *Harmonized System*.

[14] There exists a variable "Total Revenue foregone", which also includes revenue foregone from VAT or excise due to exemptions. Being a collector variable this variable is not useful in deducing statutory tariff rates.

8-Digit Level. This dataset provides tariff rates applied on imports coming to Uganda from any country in the world, except for two groups. First, products from countries within the EAC (Rwanda, Tanzania, Burundi and Kenya) enter the Ugandan market duty and tax free.[15] Second, preferential rates apply to countries that share COMESA membership with Uganda. To extend our tariff dataset with COMESA rates, we take data from the *World Integrated Trade Solution* (WITS) Database and overwrite the CET tariff schedule with COMESA rates per each of the other COMESA members, except for those countries which also have EAC membership. Here we apply zero rates throughout.[16] Finally, under the regulations of the EAC Customs Union, member states can apply for exemptions from the CET by applying to the EAC Secretariat for *Stays of Application*. These allow countries to unilaterally deviate from CET rates on a product specific level for the duration of a fiscal year. Similarly, meetings by the *Council of Ministers* may result in adjustments to the CET schedule concerning specific products on an ad hoc basis.[17] Such changes and the *Stays of Application* constitute important deviations from CET rates, as countries actively chose products of interest for which they wish to apply. We obtain data in the form of PDFs from the EAC Secretariat's website for the latest available *Stays of Applications* and incorporate these rates into our dataset.[18] We perform a number of steps to further improve the coverage and quality of the tariff dataset as described next.

A first issue is that for some products the Ugandan customs data employs good codes that differ on the last two digits from the codes used in the CET or the WITS data for COMESA rates and are therefore not merged to the tariff data. To account for this, we proceed in two steps. First, for a number of good codes that concern a large volume of transactions, we adjust the last two digits in our customs dataset manually to the classification used in the CET. For example, in our customs dataset we have a total of 4624 transactions concerning the product "2710.19.**20** - Kerosene type jet fuel", which in the CET and the WITS-Dataset is listed under 2710.19.**21** with an identical description. Examining the dataset after performing this first step, remaining cases fall into one of two categories. Either, there is a difference in our customs dataset and our tariff data set in the last two digits of the HS codes (as per the example above) or the difference is due to differences *on* the 6th digit or beyond in the HS-codes. To illustrate, the product "Machinery, plant or laboratory equipment - Other" has the code 8419.8**8.96** in our customs dataset but is listed as 8419.8**9.00** in

[15] This was verified using data from the *World Integrated Trade Solution* (WITS) Database. South Sudan ascended to the EAC only in April 2016. As our dataset covers July 2015 – June 2016, South Sudan is treated as a country outside of the EAC. As South Sudan is not a member of COMESA either, we include it as a country to which the CET applies. This approach is validated by the observed values in our dataset: Uganda collects duty on imports originating from South Sudan.

[16] This concerns Rwanda, Kenya and Burundi. Tanzania is member of the EAC, but left COMESA in 2000.

[17] For example, the *East African Community Gazette* from the 20th of June 2014 announces changes of tariff rates in the CET for a number of different paper products, reducing the rate from 25% to 10%. In the same Gazette, Uganda is granted to apply a rate of 25% (instead of 10% as per the CET) on "*Wire of iron or non-alloy steel, plated or coated with zinc*" (HS Code 7217.20.00) due to an approved *Stay of Application*.

[18] *Stays of Application* apply to imports from any country of the world. Therefore, these override both CET as well as COMESA rates. A data related bottleneck of our approach is that the latest information on *Stays of Application* is only available for the FY 2014/15, whereas our customs dataset covers the FY 2015/16. Our approach therefore relies on assuming that these exemptions still apply. We cross check this in the data by comparing applied rates (collected tariff revenues/imports) with the obtained statutory rates from the exemptions and find this assumption largely confirmed. Evidently up to date information on *Stays of Application* constitutes an ample opportunity for further improve our data quality.

the CET schedule. We account for the first case (which constitutes the vast majority of all cases for which we do not have a tariff rate) by re-merging the two datasets at the 6-Digit level of the harmonized system only for those cases for which we miss tariff data. Iterating the same procedure at the five-digit level (to account for instances of the second case) is not possible as we cannot uniquely assign observations at the 5-Digit level in the tariff dataset to observations in the customs dataset.

We next investigate how sensible the resulting statutory tariff rates are by comparing the statutory rates with average applied tariff rates (collected tariff revenue/import volume) in our dataset on a product-country pair level. Observed applied rates in the customs data and statutory rates at the product-country level may differ for one of two reasons. First, observed applied rates may be lower due to exemptions being in place that pull the observed applied rate below the statutory rate (e.g., Uganda's *Duty Remission Scheme*). Second, the actual statutory rate applicable to a product-country combination is different from the statutory rate in our constructed tariff dataset (e.g., due to an active *Stay of Application* or simply wrong rates). The vast majority of the applied rates we observe in the data concur with the statutory rates in our tariff dataset. However, for a small number of product-country combinations, observed differences between statutory rates and empirically observed applied rates are extreme, indicating that our data on statutory tariff rates is inaccurate. To rectify observed errors and improve our data on statutory tariff rates we update statutory tariff rates with observed applied rates for a number of country-product combinations.[19]

Finally, we clean the data by dropping a number of obviously erroneous records. We delete all single transactions that account for more than 1% of the overall import volume in the FY 2015/16. We also delete transactions where the observed applied tariff rate or the observed applied VAT rate is unrealistic.[20]

The resulting dataset contains a total of 498 531 transactions with an overall import volume of about 19,330 Billion UGX which entered Uganda in free circulation in fiscal year 2015/16. The subset of the data that is complete with statutory tariffs covers about 96% of the import volume and 96% of all individual transactions. For TRIST, we employ this portion of the data and delete observations for which we do not have the full set of required variables. In a final step we aggregate the individual transactions by country-product pair. The following Table 1 is taken from TRIST and provides descriptive statistics of interest.

[19] There are about 2,000 distinct country-product combinations for which there are large differences between applied and statutory tariff rates in the data for which we update statutory rates with applied rates. "Large" means that the observed applied tariff rate is +/- 10 percentage points of the assumed statutory tariff rate. In most of the cases the observed applied rate is close to one of the regular band tariffs of the CET. To illustrate with an example, in the customs data we find 35 transactions for imports of "Oil or petrol-filters for internal combustion engines" from Belgium. The statutory rate found in our dataset is 25%, whereas the empirically calculated average applied rate over all 35 transactions is 10.0001%, indicating that in fact the statutory rate in our data is wrong and the product is actually assigned to the 10% rate of the CET.

[20] For example, in the case of one transaction we find that duty collected corresponds to about 171 times the value of the import value on the same transaction.

Table 1: Summary statistics of the data used in TRIST for Uganda.

DESCRIPTIVE STATISTICS	
# of tariff lines	4,009
# of partners	161
Total import volume	19,330,663

	Statutory tariff revenue	Collected duty	Collected excise	Collected VAT
Total value	1,101,027	833,522	62,202	1,804,252
Share of total	N/A	30.9%	2.3%	66.8%
Simple average	12.5%	10.5%	0.3%	13.5%
Trade weighted average	5.7%	4.3%	0.3%	8.9%

Top 10 Import Partners	Import value	Share of total imports
India	3,574,167	18.5%
China	3,513,463	18.2%
UAE	1,848,442	9.6%
Kenya	1,544,170	8.0%
South Africa	836,062	4.3%
Japan	790,260	4.1%
Poland	669,202	3.5%
Saudi Arabia	667,533	3.5%
Indonesia	625,913	3.2%
United States	531,220	2.7%

Notes: Values for imports, collected duties and other taxes are in '000 000 Uganda Shilling.

These figures are also useful to assess the accuracy of the data underlying our model. First, crosschecking the overall import volume with data from the *United Nations Commodity Trade Database* for 2015 and 2016 confirms that the import figure of 19 330 Billion UGX is mostly in line with the officially reported figures: 19 330 Billion UGX at an average exchange rate of about 3,500 UGX per USD over the period July 2015 to June 2016 corresponds to about 5.52 Billion USD. *UnComtrade* reports 5.53 Billion USD for 2015 and 4.83 Billion USD for 2016. Similarly, the distribution of the relative importance of different countries of origin is in line with other data sources (cf. Table 1: Top 10 import partners). Finally (and most crucial for the purpose of our model), the data adequately reflects the relative importance of different import taxes: The distribution of the share of *Collected Tariff*, *Excise Tax* and *VAT* in overall revenue collected from taxing imports presented in the table matches almost perfectly (+/- 2 percentage points) with the shares found in the URA *Revenue Performance Report FY 2017/18* and is mostly in line with the distribution found in the URA *Revenue Performance Report FY 2016/17*.[21]

[21] For the report in FY 16/17, the URA reports VAT: 60.75%, Excise: 7.04% and Duty: 32.21%.

IV. Simulation examples

We conclude this paper by providing two simulation examples that demonstrate the outputs of TRIST for Uganda. All simulations are conducted using the elasticities provided for TRIST by Brenton et al (2009).

Example I: Estimating the fiscal cost of tariff exemptions in Uganda.

A relevant first exercise is to use TRIST to provide a non-static estimate the fiscal cost of tariff exemptions (e.g., due to *Duty Remission Schemes* or special import rules for international organizations). In TRIST, this can be done by simulating a scenario in which statutory tariff rates applicable on products are applied (cf. Brenton 2013). Running this simulation is also a useful exercise to validate the data underlying the model and assess its functionality: As this simulation was performed for a number of countries to assess the "tariff gap", our results can be sense-checked against these estimates. The results for this simulation for Uganda are presented on the left side of Figure 4.

Figure 4: The fiscal cost of tariff exemptions, Uganda (left) and Nigeria (right).

RESULTS	
Impact on imports:	
Imports pre	19,330,683,347,830
Imports post	19,201,927,746,063
Change in imports	-128,735,601,767
% change in imports	-0.7%
Impact on revenue:	
Tariff revenue pre	833,521,919,319
Tariff revenue post	1,081,194,297,799
Change in tariff revenue	247,672,378,480
% change in tariff revenue	29.7%
Total Tax Revenues on Imports	
Total revenue pre	2,699,975,954,035
Total revenue post	2,956,420,115,720
Change in Total revenue	256,444,161,685
% change in Total revenue	9.5%
Total Tax Revenues on Imports and Domestic Production	
Total tax revenue pre	2,699,975,954,035
Total tax revenue post	2,956,420,115,720
Change in total tax revenue	256,444,161,685
% change in total tax revenue	9.5%
Collected Tariff rate:	
Collected applied tariff rate pre	4.3%
Collected applied tariff rate post	5.6%
% change in collected applied tariff rate	30.6%

RESULTS	
Impact on imports:	
Imports pre	2,992,787,374,834
Imports post	2,958,113,559,232
Change in imports	-34,673,815,602
% change in imports	-1.2%
Impact on revenue:	
Tariff revenue pre	204,105,178,519
Tariff revenue post	266,949,622,528
Change in tariff revenue	62,844,444,009
% change in tariff revenue	30.8%
Total Tax Revenues on Imports	
Total revenue pre	346,643,093,518
Total revenue post	409,795,563,105
Change in Total revenue	63,152,469,587
% change in Total revenue	18.2%
Total Tax Revenues on Imports and Domestic Production	
Total tax revenue pre	346,643,093,518
Total tax revenue post	409,795,563,105
Change in total tax revenue	63,152,469,587
% change in total tax revenue	18.2%
Collected Tariff rate:	
Collected applied tariff rate pre	6.8%
Collected applied tariff rate post	9.0%
% change in collected applied tariff rate	32.3%

Notes: The left table is taken from the TRIST model for Uganda and the right figure is taken from Brenton et al (2013).

As evident from the simulation output for Uganda, simulating the application of statutory tariff rates shows that Uganda has a large tax gap in tariffs: If statutory tariff rates were applied, revenues from duties would increase by almost 30% and overall revenues from taxing imports (duties, VAT and excise) would rise by about 9.5%. These results are broadly in line with simulation

results for other countries.[22] On the right side of Figure 4 we present the same simulation conducted by Brenton et al (2013) for Nigeria. The basic motions and orders of magnitudes of the two simulations are largely the same: Simulating the application of statutory tariff rates suggests a reduction in overall import volume, a substantial increase in revenue from duties and total tax revenue from imports (stronger for Nigeria). In both simulations, the collected applied tariff rate increases by about 30% following the elimination of all tariff exemptions.

Example II: Simulating a 35% rate in the CET on *Coated flat rolled iron*.

For a second test of the model (and against the background of the ongoing review of the EAC-CET), we simulate a 35% tariff rate in the CET on the product lines contained in HS Chapter 7210: Coated Flat Rolled Iron. In fiscal year 2015, Uganda imported ca. 55.42 Million USD worth of products in this category from Kenya (65% of all imports), China (15%), Tanzania (6.5%), Egypt (7.3%), India (2.9%) and others (3.3%). Chapter 7210 is further broken down in Table 2 below into its products at the 8-Digit level on which the 35% rate is simulated. Together, these products accounted for about 1.1% of all imports to Uganda in 2015. This simulation is provided to demonstrate that TRIST can provide simulations on a highly disaggregated product basis.

Table 2: Tariff lines in heading 7210.

Flat-rolled products of iron or non-alloy steel, of a width of > 600 mm, clad, plated or coated.		
HS-Code	Description	Current rate in the CET
72.10.1100:	Of a thickness of 0.5 mm or more	0%
72.10.1200:	-- Of a thickness of less than 0.5 mm	0%
72.10.2000:	Plated or coated with lead, including terne plate	25%
72.10.3000:	Electrolytically plated or coated with zinc	25%
72.10.5000:	Plated or coated with chromium oxides	0%
72.10.6100:	Plated or coated with aluminium-zinc alloys	25%
72.10.7000:	Painted, Vanished or coated with plastics	25%
72.10.9000:	Other	25%

Results from this simulation suggest that a 35% tariff rate on these products would increase duty revenues by about 0.4% (ca. 3.7 Billion Uganda Shilling) and total revenue from taxing imports by 0.1%. This relatively small change reflects that the model is able to account for the fact that most imports of this product originate tax free from within the EAC: Tanzania and Kenya together supplied almost 72% of all Ugandan imports of these products.

[22] Brenton et al (2009: 4) report that tariff revenues typically increase by about 40-50% when eliminating all exemptions in TRIST.

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