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Do South-South Trade Agreements Increase Trade? Commodity-Level Evidence from COMESA

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Do South-South Trade Agreements Increase Trade? Commodity-Level Evidence from COMESA[1]

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Abstract

South-South trade agreements are proliferating: Developing countries signed 70 new agreements between 1990 and 2003. Yet the impact of these agreements is largely unknown, as existing North-North and North-South micro-level studies are likely to yield misleading predictions for South-South trade agreements. This paper focuses on the static effects of South-South preferential trade agreements stemming from changes in trade patterns. Specifically, it estimates the impact of the Common Market for Eastern and Southern Africa (COMESA) on Uganda's imports between 1994 and 2003. Detailed import and tariff data at the 6-digit harmonized system level are used for more than 1,000 commodities. Based on a difference-in-difference estimation strategy, the paper finds that—in contrast to evidence from aggregate statistics—COMESA's preferential tariff liberalization has not considerably increased Uganda's trade with member countries, on average across sectors. The effect, however, is heterogeneous across sectors. Finally, the paper finds no evidence of trade-diversion effects.

JEL Classification Numbers: F13, F14, F15, O24

Keywords: South-South trade agreements, trade creation, trade diversion

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I. INTRODUCTION

The number of preferential trade agreements (PTAs) between low-income countries—so-called South-South trade agreements—has increased dramatically in the last decade. Indeed, between 1990 and 2003, low-income countries signed 70 new PTAs (WTO, 2003). South-South arrangements account for more than 50 percent of all new trade agreements. Important examples of such arrangements include the Southern Cone Common Market (MERCOSUR) in South America and the Common Market for Eastern and Southern Africa (COMESA) in Africa. Countries that are both poor and small frequently enter into PTAs; Africa alone has 30 such arrangements (Yang and Gupta, 2005). Many PTA member countries belong to more than one agreement, resulting in competing demands.

While South-South PTAs are increasingly popular and potentially important tools for development (and peace-making according to Martin, Mayer, and Thoenig, 2005), robust empirical evidence of their trade effects is limited. Papers that analyze this type of agreements generally use country-level data, and capture the impact of preferential trade agreements by introducing a PTA dummy variable in a gravity-model framework. The dummy variable is endogenous, however, since the decision to create or join an agreement is not random and is most likely related to the trade patterns between the countries involved. In addition, aggregate data masks commodity-level heterogeneity, which may also bias the estimates. Clausing (2001) and Romalis (2005) eliminate some of these problems by using commodity-level data to analyze the effects of the Canada–United States Free Trade Agreement (CUSFTA) and the North American Free Trade Agreement (NAFTA). We will argue, however, that their results cannot be generally applied to the specific case of South-South PTAs, as South-South PTAs are likely to differ from North-North and North-South PTAs along two important dimensions: (i) the expected impact on trade volumes; and (ii) from a welfare perspective, the impact on trade creation and trade diversion.

The two main drivers of international trade are comparative advantage and economies of scale. While North-South PTAs are expected to yield large trade flows because of big differences in relative factor endowments, North-North PTAs are expected to yield large trade flows because of economies of scale. South-South PTAs, in contrast, are unlikely to (greatly) benefit from either of these channels for trade. Since developing countries tend to have similar relative factors supplies, the incentive to trade with each other is smaller than for dissimilar countries. In addition, since low-income countries usually specialize in goods with constant returns to scale (Trefler and Antweiler, 2002; Tybout, 2000), their trade is unlikely to be affected by scale economies. Therefore, South-South trade agreements are likely to give rise to *smaller* trade increases than both North-North and North-South PTAs.

Moreover, North-South studies are likely to yield misleading predictions for trade-creation and trade-diversion effects of South-South trade agreements. Venables (2003) shows that a low-income country is best off forming a trade agreement with a high-income country, since “trade creation is maximized and trade diversion minimized with such a partner” (page 758). Thus, a developing country is better off joining a North-South rather than a South-South agreement. In addition, and most importantly, estimates from North-South studies are likely to overestimate the trade-creation component and underestimate the trade-diversion component of South-South trade agreements.

The above two arguments suggest that extrapolating results from North-South and North-North studies is problematic, and that it is imperative to independently estimate the impact for South-South trade agreements (the most popular PTAs being pursued). To the best of our knowledge, this paper is the first to apply the empirical strategies of Clausing and Romalis to a South-South trade agreement. Specifically, we focus on the static effects of COMESA resulting from changes in trade patterns. By exploiting the variation in the data across commodities, origin countries, and time, we estimate the impact of COMESA-related preferential trade liberalization on Uganda's imports between 1994 and 2003. We also investigate whether these changes stem from trade creation or trade diversion.

The analysis in this paper focuses on COMESA, as it is a good example of a South-South preferential trade agreement. In addition, the agreement has been in effect since 1994. Within COMESA, we analyze the impact of preferential liberalization on Uganda's trade patterns as Uganda represents a relatively stable economy during this time period.

The main empirical specification is based on a difference-in-difference estimation strategy that makes it possible to eliminate several important sources of omitted variable bias. For example, COMESA and MFN tariff rates are correlated over time, and MFN tariffs are an important component of the overall price index which, in turn, affects Uganda's import demand from COMESA countries. Since the price index cannot be directly measured, the estimates of the impact of COMESA might be biased. The difference-in-difference specification allows us to address this issue by differencing out the price index from the specification. Using this estimator, we show that reductions in the preferential tariff rate applied by Uganda to other COMESA member countries did not considerably increase Uganda's imports from such countries. In other words, Ugandan consumers on average across the sectors examined have been reluctant to switch the origin of their purchases to COMESA countries following the advent of the COMESA agreement.

According to our findings, the elasticity of imports with respect to tariff rates is between 0.14 and 0.16. In addition, the elasticity of substitution between varieties of the same good from different origin countries is approximately 1.7. The magnitude of these effects is relatively small, compared with the results from previous studies for the United States and Canada within CUSFTA and NAFTA (Clausing, 2001; Romalis, 2005). Romalis's estimate for Mexican imports, however, is closer to our estimate for Uganda. This difference between rich and poor countries' estimates could mean that consumers in low-income countries, in general, have relatively inelastic demand curves and are thus less likely to benefit immediately from trade reform. Search costs may partly explain the reluctance of consumers in low-income countries to switch the origin of their purchases from one country to another.

Our results, however, are also consistent with the above-mentioned most important criticism in the literature of South-South PTAs—that is, because member countries are not natural trading partners, such agreements are unlikely to produce substantial increases in trade volumes. The finding that COMESA's effect on Uganda's imports is heterogeneous across sectors supports this interpretation. In particular, the industries that experienced larger and statistically significant increases in trade volume were those in which developing countries tend to have a comparative advantage (i.e., exactly the sectors where Uganda's COMESA partners should be able to provide goods at low cost).[2]

[2] It might seem puzzling that Uganda would import unskilled-intensive goods in which it might itself have a comparative advantage: What our results show is that the pattern of production of unskilled-intensive goods in Uganda did not

(continued)

The elasticity estimates withstand a number of robustness checks. One concern is that COMESA-related reductions in tariff rates might have been offset by an increase in nontariff barriers on the same commodities. For example, after COMESA's initial implementation, Uganda imposed ad valorem excise taxes on selected goods that tended to be produced by COMESA countries (International Monetary Fund, 1999). We think that our estimates are not affected by such an offsetting effect, given that we partially account for nontariff barriers by using data on import excise taxes. Political economy factors are also unlikely to affect the results because our main specification controls for both time-invariant political-economy factors and for political-economy factors that change over time that are common across member and nonmember countries. In addition, our findings are not overturned by a triple-difference estimation strategy that controls for factors that change over time and are specific to each commodity and export country (a robustness check that follows Romalis, 2005). Lastly, the results grow more robust when we consider the possible impact of tax evasion on recorded imports, as documented by Fisman and Wei (2004). One reason why recorded imports are low when tariffs are high is tax evasion. Thus, when tariffs come down, a corresponding increase in imports might partly reflect an increase in recorded (as opposed to actual) imports due to reduced tax evasion.

Finally, the empirical analysis investigates whether Uganda's small increase in trade volumes following COMESA reflects trade-creation or trade-diversion effects. We find no evidence that Uganda's imports from non-COMESA countries decreased after the start of the agreement. Thus,

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completely overlap with that of its COMESA partner countries, which is consistent with the fact that Uganda and its COMESA partner countries do not have identical factor endowments.

COMESA's small effects on trade volumes appear to be associated with trade creation. Notice that this result is not consistent with the expectation in the literature that South-South PTAs imply trade diversion. As a final point, although we conclude that the trade effects are minimal, it is important to note that even small increases could represent a marked improvement for small, low-income countries in Sub-Saharan Africa.

The remainder of this paper is divided into five sections. Section II summarizes the existing empirical literature on regional trade agreements and emphasizes this paper's innovation: we are the first to apply commodity-level empirical techniques to a South-South trade agreement. Section III discusses the differences, from a theoretical point of view, between North-North and North-South agreements on the one hand, and South-South agreements on the other. Section IV describes the commodity import and tariff data. Section V presents the empirical strategy and the main results. We start by deriving an import demand function, which we then proceed to estimate with increasing degrees of sophistication. In the main specification, we implement a difference-in-difference estimator, with imports from non-COMESA countries as the control group. This is followed by several robustness checks and by the analysis of trade-creation vs. trade diversion effects. Finally, Section VI concludes.

II. Literature

Empirical work on preferential trade agreements is extensive. In general, these studies are either ex ante computable-general-equilibrium (CGE) studies (see Baldwin and Venables, 1995, for a survey of such work) or ex post empirical studies. The ex post analyses, which are more directly related to our work, can be further divided into studies using aggregate-level data and those using either sector-level or commodity-level data.

The ex post studies drawing on aggregate-level data capture the impact of preferential trade agreements by introducing a PTA dummy variable in a gravity-model framework (e.g., Frankel and Wei, 1995).[3] Although these papers generally find that PTAs boost trade volumes, the estimated effects are likely biased due to endogeneity and reverse causality concerns. Such bias arises because the decision to create or join an agreement usually is not random. For example, high trade volumes increase the likelihood that countries will enter into an agreement, which could explain the positive coefficient on the PTA dummy variable in a gravity-model framework. To address this concern, Magee (2003) models the PTA dummy variable as endogenous in a gravity-type equation. He finds that, once endogeneity is taken into account, the impact of PTAs on trade patterns is unstable and at times not positive across different specifications.

Many studies on South-South PTAs and on African PTAs, in particular, use the pre-Magee (2003) gravity-type approach and thus may be subject to endogeneity concerns (for example, Cernat 2001; and Subramanian and Tamirisa, 2001). Cernat (2001) finds that COMESA has produced net trade-creation effects with no evidence of trade diversion.[4] Subramanian and Tamirisa (2001), however, find a negative block effect for COMESA countries before the formation of the agreement. In 1990, COMESA members traded significantly less goods with each other than did the average pair of

[3] The empirical approach of this early literature was of course limited by the fact that, at the time these papers were written, commodity-level data were not easily accessible.

[4] To differentiate between trade creation and trade diversion, Cernat (2001) introduces two dummy variables: one that captures whether two countries belong to the same PTA, and one that captures whether one country belongs to a PTA while the other does not.

countries in the sample. This finding suggests that COMESA countries are not natural trading partners and that the agreement is more likely to lead to trade diversion.[5]

The second subset of ex post studies employs sector-level and commodity-level trade data to help overcome some of the limitations of the gravity-type approach (Clausing 2001; Krueger 1999, 2000; Romalis, 2005; Yeats 1998a, 1998b). Clausing (2001) estimates the effect of CUSFTA on trade flows from Canada to the United States, and Romalis (2005) estimates the impact of NAFTA and CUSFTA on member countries' imports using a triple-difference estimation technique.[6] Clausing finds no evidence of trade diversion as a result of CUSFTA. Romalis, in contrast, finds evidence of trade-diversion effects on member countries' imports. In addition, he finds that import demand in the United States and Canada—two large, developed countries—is highly sensitive to tariff movements. By contrast, he finds that import demand in Mexico—a poorer, less-developed nation—is fairly inelastic, consistent with our findings for Uganda. In addition, based on estimated elasticities of total export supply, Romalis finds evidence that NAFTA and CUSFTA had a modest effect on border prices and welfare.

From a methodological viewpoint, our paper is most closely related to Clausing (2001) and Romalis (2005). To the best of our knowledge, we are the first in the literature to apply their empirical commodity-level strategy to a South-South trade agreement. Our paper is also closely related to recent works in the literature estimating import demand elasticities (Kee, Nicita, and Olarreaga, 2005) and elasticities of substitution (Broda and Weinstein, 2006).

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[5] Other studies using aggregate data to analyze African trade patterns are Foroutan and Pritchett (1993), Coe and Hoffmaister (1999), Rodrik (1999), and Subramanian and others (2000).

[6] This triple-difference estimation strategy is equivalent to what we use in column (6), Table 5.

III. SOUTH SOUTH TRADE AGREEMENTS

In this section, we first discuss the concepts of trade creation and trade diversion in general. Next, we analyze the differences—in terms of expected changes in trade volumes and, in particular, trade-diversion and trade-creation effects—between North-North and North-South agreements on the one hand and, on the other hand, South-South agreements. We conclude that North-North and North-South empirical studies are likely to produce misleading results for South-South PTAs.

In general, the welfare impact of PTAs is unclear. As first stated by Viner (1950), preferential trade liberalization can either result in high-cost domestic production being replaced with low-cost imports from member countries (i.e., trade creation) or in efficient imports from nonmember countries being supplanted by less-efficient imports from member countries (i.e., trade diversion). Consider the case of a small-open economy: If trade creation occurs as a result of a PTA, the agreement is welfare-improving. If trade diversion occurs, the effect on welfare through changes in trade patterns is unclear.[7] In the case of large open economies, terms-of-trade changes make it harder to sign the net welfare effect of PTAs. However, our focus on COMESA, which involves small open economies,[8] allows us to abstract from terms-of-trade changes.[9]

[7] The case of trade diversion of preferential tariff liberalization for a small open economy (SOE) is, in welfare terms, very similar to the case of nondiscriminatory tariff liberalization for a large open economy (LOE). In both situations, the net welfare effect is ambiguous due to the change of border prices faced by the country. However, in the PTA SOE case with trade diversion, the change of border prices is driven by the switch in the source of imports. In the LOE case of nondiscriminatory trade liberalization, the change of border prices is driven by a terms-of-trade effect.

[8] Given the small-open-economy assumption—that is, infinite export supply elasticity—shifts in Uganda's import demand caused by preferential trade liberalization do not affect border prices.

The difference between trade creation and trade diversion is also relevant from a political-economy point of view. Preferential trade agreements that result in trade creation are more likely to be building blocks for multilateral trade negotiations. Indeed, policymakers can build consensus around the visible gains of partial trade liberalization. By contrast, industries characterized by trade diversion—in which imports from PTA member countries replace imports from more efficient nonmember countries—could deter further multilateral free trade efforts. In such industries, the threat of direct competition with more efficient producers in nonmember countries could create greater resistance to global free trade (Krishna, 1998; Krueger, 1999).

From a theoretical point of view, North-North and North-South agreements are different from South-South trade agreements, in terms of their impact on trade volumes and, in particular, in terms of trade-creation and trade-diversion effects. Developing countries typically are not natural trading partners, as evidenced by the fact that they trade little with each other as a share of total imports.[10] For example, the 2001 share of African imports from other African countries was approximately 9 percent (IMF, 2002).[11] This pattern in the data is not surprising. The two main drivers of international trade are comparative advantage and economies of scale: Along both dimensions, we would expect developing countries to trade little with each other. First, low-income countries tend to have similar relative factors supplies, therefore the incentive to trade with each other is smaller than for dissimilar countries. In other words, developing countries tend to have a comparative advantage in the same

[9] Besides the static effects of PTAs through changes in trade patterns, additional welfare effects include the impact of PTAs on imperfectly competitive markets and their dynamic effects. See Baldwin and Venables (1995) for a complete survey. In this paper, we focus only on the static effects of PTAs that take place through changes in trade patterns.

[10] On the other hand, low trade volumes between developing countries may just reflect mutually high trade barriers.

[11] This is also consistent with the evidence that, out of all COMESA countries, Kenya was the only one who was a top 10 exporter to Uganda, in both 1994 and 2003

sectors; therefore, they generally are not low-cost producers of goods imported by other developing countries. Second, developing countries tend to specialize in sectors that do not exhibit economies of scale, in particular low-end manufacturing industries (Trefler and Antweiler, 2002).[12] Tybout (2000) surveys studies for many developing countries and finds little evidence of scale returns in most sectors—and, in particular, sectors characterized by small-scale producers, which is often the case in developing countries.[13] To conclude, we would expect North-North agreements to yield large trade flows because of scale economies and North-South agreements to yield large trade flows because of big differences in relative factor endowments. For the very same two reasons, however, the impact on trade volumes of South-South agreements is likely to be modest.

In addition, we cannot extrapolate information from North-South studies of PTAs because they are likely to overestimate the trade-creation component and underestimate the trade-diversion component of South-South trade agreements. Venables (2003) shows that the trade creation and trade diversion effects of an agreement are a function of member countries' factor endowments (and therefore comparative advantage) relative to each other and relative to the rest of the world. Venables (2003) investigates what type of partner a low-income (unskilled-labor abundant) country is best off forming a trade agreement with. The answer is a high-income (skilled-labor abundant) country, since "trade creation is maximized and trade diversion minimized with such a partner" (page 758). Thus, a

[12] According to the estimates in Trefler and Antweiler (2002), constant-returns-to-scale industries include apparel, leather, footwear, food, liquor, sawmill products, fishing, agricultural crops, and textiles. The industries with economies of scale include pharmaceuticals, electrical and electronic machinery, and non-electrical machinery.

[13] In addition, Rodrik (1988, p.115) points out that, if we treat labor costs as variable cost and capital costs as fixed cost, then "the extent of scale economies is determined completely by the choice regarding the capital intensity of the technique selected, itself presumably determined in part by labor costs relative to capital costs. This line of argument would imply that lower relative labor costs in developing countries tend to diminish the importance of scale economies."

developing country is better off joining a North-South rather than a South-South agreement.[14] Finally, since South-South trade agreements are more likely to lead to trade diversion as opposed to trade creation—if any increase in imports occurs at all—from a political-economy point of view, we expect them to produce a stumbling-block effect for multilateral trade liberalization.[15]

IV. Data

We use commodity-level import and tariff data at the 6-digit Harmonized System level. Import statistics by origin country come from the COMTRADE database, developed by the United Nations Statistics Division. Data on preferential and most favored nation (MFN) tariff rates as well as import excise taxes are from TRAINS, developed by UNCTAD. We access both data sets through the World Integrated Trade Solution (WITS) system, designed by the World Bank.

COMESA is an example of a South-South PTA involving small economies. Notwithstanding the small economic size of the countries involved, in terms of population this agreement is extensive: the overall population of COMESA countries was approximately 380 million people in 1998. The treaty establishing COMESA as a preferential trade agreement of Eastern and Southern African states was

[14] For these and other reasons, other researchers as well think that developing countries gain more economically from North-South PTAs than from South-South PTAs (Schiff, 1997; Schiff and Winters, 2003).

[15] Besides the magnitude of trade changes and the probability of trade-creation and trade-diversion effects, South-South agreements differ from North-North and North-South agreements along additional dimensions, which are not analyzed in this paper. For example, in South-South PTAs between small countries, dynamic efficiency gains linked to economies of scale and pro-competitive effects for local firms are unlikely. The reason is that South-South PTAs offer their members access to smaller markets than do North-South agreements. In addition, firms in PTA member countries which have developing economies may not be much more efficient than home firms, thus, competitive pressure on domestic producers may not be very strong. Moreover, the impact on fiscal revenues of South-South PTAs is generally more pronounced because trade taxes constitute a large proportion of developing countries' domestic revenues. In Uganda, for example, tariff revenue declined significantly (by 8 percent of GDP) after the inception of COMESA (Figure 1).

ratified on December 8, 1994.[16] At that date, some COMESA countries, including Uganda, were already part of a regional trade agreement called PTA.[17] The data available for Uganda, used in this paper, cover the last year of the PTA agreement (1994) and four years of the COMESA agreement (2000 to 2003). For each of these five years, we merge data on the value of Uganda's imports, at the commodity level and by country of origin, with data on Uganda's PTA tariff rates (for 1994), COMESA tariff rates (for 2000 to 2003), and MFN tariff rates (for all years). We also use data on Uganda's import excise taxes.

Uganda's data for the five years examined is coded according to three different versions of the Harmonized System (HS) classification: H0 for 1994, H1 for 2000 and 2001, and H2 for 2002 and 2003. We use WITS's concordance tables and recode all the data following the H0 classification.[18] Tariff data is presented according to the HS classification up to the 8-digit level, but disaggregate import values only up to the 6-digit level. We use the simple average tariff rate for each 6-digit level code (averaged over the 7-digit and 8-digit level codes).[19] Finally, the tariff rates used in the empirical analysis incorporate information on import excise taxes levied on each product. Import

[16] The member countries of COMESA are Angola, Burundi, Comoros, Democratic Republic of Congo, Djibouti, Egypt (which joined in 1998), Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Namibia, Rwanda, Seychelles (which joined in 1997), Sudan, Swaziland, Uganda, Zambia, and Zimbabwe. Tanzania initially joined the agreement but later withdrew in 2000. Since this dataset covers mainly years after this date, imports from Tanzania are treated as non-COMESA imports.

[17] The PTA, which was ratified in 1982, encompassed Burundi, Comoros, Djibouti, Ethiopia, Kenya, Malawi, Mauritius, Rwanda, Swaziland, Uganda, Zambia, and Zimbabwe (all of which were part of the later COMESA) as well as Somalia and Lesotho.

[18] Going from the H2 and H1 to the H0 classification, a few different H2 codes and H1 codes are reclassified as the same H0 code. In those cases, for each H0 code we use the simple average of the tariff rates (averaged over the corresponding H2 or H1 codes) and the sum of imports of the H2 or H1 codes corresponding to the same H0 code.

[19] Another complication is that Uganda belonged to other preferential trade agreements during the period examined (e.g., the Cross-Border Initiative and the East African Community agreement). We do not have data on preferential tariff rates within these other agreements. Our results hold to the extent that Uganda applied COMESA tariff rates to COMESA countries belonging to other PTAs. This assumption is consistent with our understanding of these arrangements (Subramanian and others, 2000; McIntyre, 2005).

excise taxes were imposed after 1994 and were the same for COMESA and non-COMESA countries. However, as pointed out in the introduction, excise taxes were imposed on selected goods that tended to be produced by COMESA countries (International Monetary Fund, 1999).

Tables 1 and 2 present summary statistics of the main variables used in our analysis. The tables document the extent of preferential and MFN tariff liberalization in Uganda between 1994 and 2003. The tables also offer a preliminary view of the impact of trade liberalization (preferential and otherwise) on Uganda's imports. Table 1 shows that tariff rates faced by COMESA countries decreased substantially from 1994 to 2003, from an average preferential tariff rate (across tariff lines) of 11.2 percentage points to an average of 5.5 percentage points.[20] At the same time, the average value of imports of a 6-digit HS commodity from these same countries increased substantially (from US$155,000 to US$289,000). Therefore, aggregate statistics seem to suggest a substantial impact of COMESA on Uganda’s imports from COMESA countries. Table 2 shows that MFN tariff rates decreased even more than preferential tariff rates (from 17.9 percentage points in 1994 to 10.2 percentage points in 2003), but were on average higher than preferential tariff rates in both 1994 and 2003.[21] Imports from non-COMESA countries also increased during this time period. The overall evidence on changes in imports, from both COMESA and non-COMESA countries, is thus consistent with the pattern of imports (as a percentage of GDP) shown in Figures 1 and 2.

[20] The mode of the distribution of preferential tariff rates decreased from “between 5 and 10 percent” to “less than 5 percent” between 1994 and 2003.

[21] In addition, during the period, the mode of the distribution of MFN tariff rates remained the same at “between 5 and 10 percent.”

Our data allows us to identify sectors most affected by the trade liberalization. The 2-digit 1996 HS sectors that experienced the greatest reduction in *preferential* tariff rates between 1994 and 2003 were “edible fruit and nuts...,” “vegetable plaiting materials...,” “essential oils, etc.; perfumery, cosmetic...,” “prep feathers, down etc..,” and “musical instruments...” Some sectors, including “tobacco and manufactured tobacco substitutes,” saw an increase in the preferential tariff rate due to the imposition of import excise taxes that generally targeted COMESA-member goods. The sectors that experienced the greatest reduction in MFN tariff rates in the same period were “coffee, tea, mate and spices,” “vegetable plaiting materials,” and “raw hides and skins and leather.” Finally, we have calculated Uganda's total imports by country of origin, in 1994 and 2003, based on data at the commodity level. Kenya is the largest exporter to Uganda in both years. Imports from other COMESA countries are substantially smaller.

As pointed out in the introduction, and as Table 1 shows in the aggregate, COMESA and MFN tariff rates are correlated over time. We now investigate their relationship at the commodity level. Figure 3 plots the 1994-2003 change in tariffs for COMESA countries against the change in tariffs for non-COMESA countries (that is, the change in MFN tariffs). Each point in the graph is a 6-digit commodity. Commodities above the 45˚ line (green line) had larger (smaller) MFN tariff reductions (increases), compared to COMESA tariff changes. Correspondingly, commodities below the line had larger (smaller) COMESA tariff reductions (increases), compared to MFN tariff changes. Commodities in the upper-right quadrant experienced increases in both tariffs which were in general due to the imposition of new import excise taxes. Commodities in the lower-left quadrant had tariff reductions in both COMESA and MFN countries. Many observations in the graph lie in the lower-left quadrant, above the 45˚ line. We also plot the regression line that relates the COMESA tariff changes to the MFN tariff changes (brown line). The regression coefficient is positive and significant with a t-statistic over 19. Finally, we label representative commodities in each quadrant.[22]

To conclude, in our empirical analysis, following the previous literature, we ask the following questions: To what extent did Uganda's imports from COMESA countries increase as a result of COMESA's preferential trade liberalization? And to the extent such imports did increase, how much of this increase was a result of trade diversion, as evidenced by a reduction in imports from non-COMESA countries? To fully explore both questions, we take a counterfactual approach, as we cannot simply consider the change in imports from COMESA countries between 1994 and 2003. Instead, we estimate how much trade would have changed in the absence of the trade agreement and net this effect out from our measure, as described in the next section.

V. EMPIRICAL STRATEGY AND RESULTS

In this section, we exploit the time, commodity, and origin-country variation in imports and tariffs to identify COMESA's impact on Uganda's imports. We first develop a simple model that delivers the estimating equations of our empirical analysis which are closely related to those used by Clausing (2001) and Romalis (2005). We next run the empirical analysis proceeding from the simplest to the most sophisticated estimation strategy.

[22] In the upper-right quadrant, cigarettes experienced an increase in tariffs for both COMESA and non-COMESA countries due to a new excise tax of 130 percent. In the lower-left quadrant, both COMESA and MFN tariffs declined for toothpaste, as tariffs declined and there were no new excise taxes: this represents the most common pattern in the data. In the upper-left quadrant, slaked lime tariffs increased for COMESA countries and decreased for MFN countries (the 1994 MFN tariff far exceeded the 1994 COMESA tariff). In the lower-right quadrant, beer tariffs showed the opposite pattern: tariffs declined for COMESA countries and increased for MFN countries.

We assume that each commodity i is differentiated by country of origin c (Armington assumption).[23] Varieties from different origins of the same good are not perfect substitutes; the impact of preferential trade liberalization on trade patterns is captured by the elasticity of substitution between varieties of different origins. The representative consumer in Uganda maximizes the following Cobb-Douglas utility function (at time t) over aggregate consumption of each commodity i, Q_{it}, subject to total expenditure being less or equal to total income Y_t:

$$U_t = \sum_i b_{it} \ln Q_{it} , \qquad \text{where } \sum_i b_{it} = 1 . \tag{1}$$

Consider a constant elasticity-of-substitution (CES) demand structure over varieties of commodity i coming from each country c at time t:

$$Q_{it} = \left[\sum_c q_{ict}^{\frac{\sigma_i - 1}{\sigma_i}} \right]^{\frac{\sigma_i}{\sigma_i - 1}} , \ \sigma_i > 1 , \tag{2}$$

where q_{ict} is the quantity demanded in Uganda of commodity i from country c at time t, and σ_i is the elasticity of substitution between different varieties of commodity i. The optimal demand for each variety is found through maximization of aggregate consumption Q_{it} subject to the following budget constraint:

$$\sum_c q_{ict} \cdot p_{ict} \cdot t_{ict} \cdot g_{ict} = E_{it} , \tag{3}$$

where $p_{ict} = p_{ict}(a_{ict}, \sigma_i)$ equals the border (FOB) price of variety c of commodity i at time t, a_{ict} equals the marginal cost to produce commodity i in country c at time t, t_{ict} is one plus the ad

[23] We use the terms "commodity," "product," and "good" interchangeably in the paper.

valorem tariff rate applied by Uganda at time t on variety c, and $g_{ict} \geq 1$ represents iceberg transport costs (i.e., in order to have one unit of variety c of good i at time t, it is necessary to buy g_{ict} units), and $E_{it} = b_{it} \cdot Y_t$ gives the total expenditure at time t on commodity i (this follows from (1)). In what follows, we will assume that the elasticity of substitution is equal across commodities ($\sigma_i = \sigma$, for every i).[24] Maximization of (2) subject to (3) results in the following quantity demanded in Uganda of variety c relative to variety c' of good i:

$$\frac{q_{ict}}{q_{ic't}} = \left(\frac{p_{ict} \cdot g_{ict} \cdot t_{ict}}{p_{ic't} \cdot g_{ic't} \cdot t_{ic't}} \right)^{-\sigma} . \tag{4}$$

The quantity demanded of variety c is therefore equal to:

$$q_{ict} = (p_{ict} \cdot g_{ict} \cdot t_{ict})^{-\sigma} \frac{E_{it}}{\left[\sum_{c'} (p_{ic't} \cdot g_{ic't} \cdot t_{ic't})^{(1-\sigma)} \right]} , \tag{5}$$

which implies a CIF value (cost including insurance and freight) of:

$$m_{ict} \equiv q_{ict} \cdot p_{ict} \cdot g_{ict} = (\frac{p_{ict} \cdot g_{ict}}{P_{it}})^{(1-\sigma)} \cdot t_{ict}{}^{-\sigma} \cdot E_{it} , \tag{6}$$

where $P_{it} = [\sum_{c} (p_{ict} g_{ict} t_{ict})^{(1-\sigma)}]^{\frac{1}{(1-\sigma)}}$ is the price index of good i at time t. Taking logarithms of expression (6), we can derive the first specification of the empirical model:

$$\ln m_{ict} = -\sigma \ln t_{ict} + (1-\sigma) \ln p_{ict} + (1-\sigma) \ln g_{ict} - (1-\sigma) \ln P_{it} + \ln E_{it} . \tag{7}$$

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[24] In the empirical analysis, we first estimate a common elasticity of substitution across commodities. We next estimate elasticities of substitution that are specific for each one-digit HS sector (see Section V.C).

Expression (7) is the starting point of our empirical analysis. Throughout our analysis, we use pooled yearly data for 1994 and 2000–2003, and measure the first term on the right hand side in expression (7) using two methods. In Table 3, we use the log of (one plus) the preferential tariff rate, as directly implied by (7).[25] In Table 4, we use $(t_{ict} - 1)$, which is the ad valorem tariff rate applied by Uganda to commodity i from country c at time t (taking a first-order Taylor approximation, $\ln t_{ict} \cong (t_{ict} - 1)$). While the coefficient on the first measure represents the impact of a percentage change of (one plus) the tariff rate, the coefficient on the second measure gives the impact of a percentage-point change.[26] Each column in the two tables labeled by the same number corresponds to the same specification.

A. Benchmark Estimators

The first step in our empirical strategy is to estimate naïve benchmark regressions meant to demonstrate that omitted variables biases are important. In particular, in regression (1) of Table 3, we start by regressing the log of imports from COMESA countries on the log of (one plus) the preferential tariff rate, the first term on the right-hand side of expression (7).[27] The implicit assumption in this specification is that the remaining terms are orthogonal to the preferential tariff rate. Next, in regression (2), we augment the first regression with year dummies that capture the impact of time effects that are invariant across product codes (e.g., inflation, growth, etc., in Uganda).

[25] Since in the empirical analysis we express tariff rates in percentage terms, $\lg t_{ict}$ is calculated as the log of (100 plus) the tariff rate.

[26] The logic for having Table 4 in the paper is that it makes our results directly comparable to the results in Clausing (2001). On the other hand, the estimates in Table 3 are directly comparable to the results in Romalis (2005).

[27] Notice that, in equation (7), there is variation across origin (COMESA) countries in the log of (one plus) the preferential tariff rate, within a commodity *i*: the reason is that, in 1994, some COMESA countries were part of the preceding PTA while some other COMESA countries were not.

Both estimates of the impact of COMESA preferential trade liberalization in regressions (1) and (2) are insignificant. We obtain the same insignificant results in Table 4.[28]

Next, in regression (3) of Table 3, we add dummy variables for 6-digit HS product-codes to net out the impact of time-invariant, unobserved, additive product-specific effects. In particular, commodity fixed effects allow us to control for time-invariant *political-economy* factors that affect the extent of trade liberalization and are, at the same time, correlated with import penetration. Notice that the specification with product-specific fixed effects assumes that the impact of varieties' prices (p_{ict}) and transport costs (g_{ict}) in (7) is captured by commodity and time dummy variables (in addition to idiosyncratic shocks in the error term). It also posits that, controlling for goods' dummy variables and time effects, the remaining variation in the price index P_{it} and expenditure E_{it} is orthogonal to tariff changes. The results of this regression show that the reduction of preferential tariff rates increased imports from COMESA countries. The effect is statistically significant at the 1 percent level. However, the size of the coefficient is not large relative to the coefficient estimated for some other countries in the existing literature (see below).[29]

[28] Notice that, in regressions (1)-(4), Table 3, we have restricted the sample to imports from COMESA countries. This restriction facilitates a comparison with our main difference-in-difference estimator (regression (5)), which uses non-COMESA imports as the control group. Results from the trade diversion exercise at the end of the paper can be used to test whether significant biases were introduced by this decision. The first regression in Table 6 (which is restricted to the sample of non-COMESA imports) is directly comparable to regression (4), Table 3 (which is restricted to the sample of COMESA imports). The estimate in Table 6 is small, significant and is consistent in magnitude with the coefficient in regression (4), Table 3. We have established that the two estimates are not statistically different (F=1.07, Prob>F=0.3004). That is, the estimates for the elasticity of substitution, measured using data for imports either from COMESA or non-COMESA countries, are similar.

[29] We obtain a similar result in regression (3), Table 4.

Next, in regression (4) (Tables 3 and 4) we replace commodity dummy variables with commodity-by-country fixed effects. This technique allows us to control for time-invariant factors that affect demand for, say, Kenyan but not Malawian mangos, or vice versa. This specification controls for all time-invariant determinants of imports of commodity i from country c, resulting in a complete fixed-effect estimation. In particular, the advantage of this specification is that it nets out the impact of *any* time-invariant political economy factor. Clausing (2001) uses a similar estimation strategy for imports by the United States from Canada. Compared to regression (3), the estimates we find are now smaller in absolute value but still significant at the 5 percent level. The elasticity of substitution (σ) is estimated to equal 1.7, while the elasticity of imports with respect to tariff rates is between 0.14 and 0.16. In particular, if the ad valorem tariff rate decreases by 100 percent (for example, by 10 percentage points when the tariff rate equals 10 percentage points), then imports from COMESA countries increase by 16 percent (based on column (4), Table 3). Based on column (4), Table 4 if the ad valorem tariff rate decreases by 10 percentage points, imports increase by 14 percent. The magnitude of these effects is relatively small, compared with the results from previous studies for developed countries. In her analysis of U.S. trade imports from Canada within the CUSFTA, Clausing (2001) finds that a 10 percentage points decrease in tariffs implies a 96 percent increase in imports from Canada. Our estimate of Uganda's elasticity of substitution is also much smaller than the estimated elasticity for the United States computed by Romalis (2005), which ranges between 6.2 and 10.9.

For Mexican imports, however, Romalis's estimate ranges between 0.6 and 2.5 and is close to our own for Uganda. Our estimate is also similar in magnitude to the elasticity of import demand for

Uganda estimated by Kee, Nicita and Olarreaga (2005) (equal to 1.22).[30] This similarity may suggest that consumers in low-income countries, in general, have more inelastic demand curves for all varieties and are, therefore, less likely to immediately benefit from trade reform. Search costs may help explain the reluctance of consumers in low-income countries to switch the origin of their purchases from one import country to another.

Another interpretation of our estimates is that the small effect on Uganda's imports of COMESA's preferential tariff liberalization is due to the South-South nature of the agreement. This reading of the results is consistent with the theoretical literature discussed in Section III and with what we find below in Section V.C when we investigate cross-sector heterogeneity.

B. Difference-in-Difference Estimator

The estimation strategy up to this point depends on several assumptions that may not hold. In particular, the price index P_{it} and expenditure E_{it} may not be orthogonal to preferential tariff rates, after controlling for commodity (or commodity-by-country) fixed effects and time effects. For example, if commodities with increased expenditure levels E_{it} (and thus high imports) are protected against preferential tariff reductions because of potentially greater political influence, then our coefficient estimate of $-\sigma$ in regression (7) would be biased toward zero. Another concern is that P_{it} might be correlated with preferential tariff movements since, by construction, P_{it} is a function of all tariffs in the sector, including COMESA tariffs. In addition, in Uganda, COMESA and MFN tariff rates were liberalized simultaneously (Figure 3), resulting in a clear correlation between the regressor

[30] The elasticity of import demand equals the elasticity of substitution, if the cross-price demand elasticity between goods is zero, which is the case in Kee, Nicita, and Olarreaga, (2005).

and P_{it} .This correlation would again create a positive omitted variable bias (i.e., estimates biased towards zero) because a lower price index – for a given commodity – resulting from lower MFN tariff rates would give rise to lower imports from COMESA countries of that commodity.

We next modify our empirical model to address these issues by constructing a difference-in-difference estimator, in which the control group is imports from non-COMESA countries. Using expression (6) for CIF imports by Uganda of variety c and of variety c' of good *i* at time *t*, we can calculate the following ratio:

$$\frac{m_{ict}}{m_{ic't}} = \left(\frac{p_{ict} \cdot g_{ict}}{p_{ic't} \cdot g_{ic't}}\right)^{(1-\sigma)} \cdot \left(\frac{t_{ict}}{t_{ic't}}\right)^{-\sigma} . \qquad (8)$$

Let c represent COMESA countries and c' represent non-COMESA countries. The advantage of considering expression (8), which represents Uganda's *relative* imports from COMESA to non-COMESA countries, is that the terms P_{it} and E_{it} are canceled out from the estimating equation. Expression (8) suggests a new specification of the empirical model. The dependent variable now becomes the logarithm of the ratio of imports from COMESA countries to imports from non-COMESA countries. We regress it on the log of the preference margin afforded by Uganda to preferential trading partners. We calculate the log of the preference margin as the difference between the log of (one plus) the preferential tariff rate and the log of (one plus) the MFN tariff rate. In other words, we estimate the following model (regression (5), Table 3):

$$\ln\frac{m_{ict}}{m_{ic't}} = -\sigma \cdot (\ln t_{ict} - \ln t_{ic't}) + (1-\sigma)\ln\frac{p_{ict}}{p_{ic't}} + (1-\sigma)\ln\frac{g_{ict}}{g_{ic't}} , \qquad (9)$$

where c and c' represent, respectively, the varieties coming from each COMESA member country and from the rest of the world (as a whole). As in regression (4), we introduce commodity-by-country fixed effects and time dummy variables. Therefore, in this last specification, we only need to assume that the time variation in relative prices and relative transportation costs of two varieties of the same commodity is orthogonal to tariff movements.

Equation (9) is based on the assumption that the elasticity of substitution for non-COMESA varieties is the same as the elasticity of substitution for COMESA varieties (of the same commodity). Notice that this assumption is consistent with the result in regression (1), Table 6 (discussed below): the estimate for the elasticity of substitution, measured using data for imports from non-COMESA countries, is -0.8 which is not statistically different from the value we estimated for COMESA countries in regression (4), Table 3 (also see footnote 28).

This regression represents our difference-in-difference (and preferred) specification. As mentioned above, this strategy makes it possible to net out the impact of commodity-specific effects that are time-varying, such as P_{it} and E_{it}. Thus, our difference-in-difference estimator also allows us to net out the impact of changes in MFN tariff rates that take place over the same period (since MFN tariff rates apply equally to all varieties from non-COMESA countries *of the same commodity*).

Results in regression (5), Table 3, suggest that the biases due to P_{it} and E_{it} may not have been substantial, since our new estimate is very close to what we previously found: The coefficient on the log of the preference margin equals –1.9 (significant at the 10 percent level). In Table 4, regression (5), we also estimate this equation using, as an independent variable, $(PTAtariff_{it} - MFNtariff_{it})$, which is the preference margin afforded by Uganda to preferential trading partners, calculated as the difference between the preferential tariff rate and the MFN tariff rate (as before, we use a first-order Taylor approximation to approximate $\ln t$). The results are similar and even more significant.[31]

To conclude, we have found evidence that the COMESA agreement has created small increases in imports by Uganda from COMESA countries. Since the literature has extensively shown empirical and theoretical evidence that protection is endogenous for political-economy reasons, we have been particularly careful to ensure our estimate is robust to this source of bias. First, commodity and commodity-by-country fixed effects – which we use in our preferred specifications – allow us to control for time-invariant political economy factors that are specific for each commodity and for each commodity-origin country pair.[32] In addition, in regression (5) (Tables 3 and 4), by using a difference-in-difference estimation strategy, we have been able to control for political-economy factors that change over time and are common across member and non-member countries. Finally notice that, as long as the sector is politically organized, we would expect higher imports to give rise to lower tariff rates (Grossman and Helpman 1994); that is, reverse causality should bias the coefficient estimate away from zero.

C. Robustness Checks

We next test the robustness of these results (see Table 5). First, in regression (1), Table 5, we expand the dataset by replacing imports' missing value observations. The reason is that, if missing value

[31] Our results in Tables 3 and 4 are overall robust to clustering standard errors by product code, although they are a bit weaker in some specifications.

[32] The assumption of time-invariant political economy factors is consistent with the literature on endogenous protection which, for the most part, has focused on the cross-sectoral (time-invariant) variation in political-economy factors (see, for example, Grossman and Helpman 1994, Goldberg and Maggi 1999, Gawande and Banduopadhyay 2000).

observations truly correspond to zero values, then it means that some COMESA countries increased exports from zero to a positive value in a specific product code or vice versa. In the former case, excluding these observations could be biasing our estimates towards zero, as this would exclude all cases where the tariff reform led to new imports from a particular country. Therefore, whenever import data exists for at least a single year but not the other years, we add observations for the missing year(s), and assign them an import value of US$1.[33] The estimate of the elasticity of substitution in regression (1) of Table 5 is not significantly different from zero. In addition, the 95% confidence interval [-2.53 1.89] suggests that the insignificance of the estimate is likely due to the small magnitude of the effect, as opposed to noise in the estimate. Therefore, the results in column (1) suggest that the exclusion of the missing-values observations in Tables 3 and 4 did not bias our estimate toward zero.

Second, we relax the assumption that the elasticity of substitution is constant across product codes and run regressions that are specific for each one-digit HS code. Estimates of the elasticity of substitution are insignificant again for each one-digit sector except HS1, HS2, and HS3 (which include agricultural products, processed food, beverages, tobacco, and basic chemicals). For these sectors, we estimate elasticities that are substantially higher than the average. We draw two conclusions from this exercise. First, our previous average estimates hide cross-sector heterogeneity. Second, and not surprisingly, the sectors where the impact is larger and significant are those where developing countries are more likely to have a comparative advantage, i.e. exactly the sectors where

[33] As in the last specifications of Tables 3 and 4, we use the difference-in-difference estimator with year and commodity-by-country fixed effects. This is the case for all regressions in Table 5 (except regression (6), where we use the triple-difference estimator).

Uganda's COMESA partners should be able to provide goods at low cost. These results are presented in regressions (2) through (4) in Table 5.

Finally, we address the possibility that the relative price ($\frac{p_{ict}}{p_{ic't}}$) term in equation (9) might be correlated with the preference margin, even after controlling for commodity (or commodity-by-country) fixed effects and time effects, as done in regression (5), Table 3. Our third robustness check attempts to control for this bias, which is, for example, due to unobserved changes in the marginal cost of production of commodity *i* in country *c* (affecting the border price) that may be correlated with tariff movements. For example, production of beer in Kenya might have become more efficient relative to non-COMESA countries, and this increased efficiency might be negatively correlated with preferential concessions for political-economy reasons (e.g., the excise taxes on alcohol). This would bias our estimate towards zero.

Expression (8) above refers to Uganda's relative imports (from COMESA versus non-COMESA countries). Based on the same model, we can derive a very similar expression for any other country's relative imports from (the same) COMESA versus (the same) non-COMESA countries. In the following expression, we consider South African imports:[34]

[34] We thank John Romalis for his suggestion to use South Africa in the triple difference specification. We choose South Africa because it is a low-income country and, therefore, is likely characterized by an elasticity of substitution which is similar to Uganda's. In addition, the size and import demand structure of South Africa maximizes the number of products that both countries (Uganda and South Africa) import from the same origin country. These are the observations that can be used to estimate equation (11). The apartheid ban on exports to South Africa was lifted in 1993; therefore, the impact on changes between 1994 and 2003 should be minimal.

$$\frac{m_{ict}^{SA}}{m_{ic't}^{SA}} = \left(\frac{p_{ict} \cdot g_{ict}^{SA}}{p_{ic't} \cdot g_{ic't}^{SA}} \right)^{(1-\sigma)} \cdot \left(\frac{t_{ict}^{SA}}{t_{ic't}^{SA}} \right)^{-\sigma} \tag{10}$$

We then use this expression to construct our triple difference estimating equation, where the dependent variable is the logarithm of Uganda's imports from COMESA countries relative to non-COMESA countries (expression (8)) divided by South Africa's imports from COMESA countries relative to non-COMESA countries (expression (10)):

$$\ln \frac{m_{ict}}{m_{ic't}} - \ln \frac{m_{ict}^{SA}}{m_{ic't}^{SA}} = \tag{11}$$

$$-\sigma \cdot [(\ln t_{ict} - \ln t_{ic't}) - (\ln t_{ict}^{SA} - \ln t_{ic't}^{SA})] + (1-\sigma)(\ln \frac{g_{ict}}{g_{ic't}} - \ln \frac{g_{ict}^{SA}}{g_{ic't}^{SA}})$$

This specification nets out the impact of the relative border-price term, which is independent of the identity of the importing country ($\frac{p_{ict}}{p_{ic't}}$ appears in both equations (8) and (10) and is canceled out by taking their ratio).[35] However, as in the previous specifications, we still need to assume that the relative transport-costs term is given by the sum of commodity-by-country fixed effects, time dummy variables, and a random component orthogonal to the preference margin.

This is the approach taken by Romalis (2005). Regression (6), Table 5 shows the results based on equation (11). The estimated elasticity of substitution is insignificantly different from zero. If this result is due to a true zero elasticity of substitution, then our previous estimates were not

[35] Even if firms in exporting countries practice pricing-to-market, we are still able to net out the impact of time-varying exporting-country effects which are common across export markets.

underestimating the impact of COMESA on imports; however, if the insignificance of the elasticity is caused by the imprecision of the estimate (e.g., due to few observations), then we cannot draw strong conclusions from this robustness check. In addition, because this robustness check is based on a much smaller number of observations than previous specifications, the estimate might be affected by a selection-bias problem. We partially check for this problem in regression (5), Table 5, which uses the same specification as regression (5), Table 3—on the smaller sample of observations—and delivers a coefficient estimate that is not statistically different from that regression's estimate of –1.93, indicating that selection bias may not be an issue.

As the results from the triple difference estimator are imprecise, we have also attempted to control for changes in the relative price term by including year dummies interacted with origin-countries fixed effects. These new variables capture overall changes in the origin country (although not differences in changes across commodities). The results are presented in column (7), Table 5 (which is directly comparable to regression (5), Table 3). The point estimate remains broadly unchanged and the level of significance increases marginally (from 10% to 13%).

Finally, notice that Uganda is a landlocked country and that goods shipped by sea are likely to arrive to the country as a transshipment from a Kenyan port. Therefore, if a portion of this trade is mistakenly classified as imports from Kenya, an increase in Uganda's overall trade openness will lead to an artificial increase in its imports from Kenya. This point strengthens our interpretation of the estimated elasticity as the upper bound (in absolute value) of the true elasticity. Along the same lines, notice that COMESA is not only a trade agreement since it has promoted the establishment of common institutions, such as a court of justice, a bank, a trade insurance agency, etc.. Thus, an increase in Uganda's trade after the creation of COMESA may be due to the impact of these common institutions, rather than to the decrease in intra-COMESA tariff rates. However, once again, this would bias the estimate of the effect of preferential tariff liberalization on Uganda's imports away from zero. Thus, it reinforces our result that the estimated effect is small.

D. Trade Diversion

Our last test is for trade diversion. This test is important to make a welfare statement about the impact of the trade agreement. Our investigation is based on the fact that, if trade diversion resulted from the PTA agreement, holding all other factors constant, we would expect a decline in imports from non-COMESA countries in those sectors in which preferential tariff rates decline. Our empirical strategy relies on expression (7) above implemented for imports from non-COMESA countries. Results are presented in Table 6.

The first column presents the results from the regression of the log of non-COMESA imports on the log of the MFN tariff rate. The equation includes commodity-by-country dummies and year effects; therefore, it is equivalent to regression (4), Table 3 for imports from COMESA countries. The number of observations is more than 62,000, accounting for the much higher share of non-COMESA imports in total imports to Uganda. The coefficient is also small, significant, and is consistent with the results in Table 3. That is, the estimates for the elasticity of substitution, measured using data for imports either from COMESA or non-COMESA countries, are similar.

To test for trade diversion effects, we include the log of the preferential tariff rate in regression (2) to capture the impact of COMESA trade liberalization on non-COMESA imports which, according to the model, works through P_{it} . If trade diversion was taking place, we would find that the log of the preferential tariff rate is positive and significant. Instead, the coefficient on the log of the preferential tariff rate is insignificantly different from zero, thus, giving no support to the trade-diversion hypothesis. Trade diversion, however, may occur only in sectors in which COMESA countries are active as exporters to Uganda. In regressions (3) and (4), to control for this factor, we include as regressors the log of COMESA imports and the COMESA share in imports, respectively, and their interaction with preferential tariff rates. All trade diversion variables remain insignificant. Therefore, we confirm the result of no trade diversion. Notice also that our finding in this table of no trade diversion is consistent with what we found in regressions (2)-(4), Table 5: the sectors where imports from COMESA countries increased following the agreement are sectors where developing countries tend to have a comparative advantage, i.e. sectors where trade creation is likely. Finally, we find additional evidence consistent with no trade diversion taking place in Figure 2, which shows that the ratio of imports from COMESA relative to non-COMESA (developing) countries decreased after 1994.

Therefore, although COMESA's preferential tariff liberalization has not considerably increased Uganda's trade with member countries, these small effects are likely to be associated with trade creation. This result is inconsistent with the expectation in the literature that South-South PTAs are more likely to give rise to trade diversion.

VI. CONCLUSIONS

This paper presents evidence that South-South trade agreements create small economic gains for member countries in terms of changes in trade patterns. Using commodity-level data, it finds that

Ugandan imports of goods from COMESA countries increased only slightly following the advent of COMESA. Notably, commodity-level data offer a different picture of the effect of COMESA than do aggregate-level data[36] (see the summary statistics in Table 1 and Cernat, 2001, who uses a gravity-type analysis) and, as expected, the results differ from previous studies of North-North and North-South trade agreements.

Our estimates are similar to Romalis's (2005) finding for Mexico within NAFTA. This similarity may indicate that low-income-country consumers generally have more inelastic demand curves than high-income-country consumers, and are thus less likely to immediately benefit from trade reform. Search costs may help explain low-income consumers' reluctance to switch the origin of their imports. An alternative explanation, however, is that developing countries are not natural trading partners, owing to their size and similar resources.

Our elasticity estimates withstand a number of robustness checks. One concern is that COMESA-related reductions in tariff rates might have been offset by an increase in nontariff barriers. For example, after COMESA's initial implementation, Uganda imposed ad valorem excise taxes on selected goods that tended to be imported from COMESA countries. We think that our estimates are not affected by such an offsetting effect, given that we partially account for nontariff barriers by using data on import excise taxes. Political economy factors are also unlikely to affect the results because our main specification controls for both time-invariant political-economy factors and for political-economy factors that change over time that are common across member and nonmember countries. In addition, the findings are not overturned by a triple difference estimation strategy that

[36] However, as pointed out in the literature survey, the evidence on the effects of South-South African PTAs based on

(continued)

controls for factors that change over time and are specific to each export country (a robustness check that follows Romalis, 2005). Lastly, the results appear more robust when we consider the possible impact of tax evasion on recorded imports, as documented by Fisman and Wei (2004).

The results of this paper suggest two questions for future research. First, if economic gains are small, what other factors might explain the increased popularity of South-South PTAs? One explanation may be that such arrangements promote noneconomic benefits, such as peace and security within a region—a goal that is an official priority of COMESA. Indeed, Martin, Mayer, and Thoenig (2005) show that regional trade agreements can reduce the probability of war between liberalizing countries, while multilateral liberalization can potentially increase it. Second, from a normative point of view, given the limited capacity of institutions in the South, is the negotiation and implementation of South-South trade agreements an efficient use of those institutions? Such an analysis would better inform efforts to promote trade in developing countries where institutions are weak and resources scarce.

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gravity-type analyses of aggregate data yields mixed results (Cernat, 2001; Subramanian and Tamirisa, 2001).

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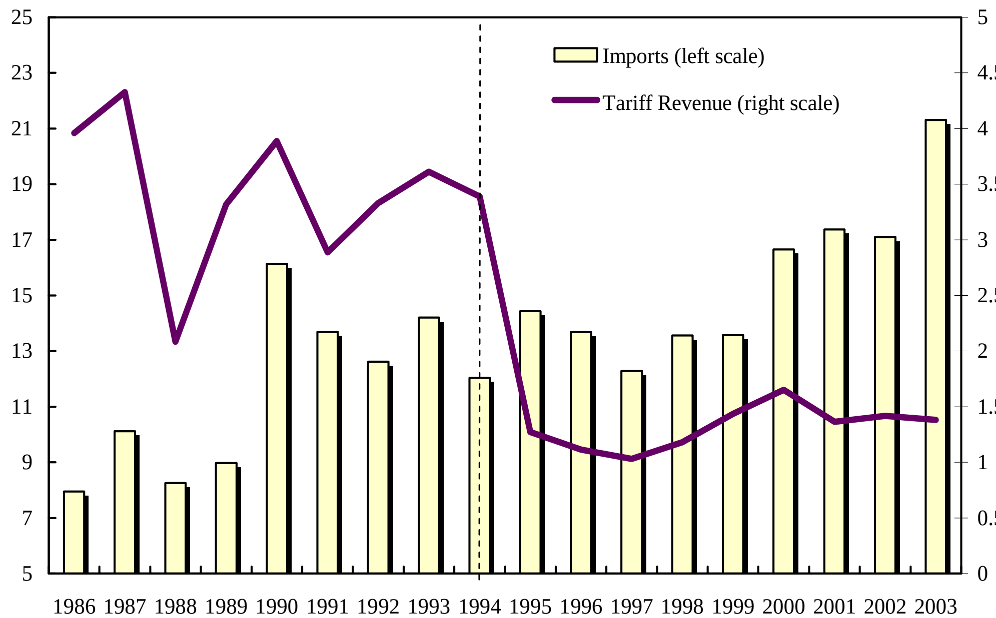
Figure 1. Uganda: Imports and Tariff Revenue, 1986–2003

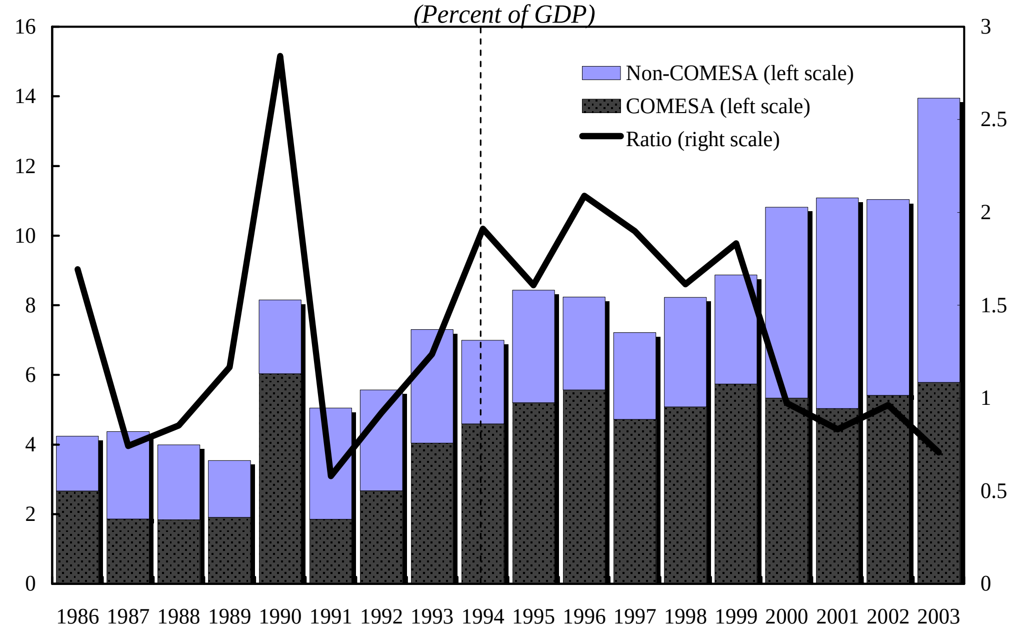
(Percent of GDP)



Source: Ugandan Authorities, DOTS (IMF), and IFS (IMF).

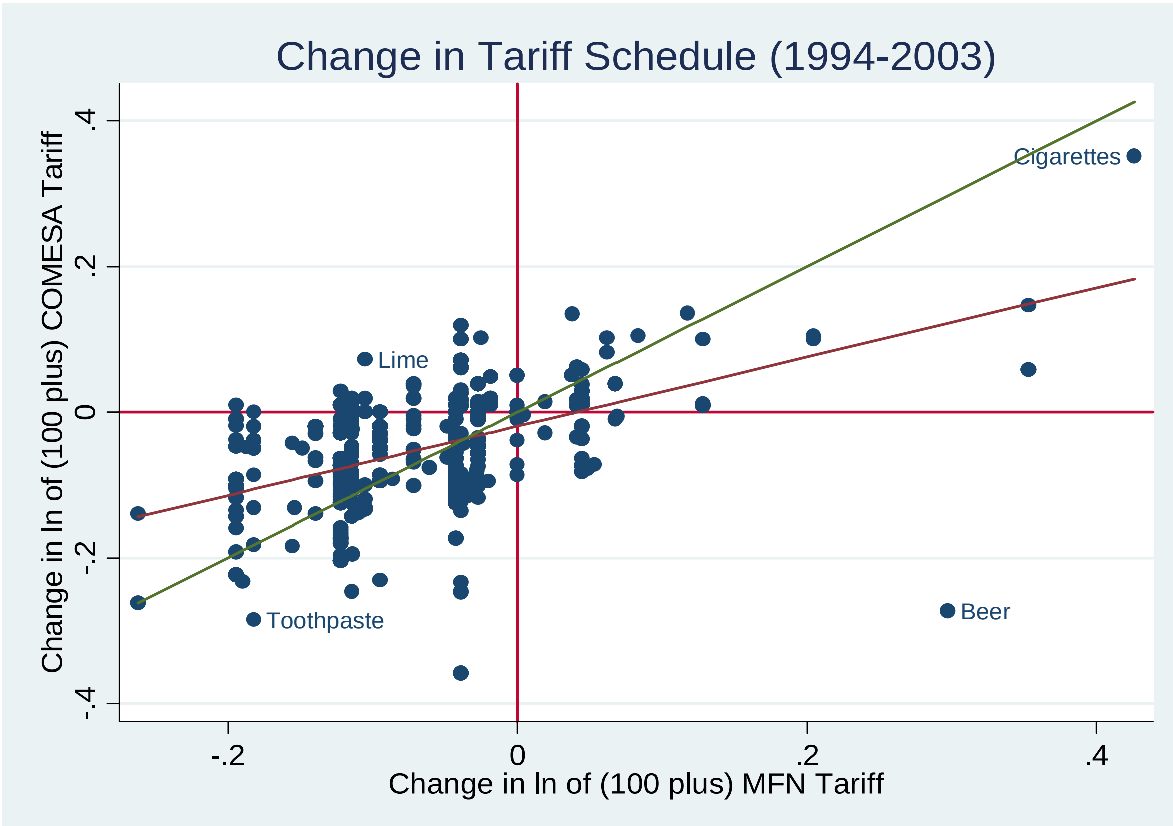
Figure 2. Uganda: Imports from Developing Countries, 1986–2003

(Percent of GDP)



Source: Ugandan Authorities, DOTS (IMF), and IFS (IMF); Non-COMESA countries are only non-COMESA developing countries. The ratio is COMESA imports to non-COMESA imports.

Figure 3: Change in COMESA vs. MFN tariff rates in 1994-2003



Notes: The sample is restricted to commodities for which data on imports from COMESA countries is available for both 1994 and 2003. The tariff rates are adjusted for the existence of import excise taxes. The tariff rate for COMESA countries in 1994 is a weighted average of the tariff rates faced by COMESA countries in 1994, i.e. a weighted average of PTA and MFN rates.

Table 1: Summary Statistics for Uganda vis-à-vis COMESA Countries (1994-2003)

Variable	Obs	Mean	Std. Dev.	Min	Max
Tariff Rate for COMESA countries 1994 (percentage points)	1,204	11.2	10.0	0.0	118.0
COMESA Tariff Rate 2003 (percentage points)	1,204	5.5	7.8	0.0	136.0
Imports from COMESA countries (1994, thousand $)	1,204	155.2	1,065.9	0.5	20,262.3
Imports from COMESA countries (2003, thousand $)	1,204	289.3	5,269.1	0.5	181,275.2

Notes: The sample is restricted to commodities for which data on imports from COMESA countries is available for both 1994 and 2003. The tariff rates are adjusted for the existence of import excise taxes. The tariff rate for COMESA countries in 1994 is a weighted average of the tariff rates faced by COMESA countries in 1994 (i.e., a weighted average of PTA and MFN rates). Imports refer to a single 6-digit HS commodity.

Table 2: Summary Statistics for Uganda vis-à-vis non-COMESA Countries (1994-2003)

Variable	Obs	Mean	Std. Dev.	Min	Max
MFN Tariff Rate 1994 (percentage points)	1,020	17.9	8.6	0.0	60.0
MFN Tariff Rate 2003 (percentage points)	1,020	10.2	10.2	0.0	145.0
Imports from non-COMESA (1994, thousand $)	1,020	364.6	1,289.2	0.5	18,223.9
Imports from non-COMESA (2003, thousand $)	1,020	718.4	2,381.7	0.5	30,602.1

Notes: The sample is resticted to commodities for which data on imports from non-COMESA countries is available for both 1994 and 2003. This is a subset of the dataset we use, which restricts product codes to commodities that in at least one of the years was imported from COMESA. Tarrif rates are adjusted for the existence of import excise taxes. Imports refer to a single 6-digit HS commodity.

Table 3: Estimates Based on Uganda Imports in 1994, 2000, 2001, 2002, and 2003

	(1)	(2)	(3)	(4)	(5)
Dependent variable	Log of imports	Log of imports	Log of imports	Log of imports	Difference of log of imports: COMESA vs. non-COMESA
Log of preferential tariff	-0.0879	0.1072	-3.1740	-1.7243	
	0.2859	0.3085	0.6954**	0.8017*	
Log of preference margin					-1.9538
					1.1924+
Constant	2.4051	1.3715	16.4824	9.8462	-1.1211
	1.3347	1.4364	3.2408**	3.7372**	0.0857**
Year dummy variables	No	Yes	Yes	Yes	Yes
Commodity dummy variables	No	No	Yes	No	No
Commodity-country dummy variables	No	No	No	Yes	Yes
Number of differences	Zero	Zero	Zero	One	Two
Estimator	OLS	OLS	OLS	FE	FE
Observations	10,341	10,341	10,341	10,341	10,341
R-squared	0.00	0.00	0.60	0.76	0.81
Elasticity of substitution	**-0.0879**	**0.1072**	**-3.174**	**-1.7243**	**-1.9538**
	0.2859	**0.3085**	**0.6954****	**0.8017***	**1.1924+**

Notes: Robust standard errors in parentheses. + significant at 10%; * significant at 5%; ** significant at 1%

The *log of import* equals the log of Uganda's imports from COMESA countries (1994, 2000, 2001, 2002, 2003). The difference of log of imports: COMESA vs. non-COMESA equals the log of Uganda's relative imports from COMESA vs. non-COMESA countries (1994, 2000, 2001, 2002, 2003). The log of preferential tariff equals the log of (100 plus) Uganda's tariff rate (1994, 2002, 2001, 2002, 2003). The log preference margin equals the log of (100 plus) Uganda's preferential tariff rate for COMESA countries (PTA tariff rate (for PTA countries) and customs-duty rate (for non-PTA countries) in 1994; and COMESA tariff rate in 2000, 2001, 2002, 2003) minus the log of (100 plus) Uganda's customs-duty rate for non-COMESA countries. Commodity dummy variables are set at the 6-digit HS product-code level. Commodity-country dummy variables are for the pairwise combinations of commodities and import-origin countries.

Table 4: Estimates Based on Uganda Imports in 1994, 2000, 2001, 2002, and 2003

	(1)	(2)	(3)	(4)	(5)
Dependent variable	Log of imports	Log of imports	Log of imports	Log of imports	Difference of log of imports: COMESA vs. non-COMESA
Preferential tariff rate	0.0010	0.0025	-0.0255	-0.0136	
	0.0024	0.0025	0.0069**	0.0083+	
Preference margin					-0.0193
					0.0096*
Constant	1.9879	1.9888	2.2772	1.8901	-1.1295
	0.0244**	0.0443**	0.0943**	0.0602**	0.0826**
Year dummy variables	No	Yes	Yes	Yes	Yes
Commodity dummy variables	No	No	Yes	No	No
Commodity-country dummy variables	No	No	No	Yes	Yes
Number of differences	Zero	Zero	Zero	One	Two
Estimator	OLS	OLS	OLS	FE	FE
Observations	10,341	10,341	10,341	10,341	10,341
R-squared	0.00	0.00	0.60	0.76	0.81

Notes: Robust standard errors in parentheses. + significant at 10%; * significant at 5%; ** significant at 1% The log of import equals the log of Uganda's imports from COMESA countries (1994, 2000, 2001, 2002, 2003). The difference of log of imports: COMESA vs. non-COMESA equals the log of Uganda's relative imports from COMESA vs. non-COMESA countries (1994, 2000). The log of preferential tariff equals the log of (100 plus) Uganda's tariff rate (1994, 2002, 2001, 2002, 2003). The log preference margin equals the log of (100 plus) Uganda's preferential tariff rate for COMESA countries (PTA tariff rate (for PTA count). Commodity dummy variables are set at the 6-digit HS product-code level. Commodity-country dummy variables are for the pairwise combinations of commodities and import-origin countries.

Table 5: Robustness Checks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Including Missing Obs.	Broad Sectors HS 1	Broad Sectors HS 2	Broad Sectors HS 3	Triple Diff with South Africa	Triple Diff with South Africa	Origin Country TFP Controls
Dependent variable	Difference of log of imports: COMESA vs. non-COMESA	Difference of log of imports: COMESA vs. non-COMESA	Difference of log of imports: COMESA vs. non-COMESA	Difference of log of imports: COMESA vs. non-COMESA	Difference of log of imports: COMESA vs. non-COMESA	Diff - in - Diff: COMESA vs. non-COMESA, Uganda vs. South Africa	Difference of log of imports: COMESA vs. non-COMESA
Log of preference margin	-0.3185	-12.0281	-8.0169	-4.4884	1.1562		-1.8775
	1.1270	6.7830+	3.0652**	2.1271*	6.5281		1.2434
Ratio of preference margin: Uganda vs. South Africa						-3.2874	
						10.8450	
Constant	-5.0657	-0.0230	3.5646	0.1060	-2.1392	4.0646	-0.8971
	0.0792**	0.6172	0.3577**	0.2060	0.6261**	0.8081**	0.0885**
Year dummy variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Commodity dummy variables	No	No	No	No	No	No	No
Commodity-country dummy variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of differences	Two	Two	Two	Two	Two	Three	Two
Estimator	FE	FE	FE	FE	FE	FE	FE
Observations	21,500	470	1,090	1,357	317	317	10,341
R-squared	0.57	0.74	0.77	0.72	0.99	0.97	0.81
Elasticity of substitution	**-0.3185**	**-12.0281**	**-8.0169**	**-4.4884**	**1.1562**	**-3.2874**	**-1.8775**
	1.127	**6.7830+**	**3.0652****	**2.1271***	**6.5281**	**10.845**	**1.2434**

Notes: Robust standard errors in parentheses. + significant at 10%; * significant at 5%; ** significant at 1%

The difference of log of imports: COMESA vs. non-COMESA equals the log of Uganda's relative imports from COMESA vs. non-COMESA countries (1994, 2000, 2001, 2002, 2003). The diff - in - diff: COMESA vs. non-COMESA, Uganda vs. South Africa equals the log of relative imports from COMESA vs. non-COMESA countries in Uganda vs. South Africa (1994, 2001). The log preference margin equals the log of (100 plus) Uganda's preferential tariff rate for COMESA countries (PTA tariff rate (for PTA countries) and customs-duty rate (for non-PTA countries) in 1994; and COMESA tariff rate in 2000, 2001, 2002, 2003) minus the log of (100 plus) Uganda's customs-duty rate for non-COMESA countries. The ratio of preference margin: Uganda vs. South Africa is the log difference between the preference margin in Uganda and the preference margin in South Africa. Commodity dummy variables are set at the 6-digit HS product-code level. Commodity-country dummy variables are for the pairwise combinations of commodities and import-origin countries. Broad HS codes are defined in Appendix I.

Table 6: Estimates of Trade Diversion Based on Uganda Imports from Non-COMESA Countries in 1994, 2000, 2001, 2002, and 2003

	(1)	(2)	(3)	(4)
Dependent variable	Log of imports	Log of imports	Log of imports	Log of imports
Log of MFN tariff	-0.8052	-0.7438	-0.6540	-0.64313
	0.2869**	0.3440*	0.3444+	0.3458+
Log of preferential tariff		-0.1306	-0.1828	-0.3144
		0.3838	0.3837	0.3884
Log of preferential tariff *Log of COMESA imports			-0.0378	
			0.0376	
Log of COMESA imports			0.1961	
			0.1750	
Log of preferential tariff *COMESA share				0.0390
				0.5702
COMESA share in imports				-1.1308
				2.6690
Constant	5.6131	5.9363	5.7554	6.4676
	1.3676**	1.6379**	1.6311**	1.7069**
Year dummy variables	Yes	Yes	Yes	Yes
Commodity-country dummy variables	Yes	Yes	Yes	Yes
Number of differences	One	One	One	One
Estimator	FE	FE	FE	FE
Observations	62,302	62,302	62,302	62,302
R-squared	0.78	0.78	0.78	0.78

Notes: Robust standard errors in parentheses. + significant at 10%; * significant at 5%; ** significant at 1%
The *log of import* equals the log of Uganda's imports from non-COMESA countries (1994, 2000, 2001, 2002, 2003). The log of MFN tariff equals the log of (100 plus) Uganda's tariff rate (1994, 2002, 2001, 2002, 2003). The log of COMESA imports equals the log of Uganda's imports from COMESA countries (1994, 2002, 2001, 2002, 2003) in that commodity. The COMESA share in imports equals the share of Uganda's imports from COMESA countries (1994, 2002, 2001, 2002, 2003) in that commodity. Commodity dummy variables are set at the 6-digit HS product-code level. Commodity-country dummy variables are for the pairwise combinations of commodities and import-origin countries.