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The effect of the Uruguay round on the intensive and extensive margins of trade ☆

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ABSTRACT

Do tariffs inhibit trade flows by limiting the entry of exporters ('firm extensive margin') or by restricting the average volume exported by each firm ('firm intensive margin')? Using a gravity equation approach, we analyze how the decrease in tariffs promoted during the 90s by the Uruguay Round multilateral trade agreement affected the trade margins of French firms for 57 sectors and 147 countries from 1993 to 2002. Our main contribution is to estimate the elasticity of trade on both margins, controlling for the unobserved heterogeneity of trade flows thanks to a three-dimensional panel and to time-varying tariffs as a measure of variable trade costs. Our results show that the number of firms exporting in a given sector to a given destination is related to the level of tariffs. But they also show that the decrease in tariffs induced by the implementation of the Uruguay Round did not lead more firms to export and that it only induced incumbent exporters to increase their shipments. We control for two problems that may affect our basic specification: tariff changes may be endogenous and zero flows are not included. Our results are confirmed — even when the extensive margin is significant, its magnitude is very small.

1. Introduction

What is the effect of trade-cost reductions on the intensive and extensive margins of trade? In this work we address this issue by analyzing the impact of trade costs through a policy variable, tariffs, and using the worldwide multilateral tariff reduction resulting from the Uruguay Round (UR), as a policy change.

Answering the previous question is at the core of recent results in trade literature. By introducing heterogeneity across firms, recent trade models show that only some firms are able to export.[1] This, in turn, generates two margins of trade: the extensive and intensive margins. The first one is defined by the number of firms that export, the second one by the average export flow by firm. The main predictions of these models are related to the effects of variable and fixed trade costs on both margins. Our question is particularly interesting from a policy point of view. Bustos (2011) shows that, after a trade liberalization, exporters tend to adopt a more efficient technology. This may create a new channel for productivity upgrading. Eaton et al. (2008) find that new Colombian exporters start exporting by shipping very low volumes. However, those who survive expand very rapidly and, after a few years, account for almost half of total export expansion in that country. Those findings suggest that, if a reduction in tariffs affects aggregate trade mainly through the extensive margin, its long-term effect can be magnified. On the other hand, if the effect channels more through the intensive margin, the economy experiences a reallocation of resources toward the incumbent exporters. In this case a relevant policy could be to allow for a higher degree of flexibility in the labor market in order to ease the reallocation process.

Some recent papers, like Crozet and Koenig (2010), address the relation between trade costs and trade margins empirically, relying on distance to assess the impact of variable costs. The main novelty of our work is to use tariffs to study the effect of variable trade costs in a micro data context. Thereby, we can address interesting econometric as well as trade-related issues. First, considering tariffs instead of simply distance, we are able to implement econometric panel methods. By controlling for country–sector specific fixed effects, we measure the within effect of a change in tariffs on both trade flows and their margins, whereas previous studies could only use cross-section estimation. Thereby, it allows us to get rid of the well-known problem that distance can also proxy for taste or cultural dissimilarity and a range of other cultural or historical considerations. Second, tariffs are one of the main trade policy instruments in the hand of governments and effort is devoted to policy programs aimed at reducing tariffs. Thus, the parameter of interest is the elasticity of trade flows and trade margins to tariffs, rather than to distance. Third, most theoretical trade models introduce trade costs through tariffs and perform comparative static analysis by letting

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[1] See Melitz (2003) and Chaney (2008) among others.

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tariffs change. In this perspective, our analysis keeps up with the theoretical literature to a larger extent than previous ones.

We study the response of French manufacturing firms to the worldwide reduction in tariffs implemented within the framework of the Uruguay Round at the end of 1994. We study France among European countries due to the availability of detailed firm-level data, from the French Customs (Douanes), which allow us to address this issue using a 3-dimensional panel. We use information on the exports of French firms for 57 sectors to 147 destinations in a time period ranging from 1993 to 2002. We use the multilateral agreement promoted by the Uruguay Round because it has been the only large scale multilateral tariff reduction in the last decades.

Merging the French firm-level dataset with TRAINS tariff data (collected by WTO, Inter-American Development Bank and the World Bank), we can exploit the tariffs imposed on French products to identify the elasticity of trade flows with respect to tariffs on both margins of trade. In fact, the structure of the Douanes dataset, which specifies the export destination by firm and product, allows us to precisely match a flow with its tariff. While a few studies did it on the import side, we are the first, up to our knowledge, to examine the export side, which is made possible by the structure of the Douanes database. This feature is particularly relevant in the case of France since tariff reductions in the 1990s were less significant on the import side than on the export side.

We use a gravity equation approach and show gradually how our results are modified as we depart from the standard specification. We show that the panel dimension is crucial for the results. When we ignore it and perform an OLS pooled cross-section estimation we find that both margins are significant and that each explains half of the total effect of tariffs on trade. We show that this result is robust to the introduction of a full set of country and sector unobserved heterogeneity effects as well as time macro-shocks. However, when we take the panel dimension of the data into account (within regressions), the effect on the extensive margin disappears. Thus, more firms export where tariffs are lower (pooled OLS). However, the decrease in tariffs (within regressions) induced by the implementation of the Uruguay Round did not push more firms into exporting, while it increased the shipments of incumbent exporters. This result reveals that using the average effect of tariffs to deduct the effect of a trade liberalization episode may be highly misleading. In fact a reduction in tariffs only helps those firms that already export, leaving small non-exporters aside. The reason may be that small firms are not able to cover the sunk costs of exporting with the gains from tariffs reduction. Whether this is the result of the (big) magnitude of sunk costs, the (small) magnitude of the UR tariffs reduction, or other impediments to the firm growth, is an interesting issue which we leave to further research.

We address two potential biases which may affect our results. First, tariff growth rates may be endogenous. After the implementation of the UR, tariffs decreased without being completely eliminated (and without reaching a predetermined level). Hence, even if tariff reductions were induced by the UR implementation, we cannot be sure that their patterns have not been shaped by other factors. A way of controlling for this bias is to instrument the growth rate of tariffs. A good instrument for the growth rate in tariffs is its pre-policy (pre-UR) level interacted with a WTO participation dummy. In fact, at the sector-country level, the higher tariffs were before the policy event, the more they decreased. Moreover pre-UR tariff levels do not affect the subsequent French export growth rate since they are predetermined. When we instrument tariffs this way, our results do not change much, however. Second, we discuss the incidence of the omission of zero-trade flows in our results. We propose two different methodologies to deal with it: a Honoré (1992) model and a Poisson Pseudo-Maximum Likelihood estimation proposed by Santos Silva and Tenreyro (2006). The extensive margin coefficient becomes significant, albeit it explains less than 20% of the effect. Moreover, and in contrast with previous findings, this result is not robust to the inclusion of further control variables.

Overall, our results suggest that the tariff reductions, partly due to the Uruguay Round, are responsible for an increase in aggregate French exports ranging from 2.3% to 3.6% between 1993 and 2002. In our preferred specification, in particular, the tariff reductions are responsible for a growth rate of French manufacturing exports of 3%, which can be split into a growth rate of 2.5% for the intensive margin, and 0.5% for the extensive margin.

Our paper is mainly related to the empirical literature on extensive and intensive margins. Eaton et al. (2004), using French firm-level data for 1986, find that the extensive margin explains much of the variations in French firm exports over all possible destinations. Crozet and Koenig (2010), using a similar approach to ours, estimate the effect of distance on French trade flows and on both margins. They use their estimates to recover the structural parameters of Chaney's (2008) model. Bernard et al. (2007), using US disaggregated export flows for 2000, find that higher distance implies a lower extensive margin but a higher intensive margin. Moreover, their findings suggest that aggregate trade relationships are more influenced by their extensive margin than by their intensive one. We depart from these papers insofar as we use a panel framework that allows us to control for sector and country unobserved heterogeneity.

Surprisingly few papers have explored the impact of tariff reductions on trade growth. The first example we are aware of is Baier and Bergstrand (2001). Using bilateral trade flows at the country level, they estimate that the elasticity to tariffs is between −2 and −4. Using data at the product level, Haveman et al. (2003) find an average elasticity of −1.6. More recently Caliendo and Parro (2009), using an extended Ricardian model a la Eaton and Kortum (2002), evaluate the effect on trade of the change in the tariff structure caused by NAFTA. They find an average trade elasticity of 8.22.[2,3]

The decomposition of the effect into margins has been estimated by Debaere and Mostashari (2010), but for the import side and using macroeconomic product margins (number of products versus shipments per product). Egger et al. (2011) use cross-sectional data for the year 2005 and find that the extensive margin contributes only marginally to the effect of a preferential trade agreement on exports. Feinberg and Keane (2009) estimate a structural model for export decision on firm level data for multinational corporations in the United States and Canada. They find no effect of tariffs on the export decision of firms.

This paper also contributes to the lively debate on the effect of WTO on world trade, originated by Rose (2004). Applying a standard gravity approach to a set of bilateral trade flows in long time series, Rose shows that GATT/WTO membership *does not* explain world bilateral trade volumes. Since then, many papers have explored this issue, trying to figure out what was driving these surprising findings. Felbermayr and Kohler (2007) show that, by controlling Rose's regression for zero flows, the GATT/WTO membership dummy turns out to be significant. Our results are consistent with theirs, but our main innovation with respect to previous literature consists in using tariffs instead of a dummy indicating participation in WTO. The scope of our results is different from that of previous studies since we do not consider *bilateral* trade flows and since the time-span in our analysis is much shorter. Nevertheless, the main concern of

[2] However, without “Agriculture”, “Mining” and “Petroleum”, which we are not using in our estimate, the average elasticity becomes a lower 5.75.

[3] Several studies have estimated trade elasticity proxying trade costs either with distance either with the maximum price difference across goods between countries as suggested by Eaton and Kortum (2002). While estimated elasticities change a lot across studies, many of them consider as a benchmark the interval 7–9 suggested by the methodology of Eaton and Kortum (2002). More recently Simonovska and Waugh (2011) claim that previous estimates are upward biased and find a trade elasticity of 4.22, which is in the range of trade elasticity estimated using firm-level data (from 3.6 to 4.8) by Bernard et al. (2003) and Eaton et al. (2011a).