

Preferential Trade, Sunk Costs, and the Path-Dependent Expansion of Exports

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Abstract. In the presence of sunk costs to exporting, preferential tariff liberalization may have a prolonged, dynamic effect on the pattern of a beneficiary country's exports. In particular, when preferential market access helps overcome product specific fixed costs to exporting, preferential tariff liberalization might trigger a geographic spread of exports to third markets outside the preferential trading area. I test this hypothesis for the pattern of Mexican exports between 1993–1997, after the inception of NAFTA, with several Latin American and European countries, respectively. After controlling for product specific shocks and the overall trend in export growth, the evidence is consistent with the hypothesis that initial exports to the United States further prompted exports to third markets. The results suggest a strong impact on exports to large or geographically proximate countries (Argentina, Brazil, Peru, Costa Rica, Guatemala, Honduras and Panama). Exports to some of those countries also exhibit an upward trend in terms of their skill content.

Keywords: Preferential tariff liberalization, extensive margin, fixed costs, NAFTA, Mexico

JEL-Codes: F13, F15, K33

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1 Introduction

This paper considers the impact of preferential market access on export product variety. The key idea is that shocks to variable trade costs may trigger a dynamic response. In particular, firms might be prompted to expand their exports in a geographical manner when tapping overseas markets involves some sort of fixed cost. The persistence of export behavior that results from sunk costs is empirically well documented; what is less recognized are the implications of sunk costs for the dynamics of trade. One obvious question is whether exports that have initially been benefited from preferential market access do provide for a “bridgehead effect” (EVENETT and VENABLES, 2002) because they are instrumental in overcoming certain fixed costs to trade. This channel could explain why preferential market access might translate into a geographic spread of trade that extends well beyond the initial preferential trading partners.

This research addresses a number of both theoretical and policy-related issues. First, with regard to the geographic dimension of diversification, very little is known on “third party effects” of trade liberalization. Preferential trading arrangements in particular have been criticized for their potentially adverse effects on ‘outside’ countries. Against this background it would be an interesting result to find that preferential market access facilitates the geographic spread of trade. Evidence to this effect would, secondly, also open up a new perspective on the evaluation of preferential market access schemes like, for instance, the Generalized System of Preferences (GSP). Those schemes have initially been established to facilitate developing countries’ transition towards more diversified manufacturing exports, as a diversified export structure is closely associated with economic growth and a higher level of per capita income (FUNKE and RUHWEDEL, 2005; UNECE, 2004; LI, 1999). Helping overcome fixed costs to exporting is one possible channel to live up to that goal. Third, there is still a considerable gap between the predictions that trade models yield for bilateral trade flows and the fact that trade relations tend to be highly concentrated. Fixed costs are widely believed to be important in explaining the many zero trade flows, thus it is desirable—as a matter of theory—to characterize the nature of these fixed costs based on empirical evidence. Fourth, to the extent that increasing product variety and export diversification gradually replace zero trade entries, research on the determinants of export diversification also contributes to the general literature on trade growth.

The intuition for the potential path dependency of exports is simple. Suppose there are product specific fixed costs like, for instance, overseas marketing. Once a given product is being shipped overseas—e.g. due to preferential tariff cuts—it becomes eas-

ier to export that product as well to additional destinations. In other words, if average costs of exporting could be lowered by trading with multiple destinations, then preferences could make for a “path dependency of exporting”, in that serving a particular market initially (the preference-granting country) increases the ability, or probability, of also tapping additional export markets with the same products. The underlying assumption is that the granting of a preference margin is decisive in recouping the fixed costs of overseas market entry, in which case preferences could directly cause the spectrum of traded varieties to expand.

Hence, it could be conjectured that in the presence of fixed costs preferential market access could provide a ‘window of opportunity’ for beneficiary countries to expand their exports on the extensive margin, both in a product and in a geographic sense. The testable hypothesis is that for a given developing country, the existence of preferential market access should increase the probability of shipping preferred products to additional export markets.

2 Evidence on Tariffs and the Extensive Margin

There are already indications that the suggested dynamic impact of tariff reductions could be at work in the case of NAFTA. Assessing the U.S.–Mexico preferential trade relations, HILLBERRY and MCDANIEL (2002) document a rapid increase in Mexico’s exports to the U.S. both at the extensive margin (some 24 percent over 8 years) as well as at the quality margin (prices rose about 47 percent over the same period). While this is evidence that preferential trading indeed makes a difference, HUMMELS (2006) goes a step further and contrasts Mexico’s within-NAFTA trade performance with that toward outside countries. His decomposition shows that the time period immediately following NAFTA’s inception coincides with a marked increase in the geographic spread of Mexican exports. While the number of HS-6 products exported to the U.S. rose from about 3,800 to 4,000 in 1994–97, the average number of destinations per HS-6 category for Mexican exports *other than the U.S.* increased from 14.9 to 20.7 over the same period. Even more strikingly, the number of products shipped exclusively to the U.S. was almost cut in half (down from 457 in 1994 to 295 in 1997) while the number of goods shipped only to non-U.S. destinations stayed roughly constant (592 and 556, respectively). Apparently, products that were solely traded with the U.S. were subsequently taken on to new markets outside the U.S. Another complementary result is contained in HUMMELS and KLENOW (2004) who uncover, among other things, important differences in the way how trade growth manifests itself for rich and poor

countries, respectively. Poor countries tend to increase their trade by exporting higher quantities per variety at about constant prices, an explanation that would be consistent with a geographic spread of trade in existing products for which fixed costs have once been overcome.

Specific evidence with regard to the geographic spread of trade, albeit without any connotation to preferential market access, is presented by EVENETT and VENABLES (2002). This paper is probably closest to their contribution since both studies share a key conceptual feature, namely the formulation of fixed costs to market entry as depending on past export performance in many markets. However, their study is different in two respects: for one, they aim at explaining the disappearance of zero trade flows by hypothesizing that exports tend to spread out to markets that are “similar” to those already served. The geographic and linguistic measures of proximity they use to operationalize “similarity” are a general feature for any given country pair, so destination market characteristics drive their results, and consequently their empirical part can draw on a large cross-section of countries. In contrast, the conjecture that preferential market access may promote the geographic spread to trade is specifically tied to preferential tariff cuts at a certain point in time, so empirical verification necessarily must come from intertemporal variation of exports following tariff reductions for select beneficiary countries and specific tariff lines. Second, if such tariff cuts are indeed causal for expanding exports to third countries, the latter should be expected to quickly follow suit, whereas EVENETT and VENABLES—due to their more general claim—consider a time period of roughly 20 years for which they calculate “births” and “exits” of products. Notwithstanding those differences EVENETT and VENABLES’ main result that the predominant form of learning occurs through the proximity to the supply frontier, i.e. distance to markets previously supplied turns out as the relatively most important channel, might well be mutually compatible with findings that attribute a role to shocks from preferential market access.

Based on firm-level data sets, a recent strand of the literature has established the significance of sunk costs in determining firms’ export behavior. DAS ET AL. (2006) develop a model in which firms face both sunk start-up costs to initiate exports and per-period fixed costs to maintain foreign market presence. Using Colombian data, they quantify start-up costs in the range of 300,000 to 400,000 US dollars (depending on firms size), while period fixed costs appear, on average, to be negligible. They also point out that the evolution of the extensive margin (at the firm level) might be industry specific, i.e. when many firms are clustered “near” a break-even cost threshold, market entry is an important response margin, whereas in a more cost-heterogeneous industry less firms are on the brink of starting to export.

The work by ROBERTS and TYBOUT (1997) uses a large panel data set of Colombian firms and provides empirical support for sunk cost hysteresis models of export participation. In particular, they find quantitatively large effects of past export participation on next period's exporting probability (and a markedly lower impact of participation lagged 2 and 3 periods). They find that those sunk costs are mainly associated with market-related information, whose value may rapidly depreciate over time. On the other hand, they do not use a combination of geographic and product variation in exports to identify characteristics of fixed costs, as is the focus of this paper. BERNARD and JENSEN (2004) and BERNARD and WAGNER (2001) also document persistence in export performance among U.S. and German firms, respectively, which is interpreted as being induced by substantial sunk costs.

Focusing on the cost side of the profit condition that determines export decisions, two recent papers have looked at how preferential tariff changes affect the evolution of the extensive margin. Applying a count measure of variety, DEBAERE and MOSTASHARI (2005) confirm the hypothesis that the extensive margin is responsive to tariff variation. Probit analyses show that both tariffs and tariff preferences, i.e. the relative position to other countries, significantly influence the extensive margin of countries' exports to the U.S. While they concede that the overall contribution of preferences is relatively small, some Eastern European countries exhibit a more pronounced response when tariff cuts are deeper, suggesting threshold effects that would be consistent with the existence of fixed costs. KEHOE and RUHL (2003) find an inverse relationship between a good's pre-liberalization share in trade and its subsequent growth. The lowest percentile of traded goods may account for as much as 40 percent of additional trade following liberalization.

The general approach in the literature to test for the possible existence of entry costs to foreign markets is to establish a positive and significant probability for last period's export behavior to affect current exports. Note that none of the above studies has linked the growth of export product variety to preferential trading arrangements or developing countries. This paper seeks to address that issue by investigating how fixed costs could make for a bridgehead effect of preferential exports. It may thus provide an explanation for the observed increase in the geographic spread of varieties, and allows to draw inference as to the nature of fixed trade costs.

3 Modeling Export Market Participation

3.1 Fixed Costs and the Extensive Margin

The hypotheses on the geographic spread of exports are framed from the perspective of a single country that exports to multiple destinations, thus any exporter index will be dropped. The model is entirely standard, except for a particular formulation of two different kinds of fixed costs, and its logic follows that in CLERIDES ET AL. (1998) and ROBERTS and TYBOUT (1997). Trade decisions are made in a dynamic discrete choice model in which exporting is based on a comprehensive profit condition. It is not a model of variety, and its purpose is not, as in ROMER (1994), to endogenously determine the number of goods. However, the number of varieties the representative country is exporting responds to changes in trade costs, namely preferential market access. Once a certain product switches its status from non-traded to traded, the exporter can subsequently capitalize on the sunk costs of exporting, which in turn causes the spectrum of traded products to expand further over time. Studying this mechanism is at the heart of the empirical exercise.

Assume there is a measure of I industries in the economy, and products within each industry i are differentiated according to country of origin. An importing country thus demands varieties from $s \in 1, \dots, S$ countries according to the following two-tiered utility function

$$U = \left[\int_0^I C(i) di \right]^\beta D^{1-\beta}; \quad C(i) = \left(\sum_s^S c_{i,s}^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}$$

in which utility is derived from a composite good $C(i)$ that consists of a CES aggregate of s imported product varieties. Note that the elasticity of substitution, σ , pertains to the Armington varieties in industry i . D denotes a domestic numeraire good. Based on the demand schedule from maximizing above utility, monopolistically competitive producers in the exporting country set prices as a markup over marginal cost. Hence, the delivered price equals $p_{i,s} = \frac{\sigma}{\sigma-1}(1 + \tau_{i,s}) \cdot mc_f$, which includes an exporter-specific tariff, $\tau_{i,s}$, the importing country might levy on goods from exporter s . With markup pricing, demand for a specific product is then given by

$$c_{i,s}(p) = \left[(1 + \tau_{i,s}) \frac{\sigma}{\sigma-1} mc_f \right]^{-\sigma} \underbrace{C(i) \left[\frac{\beta Y}{\int_i C(i) di} \right]^\sigma}_{\equiv \gamma}$$

It can be shown that, as we should expect, $\frac{\partial p_{i,s}}{\partial \tau_{i,s}} > 0$ and $\frac{\partial c_{i,s}}{\partial \tau_{i,s}} < 0$.

Marginal costs for producing good $c_{i,s}$ are given by mc_f , so the index f always represents a specific exporter–product combination. At the firm level, marginal costs obey the following specification:

$$mc_f = (1 + \eta_f)w ; \quad \eta \sim \text{lognormal}$$

in which w is the wage rate and η is a lognormally distributed random variable. When firms are ordered along the efficiency dimension, the least cost supplier (with $\eta^{(0)} = 0$) faces marginal costs equal to the wage rate. In the current CES framework, the ordering of firms from low to high cost supplier carries over to good i 's delivered prices from country s . Moreover, since fixed costs—to be specified below—are the same for all firms, there is also a unique ordering of firms' profits, π_f , which are inversely related to their efficiency draw, η_f . To illustrate, Figure 1 depicts the relationship between profits and efficiency in a stylized manner. Shifting the profit curve is associated with more firms exporting, i.e. a growth in the extensive margin at the firm level, though that process might be hidden when only country level trade data is available.

In the current framework, cost heterogeneity at the firm level leads to a *monotonic inverse* relationship between firms' profits and efficiency. Hence, predictions that arise from a firm's zero profit condition, namely whether or not it should start exporting, can be easily aggregated and thus carry over to the country level. This is essential when theoretical implications are framed in terms of probability changes at the firm level but the empirical test is based on country-level data. Clearly, though, we still need to assume that “markets”, i.e. exporter–product combinations, clear one by one, which rules out intertemporal cross-subsidization on the part of multi-product firms.¹ Nonetheless, the restrictiveness of this assumption obviously slackens with the length of the time horizon considered.

Next turn to an explicit specification of fixed costs to exporting. Consider product specific fixed costs of shipping good i to country s , FP_i . We could think of these costs as tailoring the product to foreign tastes, ensure compliance with international standards and regulations, or as easily replicable marketing efforts for this particular good abroad. These product specific fixed costs are decreasing in the number of export market, denoted by $FP_i(s \in S)$, $\frac{\partial FP_i}{\partial s} < 0$. To make things operational, let these costs

¹As a consequence of substantial sunk entry costs, DAS ET AL. (2006) find that Colombian firms tend to continue exporting even when current net profits are temporarily negative so as to avoid incurring start-up costs again. By the same token, the option value of being able to export appears important for the decision of when to start exporting.

be equal to a fixed dollar amount A when first encountered and zero afterwards. In that polar case,

$$FP_i = \begin{cases} A & \text{if } c_{i,s} = 0 \quad \forall s \in S; \\ 0 & \text{otherwise.} \end{cases}$$

The profit function for product i to be shipped to destination s , as a function of fixed costs and local tariffs, can then be stated as

$$\begin{aligned} \pi_i^s(\tau, F) &= \left(\frac{P_{i,s}}{(1 + \tau_{i,s})} - mc_f \right) c_{i,s} - FP_i(q_{i,s}) \\ &= \underbrace{\sigma^{-\sigma} (1 - \sigma)^{1-\sigma} \gamma \cdot (1 + \tau_{i,s})^{-\sigma} \cdot mc_f^{1-\sigma}}_{\equiv R(\tau_{i,s}, \gamma)} - FP_i(q_{i,s}) \end{aligned}$$

in which $R(\tau_{i,s}, \gamma)$ denotes ‘operating profits’ that are net of tariffs and marginal costs but exclude fixed costs. Since fixed costs are decreasing in export quantities, and the latter are in turn decreasing in tariffs, it can be verified that $\frac{\partial \pi_i^s}{\partial \tau_{i,s}} < 0$, i.e. tariff rate cuts on the part of country s unambiguously raise profits. More importantly, $\frac{\partial \pi_i^{-s}}{\partial \tau_{i,s}} < 0$ holds as well, the necessary condition for the geographic spread of trade. Whether or not such tariff cuts are sufficient, i.e. whether they render a product profitable, depends on a host of other factors, but the salient point is that it unambiguously increases the probability thereof, even at the country level (cf. Figure 1).

We are now in a position to study the impact of (preferential) tariff cuts on the evolution of the beneficiary country’s extensive margin with respect to *third* markets. In the current setup, changes in the exporting country’s trade portfolio following a tariff cut can in principle be brought about on two different margins: first, it might now turn out to be profitable to ship good i to destination s . Second, after having recouped the product specific fixed costs for i , that same product could now be shipped to additional destinations other than s , denoted by $-s$. Let two indicator variables $D_{i,t}^s, D_{i,t}^{-s}$, respectively, denote whether or not exports take place at time t in the two different channels just mentioned. Instantaneous profit maximization by firms at time t then obeys

$$\begin{aligned} \max_{D_{i,t}^s, D_{i,t}^{-s}} \pi(\tau, F) &= D_{i,t}^s \left[R(\tau_{i,s}) - (1 - D_{i,t-1}^s) (FP_i + FD^s) \right] \\ &+ D_{i,t}^{-s} \left[R(\tau_{i,-s}) - (1 - D_{i,t-1}^{-s}) FP_i - (1 - D_{i,t-1}^{-s}) FD^{-s} \right] \end{aligned}$$

The terms FD^s, FD^{-s} denote other kinds of fixed costs, e.g. costs that are destination specific or that are incurred anew in each period. Those terms are not of particular

interest for the present question but their existence is clearly suggested by the findings of EATON ET AL. (2004). It is clear that the decision problem takes on this simple form only when the fixed costs are binary and when optimization is static.² Provided that as of time $t - 1$ good i is not yet exported to a third country $-s$, potential dynamic effects manifest themselves exclusively along the extensive margin.

Since the primary interest lies in third party effects, the first-order condition associated with country $-s$ is directly read off the maximization problem:

$$D_{i,t}^{-s} : \quad R(\tau_{i,s}, \tau_{i,-s}) \geq \left(1 - D_{i,t-1}^s(\tau_{i,s})\right)FP_i + \left(1 - D_{i,t-1}^{-s}\right)FD^{-s}$$

Notice that the operating profits stemming from a third market $-s$ depend on $\tau_{i,s}$. Hence, exploring whether the combination of tariff cuts and fixed costs can provide an explanation for the extensive margin to expand is tantamount to testing whether $\tau_{i,t-1}^s$, or some lags thereof, enter significantly in an equation determining export trade flows. In that regard it is not so much the trivial structure of the FOCs that will be exploited empirically but rather their dynamic intertemporal relationship when a decline in $\tau_{i,t-1}^s$ is considered: first, such a tariff reduction has the obvious own-product effect on $D_{i,t}^s$. This could occur either on the intensive margin when i has already been shipped, or could cause i to be exported for the first time. Moreover, in the presence of product specific fixed costs, $D_{i,t-1}^s$ positively affects $D_{i,t}^{-s}$ (eq. (1)), i.e. a cross-market effect of tariffs that induces the geographic spread of trade. Note how the model prediction hinges both on the initial shock in variable trade costs *and* on the presence of a particular kind of fixed cost. This tight structure should facilitate a causal interpretation of trade patterns observed under a preferential trading regime. Equally important, tariff reductions on the part of country s in product line i are arguably exogenous to observed and unobserved factors that affect the vector $D_{i,t}^{-s}$ of endogenous variables.

Thus the vector of the binary variable obeys a discrete dynamic process. Combining with the FOCs from above makes the probability of good i to be geographically spread out to an additional destination $-s$ a function of tariff rates

$$\Pr(D_{i,t}^{-s} = 1 | \gamma) = \Pr\left(R(\tau_{i,-s}) - (1 - D_{i,t-1}^s)FP_i - (1 - D_{i,t-1}^{-s})FD^{-s} > 0 | \gamma\right)$$

²Forward-looking decision making would as well incorporate future net benefits from exporting today, and might thus lead to positive exports even when current profits are negative.

Notice in particular the key implication

$$\Pr(D_{i,t}^{-s} = 1 \mid D_{i,t-1}^s = 1) > \Pr(D_{i,t}^{-s} = 1 \mid D_{i,t-1}^s = 0)$$

That is, previous exports of product i to s raise the probability of that good being subsequently exported to $-s$ as well, thus capturing the bridgehead effect that is induced by product specific fixed costs. The next section derives an estimable equation from a static reduced form specification that takes “long differences” between two points in time around NAFTA’s inception and just assumes that the spread of exports does take place sometime in between that interval, leaving the exact lag structure unspecified.³

3.2 Cross-Sectional Estimation

A natural ‘long difference’ approach would be to regress changes in exports to a third country on changes in exports to the US, and instrument for trade flows with trade costs. However, that approach suffers from a weak instruments problem, and I suspect the virtually nonexistent model fit in the first-stage regressions to blur any possible findings. Thus, as an alternative to IV, consider instead a normalization of Mexican export flows on its total exports, i.e. world exports except for the US. After rearranging, that approach is effectively tantamount to regressing excess growth rates of exports to a third market on the excess growth rate of exports to the US.

For an estimable equation start from

$$\begin{aligned} \ln\left(\frac{X_{i,t1}^c}{X_{i,t1}^w}\right) - \ln\left(\frac{X_{i,t0}^c}{X_{i,t0}^w}\right) &= \alpha + \beta_1 \left[\ln\left(\frac{X_{i,t1}^{US}}{X_{i,t1}^w}\right) - \ln\left(\frac{X_{i,t0}^{US}}{X_{i,t0}^w}\right) \right] \\ &+ \beta_3 \ln\left(\frac{(1 + \tau_{i,t1}^{Mex})}{(1 + \tau_{i,t0}^{Mex})}\right) + \beta_4 \ln\left(\frac{(1 + \tau_{i,t1}^{MFN})}{(1 + \tau_{i,t0}^{MFN})}\right) \\ &+ \beta_5 \left[\ln\left(\frac{(1 + \tau_{i,t1}^{Mex})}{(1 + \tau_{i,t0}^{Mex})}\right) \times \ln\left(\frac{X_{i,t1}^{US}}{X_{i,t0}^{US}}\right) \right] \\ &+ \beta_6 \left[\ln\left(\frac{(1 + \tau_{i,t1}^{MFN})}{(1 + \tau_{i,t0}^{MFN})}\right) \times \ln\left(\frac{X_{i,t1}^{US}}{X_{i,t0}^{US}}\right) \right] + \varepsilon_{i,t} \end{aligned}$$

³A non-structural approach is also taken by BERNARD and JENSEN (2004); CLERIDES ET AL. (1998); BERNARD and WAGNER (2001) and ROBERTS and TYBOUT (1997).

which is equivalent to

$$\ln \left(\frac{X_{i,t1}^c}{X_{i,t0}^c} \right) - \ln \left(\frac{X_{i,t1}^W}{X_{i,t0}^W} \right) = \alpha + \beta_1 \ln \left(\frac{X_{i,t1}^{US}}{X_{i,t0}^{US}} \right) - \beta_2 \ln \left(\frac{X_{i,t1}^W}{X_{i,t0}^W} \right) + [\dots]$$

In this form the left-hand side has an immediate interpretation as the excess growth rate of Mexican exports to a third market c over rest-of-world (RoW) exports (ex USA). Normalization by world exports, $X_{i,t}^W$, eliminates all product-specific (demand or supply side) shocks, including proportional measurement error at the tariff line level.⁴ The coefficient β_2 will be negative by construction.⁵ Dates t_0, t_1 define the long difference; the former is invariable set to $t_0 = 1993$, the latter ranges from 1995 to 2000, to trace out impact and medium-run effects.

The expected signs of coefficients are as follows. NAFTA tariff cuts provide preferential market for Mexican goods and, assuming some sort of short-run supply capacity constraint, thus have a negative effect on third market exports, so β_3 is expected to be positive. Conversely, as the US lowers their MFN rates, other countries gain relatively better market access and might replace Mexican exports to the US, thus β_4 is expected to be negative. The last two terms are interaction effects between the growth in US exports and the change in Mexican and MFN tariff rates, respectively. They allow for the possibility to more clearly separate the effect of US exports that is triggered by tariff changes from the (positive) bridgehead effect of US exports. When NAFTA preferential tariff cuts absorb exports destined for third market c and thus depressing exports to that destination, β_5 is expected to be positive. Lastly, Mexican exports to the US might be replaced by other suppliers following a decline in the US MFN rate, but it is not a priori clear whether those exports then stay at home or get exported to an alternative destination. In the latter case, the excess growth rate of exports to country c as the dependent variable will decrease unless exports in that product are deflected to exactly that country c , thus β_6 can in general be expected to come in negative. Hence, the changes in tariffs and the interaction terms together capture the trade diverting effects in which US exports are involved, and it is only after controlling for those effects, plus overall export growth, that an *additionally* discernible positive effect of US exports on third country exports is evidence of a geographic spread of

⁴Destination-specific measurement error could potentially be problem but is probably washed out by aggregation as $X_{i,t}^W$ consists of a large number of countries.

⁵The high model fit is a direct consequence of the normalization by world exports. As the coefficient on RoW exports approaches -1 the R^2 rises accordingly, thus no particular meaning or significance is attached to the value of that statistic. The prime purpose is not to achieve a high model fit but to control for product-specific shocks and a time trend by constructing excess growth rates of exports.

Mexican exports following the NAFTA experience.

4 Mexico's post-NAFTA Export Pattern

The inception of the North-American Free Trade Agreement (NAFTA) in 1994 provides an excellent case for studying the dynamic effects of a one-shot decline in variable trade costs. Although Mexico's NAFTA experience is much researched there is, to the best of my knowledge, no empirical evidence yet on the impact that NAFTA tariff reductions exerted on Mexico's exports toward non-NAFTA partners. Indeed, for a number of countries (though not for all trading partners) a geographic spread of those goods can be observed that initially benefited from preferential tariff reductions under NAFTA.

4.1 Data

Data on trade flows and trade costs, especially applicable effective tariff rates, are sufficient to assess the hypotheses derived above. The United States' NAFTA tariff rates towards Mexico are obtained from the data base "U.S. Tariffs Light, 1989–2001", compiled by John Romalis and available on the NBER's International Trade Data website.⁶ Tariffs are recorded at the 8 digit level of the Harmonized Tariff Schedule of the United States (HTS), and are subsequently aggregated to the HS-6 digit level to ensure compatibility with trade data. Data include the most favoured nation (MFN) tariff per product as well as an estimated ad valorem equivalent (AVE) for Mexican imports, based on both the ad valorem and the specific portion of Mexico's NAFTA preferences. A major advantage of this data base, which is particularly vital when analyzing the extensive margin, is that it also provides information on applicable tariff rates when no trade is observed. Without this feature, exactly those tariff line observations would be lost that switch their status from non-traded to traded. However, precisely these tariff lines embody the variation that is needed for identification.

Mexican export data is retrieved from the OECD *International Trade by Commodity Statistics* data base. Trade flows classified by the HS(1988) scheme are available at the HS-6 digit level. Apart from the US, the country coverage in this study spans 20 Central and South American countries as well as 16 European countries.⁷ Table (1) and (2)

⁶Or directly from <http://gsbwww.uchicago.edu/fac/john.romalis/research/TariffL.ZIP>.

⁷Central and South American countries include: Argentina (ARG), Bolivia (BOL), Brazil (BRA), Chile (CHL), Colombia (COL), Costa Rica (CRI), Dominican Republic (DOM), Ecuador (ECU), Guatemala (GTM), Honduras (HND), Nicaragua (NIC), Panama excl. Canal Strip (PAN), Peru

document the rapid change in Mexico’s export structure in the aftermath of NAFTA towards an array of Latin American and European trading partners, respectively, for the reference period 1993–97. The tables list a count measure of products continuously traded with each country and overall trade growth in those product lines, plus the number newly traded goods and their share in terms of 1997 trade as well as the number of “dying” products and their share in 1993 trade.

Even though the figures are not benchmarked against a longer-term trend or the average duration of export spells, the growth in the extensive margin of Mexican exports after 1994 seems stunning, often reaching a manifold of the number of already traded products. Of the 16 Latin American countries considered, seven turn out to receive more than 1,000 new product lines from Mexico in 1997 (Guatemala, Costa Rica, Chile, Venezuela, Colombia, Panama and El Salvador, in descending order). Consider, for instance, Guatemala in Table (1) which records the highest number of newly traded products, even though its figure of continuously traded goods is already large (second only to the US). Trade in those goods grew by 272 percent over the 4 years covered, while 1,307 new HS-6 digit lines were added to the Mexico–Guatemala trade relation, accounting for slightly more than one quarter in 1997 bilateral trade. Another 200 product lines ceased to be traded which contributed about 10 percent to the initial 1993 bilateral trade volume, leaving a net increase of 1,107 product lines.⁸ When a 3-year range is considered instead of a point in time alone (i.e. products not traded in 1993 but traded in all three years 1996–98), the numbers come down somewhat but the result remains qualitatively unchanged, meaning that the number of entries is roughly at least as high as the number of already exported goods. Figures are based on the broadest possible sample, i.e. exclusively on trade data *before* merging in tariff and wage data.

There are hardly any systematic differences between Latin American countries. All of them feature rapid growth in already traded goods as well as substantial compositional change (entry and exit of goods), with new products almost invariably accounting

(PER), El Salvador (SLV), Uruguay (URY) and Venezuela (VEN). European countries encompass Austria (AUT), Switzerland (CHE), Germany (DEU), Denmark (DNK), Spain (ESP), France (FRA), Great Britain (GBR), Hungary (HUN), Ireland (IRL), Italy (ITA), the Netherlands (NLD), Norway (NOR), Portugal (PRT), Sweden (SWE), Turkey (TUR) and Belgium–Luxembourg (XBL).

⁸Note that a number of additional statistics can be calculated from the figures in Table 1: since the total number of products equals 4,995 (for all countries), we can infer the number of persistent zero trade entries for Guatemala as $4,995 - (1,1181 + 200) = 3,614$. Furthermore, although trade growth at the intensive margin—in a geographic sense—surged by +272 percent, the trade share of products continuously traded fell from $(100 - 9.5) = 90.5$ percent in 1993 to $(100 - 27.9) = 72.1$ percent in 1997, due to the hefty increase in goods not previously traded.

for at least one third of export volume in 1997. The same broadly holds for European export destinations, which are on the one hand farther away but on the other hand more similar to the US in terms of income level and demand structure.

4.2 Results

The empirical results are collected in Table (3) and (4), respectively. Analogous tables have been compiled for the years 1995, 1998 and 2000 but are omitted for space reasons. Each country has two specifications in the table, the first and second column excluding and including interaction terms, respectively. When all Mexican exports to the 16 Latin American or European destinations are aggregated, the results reported in Table (5) and (6), respectively, are obtained. However, the countrywise estimations are preferred.

Several results stick out: first, almost all coefficients in the 64 regressions (16 destinations, 4 years), for Latin American and for Europe, respectively, are correctly signed (see section refsec32) and—given the considerable noise in trade data at the disaggregated HS 6-digit level—are remarkably robust over time.

Second, the country-level regressions trace out the substantial impact US tariff cuts had on Mexico's trade pattern. Since about 85 percent of Mexico's exports are directed towards the US, it is not surprising to see changes in both US–Mexican and US–MFN tariff rates having such major repercussions on Mexico's trade pattern. For most third market destinations, the decline in US–Mexican tariffs following NAFTA had a negative impact on exports to other countries. This effect is visible already in 1995 data, thus suggesting a quick re-orientation of Mexican exports, possibly driven by a supply capacity constraint on the part of Mexico. Likewise, the lowering of US–MFN rates increases Mexican exports to other markets, which is consistent with a process of “reverse trade diversion” in which outside countries now assume exports that have previously been supplied to the US by Mexico as the preferential trading partner. In turn, Mexico seems to ship those goods in which it has been replaced on the US market to other countries. In general, it is interesting to note that the coefficients' order of magnitude bears a clear relationship to the respective country's similarity with the US market. This is the reason why some major European economies like Germany, UK and the Netherlands are among those most severely affected by tariff-induced trade diversion. While they are on the one hand farther away in terms of distance than Latin American economies, they are quite likely to have a similar demand structure as the US and thus to import similar products from Mexico.

Third, including interaction effects between tariff cuts and the change in US exports, the partial effect of US exports alone is strengthened while the partial effect of tariffs towards Mexico tend to be smaller. On the one hand, the positive and significant interaction term between NAFTA tariff cuts and the change in US exports confirms the existence of the conjectured “crowding out”: the negative impact of tariff cuts on third country exports depends on the magnitude of the change in exports to the US. The reason is precisely that the latter assume the resources that are not available any longer for exports to third markets. On the other hand, the negative and significant effect of the interaction term between US–MFN tariff cuts and the change in US exports captures the variation in those products whose shipments to the US stagnated or declined due to the replacement by other suppliers. The negative sign of this interaction term reflects the fact that those products can hardly contribute to a positive effect of US exports on third markets.

Fourth, exporting a given product to the US has a positive effect on Mexican exports to third markets, even after accounting for product-specific shocks and the overall growth of Mexican exports. This phenomenon is consistent with the existence of product-specific fixed costs of exporting and is, to the best of my knowledge, the first direct empirical evidence of a “geographic spread of trade” triggered by a particular preferential tariff liberalization. The positive impact of US exports takes more time to materialize and mostly show up from 1997 onwards. Regarding Latin American trade partners, that geographic spread tends to benefit larger economies (Argentina, Brazil, Peru) or those in Central America that are geographically close to the US (Costa Rica, Guatemala, Honduras, Panama).

Fifth, comparing European and Latin American destinations, it is a natural consequence of its geographic proximity that Latin American countries are more widely affected by both tariff and trade effects. In particular, the geographic spread of goods once shipped to the US take noticeably longer to find its way to European countries, and fewer countries are at all affected. Again, it is the larger economies where goods are subsequently shipped to after having been exported to the US, namely Germany, Spain, UK. The positive impact on exports to smaller countries with important sea ports like the Netherlands, Portugal or Denmark may reflect “port of entry” trade and thus transshipments to other European countries. Hungary, as one of the most advanced Eastern European countries, is notable in that is also affected by both tariff-induced trade diversion and additional US-led exports.

Sixth, the country level evidence in Europe translates well into an overall big picture when regional trade flows are aggregated. The coefficients on US tariffs are particu-

larly large, and except for 1997 US exports also enter positive and highly significant. However, the same is not true for the Latin American region where the piecewise country evidence does not aggregate well. The reason lies in the outlier behavior of Chile and Costa Rica.⁹ If both countries are excluded from total Latin American exports (leaving 14 destinations for aggregation), the plausible pattern from the country level is well replicated in the aggregate, with US–Mexican tariffs exerting an extremely high impact in 1995 that falls off to about half its initial level later on, and US exports being positive and significant in 1997 and 2000, respectively.

4.3 Decomposition of Exports

In order to characterize further the results on the geographic spread of Mexican trade, I furnish decompositions of trade flows in terms of products' skill content. Skill is proxied by the average wage in 1990 US dollars per hour paid in the respective industry, and the three categories 'low skilled', 'medium skilled' and 'high skilled' refer to wage intervals (5, 10], (10, 15] and (15, 22] dollars/hour. For some industries no wage data is available (445 products), so the figures do not provide a complete break-down of total exports. Moreover, note that in addition to 'continuously traded' and 'newly traded' products there are also 'continuously non-traded' and 'dying' products, thus the two subsamples alone mapped out here do not exhaust total exports in 1997. Figure (2) depicts the percentage shares of those categories for the subsample of continuously traded products (upper panel) and new products (lower panel).

A regularity with respect to continuing products is that the major economies in terms of size like Brazil, Venezuela, Argentina, Peru and Chile are the top receivers of medium and high skilled goods, while smaller economies receive less sophisticated goods. The skill content of new goods has some interesting features. The two countries that seem to benefit from exports to the US—Chile and Costa Rica—are both at the lower end of the table and therefore resemble the position of the US, which ranks last in terms of high-skilled products.¹⁰ In contrast, the new goods exported to smaller

⁹While the latter exhibits a stable and positive impact of US exports, the coefficient on Mexican tariffs is consistently wrongly signed, indicating that exports to Costa Rica are negatively correlated with Mexican tariffs. That sign would only make sense if, for instance, Costa Rica maintained a customs union with the US. Alternatively, that coefficient could pick up unilateral liberalization measures on the part of Cost Rica or Chile, possibly pursuant to the implementation of their Uruguay Round commitments. In the case of Chile coefficients on Mexican tariffs are also negative in 1995 and 1997, but cease to do so afterwards, and eventually in 2000 a positive impact of US exports kicks in, so only in the beginning there seem to be some irregularities.

¹⁰It should be noted that subsequent merging of different data sets leads to an increasing loss of observations, which has consequences for the ranking of countries in the Figures below. For

economies like Guatemala, El Salvador and Bolivia seem to be of a more sophisticated manner than the goods that used to be shipped to those countries. Apparently there are a few product lines of a higher skill category that make for a ‘volume effect’ that is rather different from what a count measure would suggest.

New exports to smaller economies like Guatemala, El Salvador, Honduras, Uruguay and Cayman Islands indeed seem to experience a reshuffling towards higher skilled goods, a trend that sits well with the finding that Mexican exports to the US overwhelmingly take place in those kinds of goods.

5 Conclusions

Mexico’s post-NAFTA export pattern sees a huge increase in the extensive margin, i.e. new products are being shipped to both Latin American and European destinations. The main result of this paper demonstrates that export flows from Mexico to the US have predictive power for the subsequent shipment of those products to additional markets. In order to identify the impact of exports to the US on third destinations—thus verifying a ‘bridgehead effect’—a ‘long difference’ specification surrounding NAFTA’s tariff cuts or their phase-outs is chosen. The approach constructs excess growth rates to alternative destinations relative to world exports and thus effectively controls for all product-specific shocks but simultaneously avoids the apparently poor fit of first-stage IV regressions of US trade flows on US trade costs.

I find that changes in US tariff rates—both preferential rates towards Mexico as well as US MFN rates—exert a profound impact on Mexican patterns. Two developments are simultaneously ongoing. First, following NAFTA the evolution of exports from 1995 to 2000 seems to reflect a re-direction of Mexican trade toward the US and a gradually unfolding crowding-out of its exports to neighboring Latin American trade partners. Thus the country-by-country pattern appears to be consistent with a capacity constraint on the part of Mexico as a supplier. Second, though, exporting a given product to the US has a positive effect on Mexican exports to third markets, even after accounting for product-specific shocks and the overall growth of Mexican exports. This phenomenon is consistent with the existence of product-specific fixed costs of exporting

instance, consider the skill content of new goods in which the US is currently last, receiving no high-skilled exports at all. When the wage data is merged directly into the original trade flow data (since no tariffs and trade cost data is needed for this exercise), then the exact opposite obtains, i.e. the US features 81% high-skilled exports and thus leads the table. While this is an extreme example, and the positions of other countries seem to be rather stable, it is a potential cause for concern.

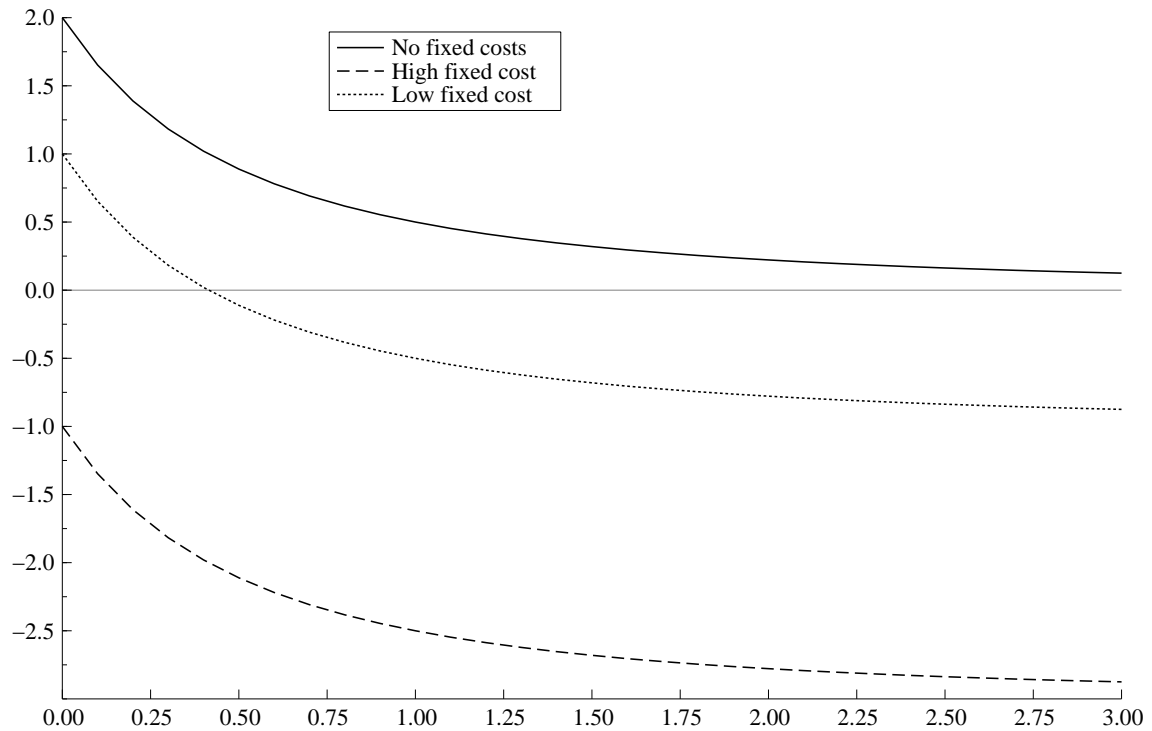
and is, to the best of my knowledge, the first direct empirical evidence of a “geographic spread of trade” triggered by a particular preferential tariff liberalization. The positive impact of US exports takes more time to materialize than the immediate tariff change impact and mostly shows up from 1997 onwards. Hence, in the presence of product specific fixed costs a shock in variable trade costs may yield important dynamic effects as it may lead to a path dependency of those exports that were initially stimulated by, for instance, a preferential tariff liberalization.

At the tariff line level, the low-skilled end of the product space grows more than proportionately as compared to the skill structure of existing exports. To many Latin American destinations low skilled goods are substituted for medium or high skilled ones. In value terms, however, there is a number of smaller Latin American economies whose new imports from Mexico consists of a markedly higher share of high skilled goods than existing imports used to be.

Further analysis is needed to clarify how the distinct geographic broadening of the Mexican export portfolio relates to preferential market access under NAFTA. In particular, the decomposition of exports in terms of skill and technology content needs to be incorporated in a parametric estimation because the hypothesis of a geographic spread does not generally predict some (upward) trend in skill intensity but rather that this intensity should mimic the behavior of exports to the US, from which third country exports are conjectured to be initiated. I close with a caveat concerning the theoretical underpinnings used in this study. Namely, the decision to export is modeled from a supply side perspective, assuming elastic demand. Thus, whenever demand side factors happen to play a role, either for a given product or at a given point in time, the zero-profit condition that determines export participation becomes slack, yielding possibly inaccurate predictions for trade flows. It would therefore be desirable to effectively control for demand side influences, although doing so probably requires abandoning the countrywise estimations and pooling over destination markets.

Tables and Figures

Figure 1: Profits and Efficiency



Notes: The solid curve shows, as a baseline, the ‘no fixed cost’ case, whereas incurring fixed costs shifts the profit schedule downwards (dashed line). As it is drawn no trade occurs in this (i, s) combination since not even the least cost supplier finds it profitable to export. The dotted line at last features some limited entry by more productive firms until profits turn negative. Shifting the profit curve even higher is associated with more firms exporting, i.e. a growth in the extensive margin at the firm level.

Figure 2: SKILL CONTENT OF MEXICAN EXPORTS, 1993/1997

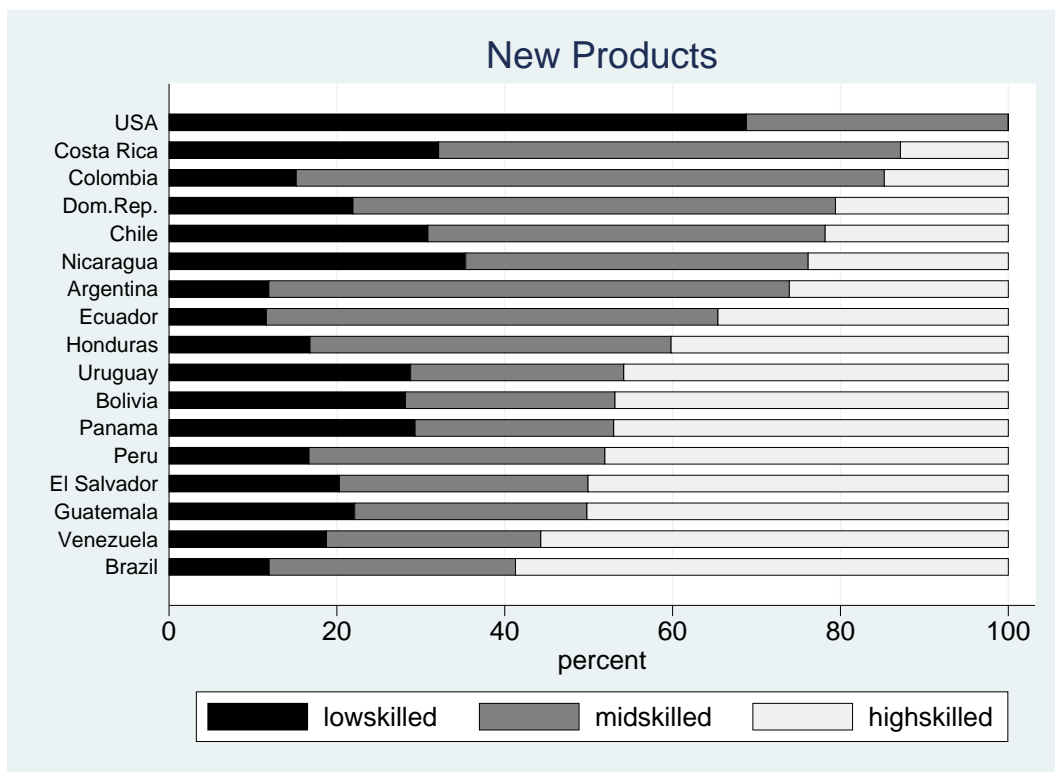
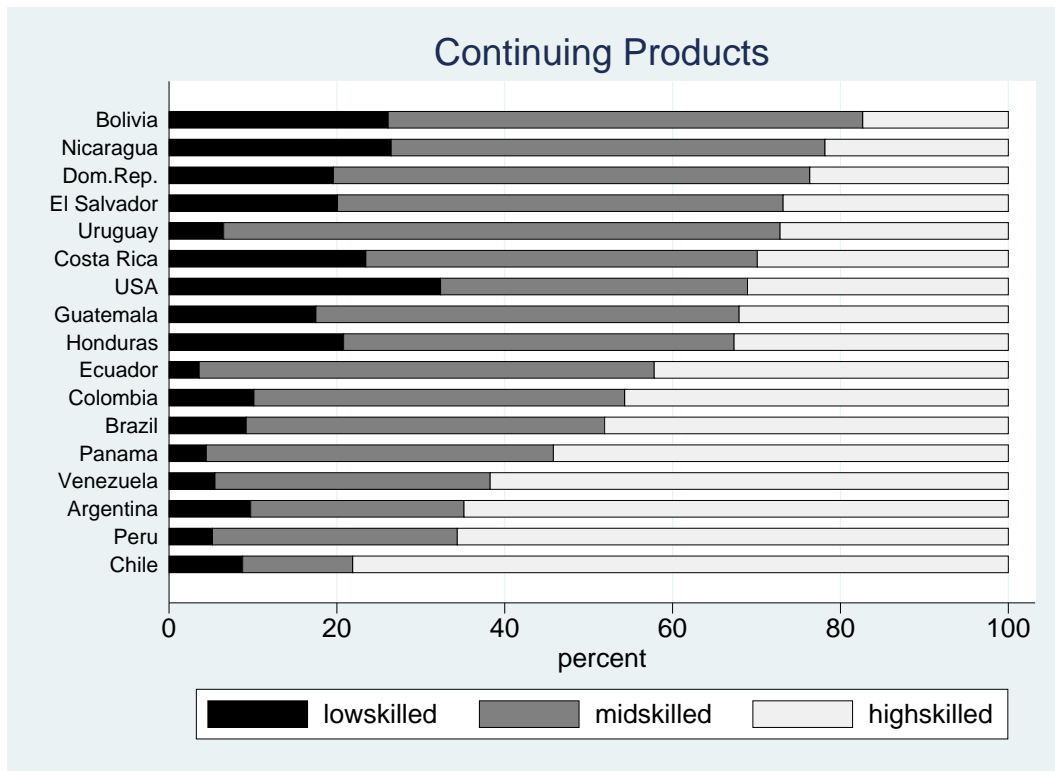


Table 1: EXTENSIVE MARGIN, LATIN AMERICA, 1993–1997

Country	C_i		N_i		D_i	
	count	growth*	count	share*	count	share*
Argentina	428	124.6	810	21.5	167	10
Bolivia	69	176.4	676	74.9	43	12.8
Brazil	346	335.3	791	39.9	151	25.7
Chile	570	457.5	1266	28.1	103	6.3
Colombia	646	231.4	1049	29.1	173	10.4
Costa Rica	752	292.5	1299	38	163	30.6
Dom.Rep.	189	162.3	826	16.4	75	5.9
Ecuador	295	177.4	774	45.4	118	22.1
Guatemala	1181	271.9	1307	28.5	200	9.5
Honduras	540	340.8	984	28.3	138	15.6
Nicaragua	263	191.2	829	59.2	76	12.8
Panama	465	212.1	1039	36.2	137	8.4
Peru	350	107.9	864	44.5	153	12.2
El Salvador	773	160.3	1035	26.9	157	7.2
Uruguay	149	126.3	472	32.9	112	22.5
Venezuela	622	344	1069	33.2	149	26
USA	3750	95.8	371	.6	392	.6

Notes:

Total number of HS-6 digit products: 4,995;

C_i – product i continuously traded in 1993 and 1997, aggregate growth over entire period;

N_i – product i newly traded in 1997 but not in 1993, value share of those products in 1997;

D_i – product i traded in 1993 but not in 1997, value share of those products in 1993;

* Figures are given as percentage of trade volume in that category.

Table 2: EXTENSIVE MARGIN, EUROPE, 1993–1997

Country	C_i		N_i		D_i	
	count	growth*	count	share*	count	share*
Austria	44	167.9	183	47.1	48	78.6
Switzerland	143	323.2	452	63.6	123	9.3
Germany	639	227.9	685	18.1	232	9.7
Denmark	44	206.4	177	22.5	49	36.8
Spain	371	102.8	783	11.5	163	4.3
France	398	148.6	541	22.3	179	26.6
UK	334	414.5	658	42.1	167	16.5
Hungary	6	-42.5	146	99.8	8	43
Ireland	14	-43.6	212	99.7	23	54.8
Italy	276	420.3	661	56.9	151	48.4
Netherlands	205	201.2	414	56.8	180	55.8
Norway	27	493.7	98	49.7	21	79.8
Portugal	38	139.8	181	14.7	41	10.5
Sweden	92	1585.9	216	14.8	87	46
Turkey	11	98.6	88	84.5	25	84.9
Belgium–Lux.	148	78.8	281	32.7	125	14.5

Notes: see Table 1.

Table 3: LONG DIFFERENCE IN EXPORTS, LATIN AMERICA, 1997/93

	Argentina		Bolivia		Brazil		Chile	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Δ US Exports	0.0315*** (0.009)	0.0347*** (0.010)	-0.0031 (0.004)	-0.0012 (0.005)	0.0275*** (0.008)	0.0273*** (0.009)	0.0261** (0.011)	0.0146 (0.012)
Δ RoW Exports*	-0.9137*** (0.009)	-0.9135*** (0.009)	-0.9822*** (0.004)	-0.9818*** (0.004)	-0.8952*** (0.009)	-0.8951*** (0.009)	-0.8045*** (0.013)	-0.8039*** (0.013)
Δ US Mex. Tariff	4.2812*** (0.577)	4.1121*** (0.615)	-0.1925 (0.354)	-0.3749 (0.368)	2.5168*** (0.574)	2.4901*** (0.577)	-2.1032** (0.836)	-1.8727** (0.869)
Δ US MFN Tariff	-2.1408*** (0.595)	-2.0628*** (0.718)	-0.1790 (0.373)	0.0815 (0.420)	-1.3634** (0.565)	-1.2760* (0.677)	-0.2266 (0.816)	0.4872 (0.895)
$(\Delta$ Mex. Tariff) \times (Δ US Exp.)		0.1536 (0.179)		0.1271 (0.094)		0.0078 (0.163)		-0.3893 (0.297)
$(\Delta$ MFN Tariff) \times (Δ US Exp.)		-0.0166 (0.268)		-0.1597 (0.108)		-0.0630 (0.152)		-0.6368** (0.290)
Constant	0.2036*** (0.027)	0.2017*** (0.027)	0.1217*** (0.015)	0.1204*** (0.015)	0.2848*** (0.029)	0.2848*** (0.029)	0.4591*** (0.030)	0.4654*** (0.030)
N	4608	4608	4608	4608	4608	4608	4608	4608
R^2	0.6643	0.6643	0.8632	0.8633	0.6133	0.6133	0.5089	0.5095
memo: marg. effect US Exports (p-value)		0.0321 0.0004		-0.0026 0.5276		0.0275 0.0008		0.0248 0.0222
marg. effect Mex. Tariff (p-value)		4.1866 0.0000		-0.3133 0.3840		2.4938 0.0000		-2.0616 0.0134
marg. effect MFN Tariff (p-value)		-2.0709 0.0016		0.0040 0.9920		-1.3066 0.0386		0.1783 0.8308

Table 3: (continued)

	Colombia		Costa Rica		Dom. Rep.		Ecuador	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Δ US Exports	0.0064 (0.009)	0.0102 (0.010)	0.0214** (0.010)	0.0210* (0.012)	0.0023 (0.006)	0.0004 (0.006)	0.0114 (0.008)	0.0137 (0.009)
Δ RoW Exports*	-0.8288*** (0.011)	-0.8281*** (0.011)	-0.8447*** (0.011)	-0.8441*** (0.011)	-0.9497*** (0.006)	-0.9495*** (0.006)	-0.9277*** (0.007)	-0.9273*** (0.008)
Δ US Mex. Tariff	0.8437 (0.713)	0.5277 (0.758)	-1.1338 (0.768)	-1.2919* (0.768)	2.0351*** (0.472)	2.0507*** (0.472)	2.5255*** (0.359)	2.3341*** (0.384)
Δ US MFN Tariff	-1.5866*** (0.601)	-1.1920* (0.672)	-0.5249 (0.706)	-0.0680 (0.765)	-0.2074 (0.504)	-0.0275 (0.592)	-0.2731 (0.426)	-0.0285 (0.566)
$(\Delta$ Mex. Tariff) \times (Δ US Exp.)		0.2325 (0.202)		0.0593 (0.253)		-0.0552 (0.129)		0.1397 (0.103)
$(\Delta$ MFN Tariff) \times (Δ US Exp.)		-0.2311 (0.163)		-0.3243 (0.277)		-0.1488 (0.138)		-0.1445 (0.232)
Constant	0.3192*** (0.029)	0.3168*** (0.029)	0.4270*** (0.029)	0.4270*** (0.029)	0.2481*** (0.020)	0.2491*** (0.020)	0.1986*** (0.022)	0.1972*** (0.022)
N	4608	4608	4608	4608	4608	4608	4608	4608
R^2	0.5549	0.5551	0.5715	0.5716	0.7679	0.7679	0.7521	0.7522
memo: marg. effect US Exports (p-value)		0.0074 0.4335		0.0217 0.0367		0.0022 0.6947		0.0121 0.1228
marg. effect Mex. Tariff (p-value)		0.6405 0.3813		-1.2631 0.0942		2.0239 0.0000		2.4018 0.0000
marg. effect MFN Tariff (p-value)		-1.3041 0.0397		-0.2254 0.7512		-0.0997 0.8575		-0.0986 0.8432

Table 3: (continued)

	Guatemala		Honduras		Nicaragua		Panama	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Δ US Exports	0.0309*** (0.012)	0.0311** (0.013)	0.0155* (0.008)	0.0153* (0.009)	-0.0042 (0.006)	-0.0054 (0.007)	0.0251*** (0.008)	0.0263*** (0.009)
Δ RoW Exports*	-0.7885*** (0.012)	-0.7888*** (0.012)	-0.9157*** (0.008)	-0.9159*** (0.008)	-0.9588*** (0.006)	-0.9585*** (0.006)	-0.8964*** (0.009)	-0.8961*** (0.009)
Δ US Mex. Tariff	3.3268*** (0.713)	3.3921*** (0.726)	1.0679** (0.529)	1.1378** (0.541)	2.5630*** (0.380)	2.5048*** (0.390)	0.3989 (0.644)	0.2912 (0.666)
Δ US MFN Tariff	-0.7889 (0.746)	-0.9833 (0.747)	-0.6958 (0.602)	-0.8536 (0.628)	-0.6463* (0.386)	-0.3582 (0.483)	-1.2296** (0.528)	-1.0879* (0.610)
$(\Delta$ Mex. Tariff) \times (Δ US Exp.)		-0.0233 (0.239)		-0.0360 (0.186)		-0.0045 (0.110)		0.0776 (0.200)
$(\Delta$ MFN Tariff) \times (Δ US Exp.)		0.1385 (0.264)		0.1078 (0.211)		-0.2158* (0.130)		-0.0846 (0.185)
Constant	0.5007*** (0.031)	0.5006*** (0.031)	0.2434*** (0.022)	0.2437*** (0.022)	0.2572*** (0.019)	0.2578*** (0.019)	0.2600*** (0.024)	0.2592*** (0.024)
N	4608	4608	4608	4608	4608	4608	4608	4608
R^2	0.5151	0.5151	0.7196	0.7196	0.7976	0.7976	0.6674	0.6674
memo: marg. effect US Exports (p-value)		0.0307		0.0153		-0.0041		0.0254
marg. effect Mex. Tariff (p-value)		0.0089		0.0571		0.4813		0.0017
marg. effect MFN Tariff (p-value)		3.3808		1.1204		2.5027		0.3289
		0.0000		0.0334		0.0000		0.6129
		-0.9161		-0.8013		-0.4629		-1.1289
		0.2092		0.1852		0.2999		0.0469

Table 3: (continued)

	Peru		El Salvador		Uruguay		Venezuela	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Δ US Exports	0.0207*** (0.008)	0.0286*** (0.009)	0.0140 (0.009)	0.0159 (0.011)	0.0126** (0.005)	0.0096* (0.006)	0.0069 (0.011)	0.0146 (0.012)
Δ RoW Exports*	-0.9137*** (0.008)	-0.9139*** (0.008)	-0.8766*** (0.009)	-0.8762*** (0.009)	-0.9665*** (0.006)	-0.9666*** (0.006)	-0.8367*** (0.012)	-0.8361*** (0.012)
Δ US Mex. Tariff	2.5623*** (0.477)	2.3172*** (0.501)	2.4559*** (0.583)	2.2661*** (0.598)	-0.4288 (0.396)	-0.3150 (0.412)	1.2890** (0.645)	0.8653 (0.673)
Δ US MFN Tariff	-1.1615* (0.612)	-1.4282** (0.692)	-1.2920** (0.552)	-1.0073* (0.600)	-0.8500** (0.385)	-0.8065 (0.505)	-1.4068* (0.781)	-1.1643 (0.764)
$(\Delta$ Mex. Tariff) \times (Δ US Exp.)		0.3059** (0.130)		0.1291 (0.165)		-0.1244 (0.121)		0.3746* (0.196)
$(\Delta$ MFN Tariff) \times (Δ US Exp.)		0.2812 (0.247)		-0.1772 (0.176)		-0.0661 (0.148)		-0.0795 (0.205)
Constant	0.2319*** (0.024)	0.2274*** (0.024)	0.3684*** (0.026)	0.3672*** (0.026)	0.0621*** (0.017)	0.0638*** (0.017)	0.3421*** (0.030)	0.3376*** (0.030)
N	4608	4608	4608	4608	4608	4608	4608	4608
R^2	0.6923	0.6926	0.6349	0.6350	0.8553	0.8554	0.5621	0.5624
memo: marg. effect US Exports (p-value)		0.0217		0.0146		0.0122		0.0084
marg. effect Mex. Tariff (p-value)		0.0067		0.1243		0.0183		0.4420
marg. effect MFN Tariff (p-value)		2.4656		2.3288		-0.3754		1.0471
		0.0000		0.0001		0.3516		0.1080
		-1.2918		-1.0933		-0.8385		-1.2029
		0.0465		0.0565		0.0675		0.1124

Notes:

Dependent variable is $\ln\left(\frac{X_{i,t}^c}{X_{i,t}^c}\right) - \ln\left(\frac{X_{i,t}^W}{X_{i,t}^W}\right)$, with $X_{i,t}^c$ denoting Mexican exports in product i at time t to 16 alternate Latin American countries c , and $X_{i,t}^W$ worldwide Mexican exports excluding those to the US.

Table 4: LONG DIFFERENCE IN EXPORTS, EUROPE, 1997/93

	Austria		Switzerland		Germany		Denmark	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Δ US Exports	0.0021 (0.002)	0.0032* (0.002)	0.0086 (0.007)	-0.0015 (0.009)	-0.0014 (0.009)	0.0037 (0.010)	-0.0008 (0.002)	-0.0006 (0.002)
Δ RoW Exports*	-0.9885*** (0.003)	-0.9883*** (0.003)	-0.9534*** (0.008)	-0.9551*** (0.007)	-0.8841*** (0.010)	-0.8838*** (0.011)	-0.9865*** (0.004)	-0.9865*** (0.004)
Δ US Mex. Tariff	-0.2026 (0.243)	-0.2813 (0.247)	0.2519 (0.662)	1.0612*** (0.406)	3.8801*** (0.607)	3.6133*** (0.633)	0.4616** (0.190)	0.4511** (0.201)
Δ US MFN Tariff	-0.5682** (0.270)	-0.4914* (0.297)	1.3131 (1.042)	0.3321 (0.716)	-1.8468** (0.799)	-1.7233* (0.946)	-1.0685* (0.571)	-1.0590* (0.580)
$(\Delta$ Mex. Tariff) \times (Δ US Exp.)		0.0626* (0.037)		-0.6019* (0.322)		0.2422 (0.173)		0.0085 (0.038)
$(\Delta$ MFN Tariff) \times (Δ US Exp.)		-0.0404 (0.046)		0.5681 (0.456)		-0.0265 (0.227)		-0.0048 (0.070)
Constant	0.0147 (0.010)	0.0141 (0.010)	0.0569*** (0.022)	0.0631*** (0.021)	0.1413*** (0.029)	0.1384*** (0.029)	0.0088 (0.013)	0.0087 (0.012)
N	4608	4608	4608	4608	4608	4608	4608	4608
R^2	0.9367	0.9367	0.8059	0.8069	0.6306	0.6307	0.9458	0.9458
memo: marg. effect US Exports (p-value)		0.0024 0.1687		0.0060 0.4001		-0.0004 0.9640		-0.0008 0.6894
marg. effect Mex. Tariff (p-value)		-0.2509 0.3053		0.7692 0.0595		3.7308 0.0000		0.4552 0.0200
marg. effect MFN Tariff (p-value)		-0.5109 0.0734		0.6077 0.3855		-1.7362 0.0495		-1.0613 0.0659

Table 4: (continued)

	Spain		France		United Kingdom		Hungary	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Δ US Exports	0.0198** (0.008)	0.0203** (0.009)	0.0021 (0.006)	-0.0027 (0.008)	0.0228*** (0.009)	0.0121 (0.011)	0.0037** (0.002)	0.0038** (0.002)
Δ RoW Exports*	-0.9082*** (0.010)	-0.9091*** (0.010)	-0.9479*** (0.008)	-0.9491*** (0.008)	-0.9012*** (0.010)	-0.9034*** (0.010)	-0.9989*** (0.002)	-0.9988*** (0.002)
Δ US Mex. Tariff	-0.7940 (0.722)	-0.5841 (0.634)	0.0168 (0.710)	0.5188 (0.501)	1.2471 (0.912)	2.2046*** (0.663)	0.2749** (0.139)	0.2549* (0.131)
Δ US MFN Tariff	1.2357 (0.977)	0.6250 (0.775)	0.3822 (1.019)	-0.3973 (0.557)	-0.7744 (1.189)	-2.0787** (0.877)	-0.2100* (0.114)	-0.1693 (0.112)
$(\Delta$ Mex. Tariff) \times (Δ US Exp.)		-0.0779 (0.257)		-0.3358 (0.276)		-0.6806* (0.394)		0.0112 (0.029)
$(\Delta$ MFN Tariff) \times (Δ US Exp.)		0.4338 (0.429)		0.4899 (0.495)		0.7877 (0.508)		-0.0273 (0.030)
Constant	0.1986*** (0.027)	0.1986*** (0.027)	0.0752*** (0.023)	0.0783*** (0.022)	0.1736*** (0.030)	0.1804*** (0.028)	0.0122 (0.007)	0.0121 (0.007)
N	4608	4608	4608	4608	4608	4608	4608	4608
R^2	0.6670	0.6673	0.7595	0.7599	0.6418	0.6431	0.9685	0.9685
memo: marg. effect US Exports (p-value)		0.0193 (0.0162)		0.0005 (0.9353)		0.0197 (0.0242)		0.0037 (0.0142)
marg. effect Mex. Tariff (p-value)		-0.6219 (0.3211)		0.3559 (0.4848)		1.8744 (0.0048)		0.2603 (0.0532)
marg. effect MFN Tariff (p-value)		0.8355 (0.2789)		-0.1596 (0.7848)		-1.6965 (0.0431)		-0.1825 (0.1032)

Table 4: (continued)

	Ireland		Italy		The Netherlands		Norway	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Δ US Exports	0.0032 (0.004)	0.0037 (0.004)	0.0058 (0.007)	-0.0082 (0.009)	0.0093 (0.007)	0.0124 (0.008)	0.0035** (0.001)	0.0040** (0.002)
Δ RoW Exports*	-0.9867*** (0.004)	-0.9864*** (0.004)	-0.9169*** (0.010)	-0.9177*** (0.010)	-0.9498*** (0.008)	-0.9498*** (0.008)	-0.9972*** (0.002)	-0.9972*** (0.002)
Δ US Mex. Tariff	0.0286 (0.251)	-0.0519 (0.269)	-0.3274 (0.727)	0.3879 (0.639)	2.0661*** (0.517)	1.9519*** (0.546)	0.1147 (0.096)	0.0841 (0.103)
Δ US MFN Tariff	-0.1716 (0.313)	-0.0063 (0.422)	-1.0159 (0.648)	-1.3014 (0.800)	-1.8827*** (0.689)	-1.9313** (0.827)	-0.0982 (0.099)	-0.0805 (0.115)
$(\Delta$ Mex. Tariff) \times (Δ US Exp.)		0.0450 (0.072)		-0.6595* (0.343)		0.1259 (0.150)		0.0271* (0.016)
$(\Delta$ MFN Tariff) \times (Δ US Exp.)		-0.1110 (0.095)		0.0346 (0.273)		0.0702 (0.207)		-0.0058 (0.018)
Constant	0.0372*** (0.011)	0.0368*** (0.011)	0.0769*** (0.027)	0.0851*** (0.026)	0.0181 (0.024)	0.0164 (0.024)	-0.0003 (0.007)	-0.0006 (0.007)
N	4608	4608	4608	4608	4608	4608	4608	4608
R^2	0.9240	0.9240	0.7240	0.7247	0.7813	0.7813	0.9706	0.9706
memo: marg. effect US Exports (p-value)		0.0035		0.0032		0.0098		0.0036
marg. effect Mex. Tariff (p-value)		0.3747		0.6288		0.1554		0.0189
marg. effect MFN Tariff (p-value)		-0.0300		0.0679		2.0130		0.0972
		0.9080		0.9155		0.0001		0.3339
		-0.0601		-1.2846		-1.8973		-0.0834
		0.8750		0.0772		0.0134		0.4473

Table 4: (continued)

	Portugal		Sweden		Turkey		Belgium–Luxembg	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Δ US Exports	0.0020 (0.003)	0.0028 (0.004)	-0.0011 (0.003)	-0.0006 (0.003)	0.0026 (0.003)	0.0023 (0.003)	0.0041 (0.004)	0.0062 (0.005)
Δ RoW Exports*	-0.9861*** (0.004)	-0.9862*** (0.005)	-0.9833*** (0.004)	-0.9833*** (0.004)	-0.9934*** (0.002)	-0.9934*** (0.002)	-0.9581*** (0.006)	-0.9578*** (0.006)
Δ US Mex. Tariff	-0.0358 (0.310)	-0.0178 (0.315)	0.8008*** (0.256)	0.8003*** (0.258)	-0.1216 (0.185)	-0.1155 (0.203)	0.3348 (0.344)	0.1562 (0.336)
Δ US MFN Tariff	-1.1620** (0.550)	-1.3019** (0.631)	-0.7090 (0.453)	-0.7641 (0.478)	-0.1276 (0.227)	-0.1081 (0.282)	-0.1954 (0.334)	0.0333 (0.390)
$(\Delta$ Mex. Tariff) \times (Δ US Exp.)		0.0125 (0.066)		0.0126 (0.047)		-0.0104 (0.043)		0.1302* (0.074)
$(\Delta$ MFN Tariff) \times (Δ US Exp.)		0.1075 (0.114)		0.0444 (0.064)		-0.0173 (0.082)		-0.1351 (0.087)
Constant	0.0017 (0.013)	0.0013 (0.013)	0.0103 (0.012)	0.0101 (0.012)	0.0030 (0.009)	0.0032 (0.009)	0.0184 (0.019)	0.0171 (0.019)
N	4608	4608	4608	4608	4608	4608	4608	4608
R^2	0.9378	0.9378	0.9222	0.9222	0.9539	0.9539	0.8243	0.8244
memo: marg. effect US Exports (p-value)		0.0020 0.4962		-0.0010 0.6848		0.0025 0.4231		0.0047 0.2514
marg. effect Mex. Tariff (p-value)		-0.0118 0.9698		0.8064 0.0017		-0.1206 0.5338		0.2194 0.5188
marg. effect MFN Tariff (p-value)		-1.2497 0.0367		-0.7426 0.1129		-0.1165 0.6519		-0.0323 0.9300

Notes:

Dependent variable is $\ln\left(\frac{X_{i,t}^c}{X_{i,t_0}^c}\right) - \ln\left(\frac{X_{i,t}^W}{X_{i,t_0}^W}\right)$, with $X_{i,t}^c$ denoting Mexican exports in product i at time t to 16 alternate European countries c , and $X_{i,t}^W$ worldwide Mexican exports excluding those to the US.

Table 5: MEXICAN EXPORTS TO LATIN AMERICA, 1997/93

	(1)	(2)	(3)	(4)
Δ US Exports	0.4335*** (0.146)	0.1223*** (0.036)	0.0224** (0.011)	0.0134 (0.013)
Δ RoW Exports*			-0.3560*** (0.015)	-0.3546*** (0.015)
Δ US Mex. Tariff			-0.8902 (0.859)	-0.9566 (0.766)
Δ US MFN Tariff			-1.0667 (1.080)	0.1484 (0.881)
(Δ Mex. Tariff) \times (Δ US Exp.)				-0.1995 (0.328)
(Δ MFN Tariff) \times (Δ US Exp.)				-0.9588** (0.439)
Constant	1.3192*** (0.078)	0.1648*** (0.019)	0.4155*** (0.033)	0.4201*** (0.033)
N	4608	4608	4608	4608
R^2	.	.	0.1965	0.1985
memo: marg. effect US Exports (p-value)				0.0221 0.0517
marg. effect Mex. Tariff (p-value)				-1.0534 0.1609
marg. effect MFN Tariff (p-value)				-0.3168 0.7122

Notes:

Column 1: dependent variable is $\ln\left(\frac{X_{i,t1}^{XLA}}{X_{i,t0}^{XLA}}\right)$, with $X_{i,t}^{XLA}$ denoting aggregate Mexican exports in product i at time t to 16 Latin American countries (XLA).

Column 2: dependent variable is 1 for new products and 0 otherwise.

Columns 3 and 4: dependent variable is $\ln\left(\frac{X_{i,t1}^{XLA}}{X_{i,t0}^{XLA}}\right) - \ln\left(\frac{X_{i,t1}^W}{X_{i,t0}^W}\right)$, with $X_{i,t}^W$ denoting worldwide Mexican exports excluding those to the US.

Table 6: MEXICAN EXPORTS TO EUROPE, 1997/93

	(1)	(2)	(3)	(4)
Δ US Exports	-0.1717 (0.205)	-0.0406 (0.033)	0.0291** (0.014)	0.0198 (0.016)
Δ RoW Exports*			-0.5858*** (0.016)	-0.5876*** (0.016)
Δ US Mex. Tariff			3.0653*** (0.968)	3.8695*** (0.899)
Δ US MFN Tariff			-1.1666 (1.279)	-2.2232* (1.243)
(Δ Mex. Tariff) \times (Δ US Exp.)				-0.5802 (0.400)
(Δ MFN Tariff) \times (Δ US Exp.)				0.6303 (0.525)
Constant	0.9424*** (0.104)	0.1888*** (0.017)	0.1966*** (0.040)	0.2025*** (0.040)
N	4608	4608	4608	4608
R^2	.	.	0.3020	0.3030
memo: marg. effect US Exports (p-value)				0.0265 0.0513
marg. effect Mex. Tariff (p-value)				3.5880 0.0000
marg. effect MFN Tariff (p-value)				-1.9174 0.1009

Notes:

Column 1: dependent variable is $\ln\left(\frac{X_{i,t1}^{XGE}}{X_{i,t0}^{XGE}}\right)$, with $X_{i,t}^{XGE}$ denoting aggregate Mexican exports in product i at time t to 16 European countries (XGE).

Column 2: dependent variable is 1 for new products and 0 otherwise.

Columns 3 and 4: dependent variable is $\ln\left(\frac{X_{i,t1}^{XGE}}{X_{i,t0}^{XGE}}\right) - \ln\left(\frac{X_{i,t1}^W}{X_{i,t0}^W}\right)$, with $X_{i,t}^W$ denoting worldwide Mexican exports excluding those to the US.

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