Shipping the good tequila out

*Investment, domestic unit values and entry of multi-product plants into export markets**

Leonardo Iacovone† Beata S. Javorcik‡

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†The World Bank, 1818 H St, NW, Washington DC 20433, USA. Email: liacovone@worldbank.org.

‡University of Oxford and CEPR. Department of Economics, Manor Road Building, Manor Road, Oxford OX1 3UQ, United Kingdom. Email: beata.javorcik@economics.ox.ac.uk.

Abstract

This study uses Mexican plant-product level data to examine the behavior of producers preceding an expansion into foreign markets in a period of profound changes in trade policies mandated by the North American Free Trade Agreement (NAFTA). Our approach is novel in that we focus on the domestic price premium of current and future export products. Our findings are consistent with the predictions of the theoretical literature. First, we find that producers who export a particular product variety tend to obtain a price premium for their domestic sales of this variety. Second, we show that those manufacturers that will export a particular product in the future experience an increase in the price premium two years before exporting begins. Interestingly, no price premium is observed three years before exports take place. Third, we document an increase in investment activity before a new variety is introduced into export markets. No such increase is observed before a new variety is introduced on the domestic market. Fourth, the instrumental variable estimation suggests that anticipated changes in US tariffs drive investment, which is in turn positively linked to future changes in the product price premium. Our findings are consistent with Mexican producers engaging in quality upgrading in anticipation of future improvement in their access to the US market taking place under NAFTA.

1 Introduction

The link between product quality and international trade has attracted a lot of attention in the economics profession. As far back as half a century ago, Linder (1961) argued that richer countries spend a larger proportion of their income on high quality goods, and that this is reflected in the composition of their international trade and the choice of trading partners. Recently, Sutton (2007) postulated that globalization creates a 'moving window.' It leads to the emergence of a lower bound on quality, below which firms cannot sell their products irrespective of how low their wage level is. Product quality has also been linked to economic growth by Hausmann, Hwang, and Rodrik (2007) who argue that countries promoting exports of more sophisticated goods grow faster.

The empirical literature has documented a wide variation in unit values of exports originating from different countries (Schott 2004, Hummels and Klenow 2005). However, to the best of our knowledge, no comparisons have been made between unit values of exported and domestically sold products within one country. Yet economic theory predicts that a significant variation in product unit values should exist not only across but also within countries.

Two strands of the literature give different reasons for why unit values of exported products should exceed unit values of products sold domestically. The first strand goes back to the Alchian and Allen's (1964) "shipping the good apples out" hypothesis. This hypothesis states that presence of a per unit transaction cost lowers the relative price of high quality goods, leading firms to ship high quality goods abroad while holding lower quality goods for domestic consumption. In the second strand of literature (reviewed in detail in the next section), consumers differ across countries in terms of income and hence in willingness to pay for product quality. Southern exporters produce higher quality goods for export than for the domestic market in order to appeal to richer Northern consumers. Thus anticipated improvements in access to a Northern market induce quality upgrading in the South. As trade flows within a country are largely unobserved, the Alchian-Allen hypothesis has not been tested formally in a single country setting. Neither has it been tested in a dynamic setting, as the existing studies have focused on cross-sectional data.[1]

[1]Hummels and Skiba (2004) use detailed data on international trade flows to test a modified version of the hypothesis and find evidence in support of it. They show that doubling shipping costs leads to an 80-141% increase in average unit values of exports, while doubling tariffs reduces average export prices by 146-256%. Using international trade data Baldwin and Harrigan (2007) show that export unit values are positively related to the distance between trading partners.

Similarly, there is no direct evidence on quality upgrading and exporting.[2]

This study aims to fill this gap in the literature by focusing on the link between product quality and exports. We proxy for quality using the domestic price premium defined as the difference between the unit value (i.e., value of domestic sales divided by the quantity sold) obtained by product p sold in Mexico by producer i at time t and the average unit value obtained by all producers selling product p in Mexico at time t.[3] We examine two questions: (i) Do exported product varieties tend to exhibit higher unit values in their domestic sales than their counterparts sold exclusively on the domestic market? Or, in other words, do those manufacturers exporting a particular product variety tend to obtain a price premium on their domestic sales of this variety? (ii) Is there evidence of product upgrading taking place in anticipation of exporting?[4]

Our analysis is possible thanks to a unique plant-product level data set from Mexico which includes information on 3,183 products manufactured by 6,299 plants during the 1994-2003 period. This gives us between 13,751 and 19,314 plant-product observations a year. Focusing on the period of the Mexican export boom stimulated by the North American Free Trade Agreement (NAFTA), which came into effect on January 1, 1994, and the peso devaluation, which took place in December 1994, provides an excellent setting for our exercise. We are able to observe many instances of manufacturers introducing into export markets products that they had previously sold only in Mexico.[5] This allows us to focus not only on the comparison between exported and domestically sold goods but also to examine changes in price premiums taking place prior to a product being introduced into export markets. If product upgrading prior to exporting is indeed a real phenomenon, this is a setting in which it should manifest itself.

Another useful feature of our data set is that we are able to link the changes in price premiums to plant-level investment behavior. A big benefit of focusing on the period following NAFTA coming into effect is that we are able to use the anticipated changes in US tariffs on imports from Mexico, mandated by NAFTA, to instrument for investment behavior of Mexican producers. In this way, we identify product upgrading taking place

[2]There exists, however, some indirect evidence. Alvarez and López (2005) and Lopez (2009) show that future exporters tend to have higher investment outlays. Bustos (2007) documents a link between a fall in Brazilian MERCOSUR tariffs and increases in entry into export markets and technology spending by Argentinean firms. Verhoogen (2008) finds that more productive plants increased the export share of sales, white-collar wages, blue-collar wages, the relative wage of white-collar workers, and ISO 9000 certifications more than less-productive plants during the peso crisis period.

[3]While we recognize that unit values are an imperfect proxy for quality, they have been widely used in the international trade literature. See for instance Schott (2004) and Hallak (2006).

[4]Note that we use the terms *product*, *product variety* and *variety* interchangeably.

[5]In our data, 85% of export products sold by producers entering foreign markets for the first time were sold domestically in the previous year. In the case of export products introduced by established exporters, this figure is somewhat lower but still very high (70%). For more details see Iacovone and Javorcik (2010).

in response to the anticipated improvement in market access. As Mexico was the weakest player at the NAFTA negotiation table (Kowalczyk and Davis 1996), the timing of tariff cuts can be plausibly treated as exogenous.[6]

Our findings are consistent with the predictions of the theoretical literature stating that exported products have higher unit values than products sold only at home and that anticipated improvements in market access lead to product upgrading. To make this argument we proceed in several steps. First, we show that manufacturers who export a particular product variety tend to obtain a price premium for their domestic sales of this variety. Second, we show that those manufacturers that will export a particular product in the future experience an increase in the price premium obtained for this variety two years before exporting starts. Interestingly, three years before exporting takes place, their product carries no price premium, i.e., it is indistinguishable in terms of unit values from varieties sold by other producers. We further show that this pattern is observed only in the case of products registering a significant improvement in access to the US market. These observations are suggestive of a close link between changes in product attributes and exporting. Third, we document an increase in investment activity before a new variety is introduced into export market. No such increase is observed before a new variety is introduced on the domestic markets. Fourth, our IV estimates suggest that anticipated changes in US tariffs drive investment, which in turn positively affects future changes in price premiums.

We demonstrate that our conclusions with respect to changes in unit value premiums are robust to controlling for markups, plant exit and dropping a product from the export market. Moreover, we find that our conclusions cannot be attributed to changes in the product's market share.

Our study contributes to three distinct strands of literature. The first strand of literature in the spirit of the Alchian-Allen's hypothesis (Hummels and Skiba 2004, Baldwin and Harrigan 2007, Crozet, Head, and Mayer 2009) focuses on the effects of trade costs on the quality of exports. Although the existing studies have been able to establish a relationship between trade costs and unit values of exports at the national level, they have been unable to explicitly examine whether the products destined for exports exhibit higher unit values than their counterparts sold at home. To the best of our knowledge, our study is the first one to do so. Our results provide evidence that exported varieties exhibit higher unit values, relative to their domestic counterparts, even within very narrowly defined categories. Moreover, we present evidence suggesting that producers upgrade the quality of their products in anticipation of future exporting.

[6] Our empirical strategy was inspired by the work Trefler and Lileeva (2007) who use the US tariff cuts mandated by the Canada-US Free Trade Agreement as an instrument for the decision of Canadian plants to start exporting.

The second literature to which we contribute builds on the seminal studies of Clerides, Lach, and Tybout (1998) and Bernard and Jensen (1999) who document the superior performance of exporters across several dimensions and attribute it to self-selection of the best performers into exporting.[7] Our findings do not contradict these studies; however, they provide a more nuanced picture. Our results confirm the observation that exporters are different from other firms. But rather than focusing on firm characteristics, as these studies have done, we examine the characteristics of exporters' products. We show that the exported products exhibit a price premium in the domestic market. More importantly, we present evidence consistent with the producers changing their behavior and the characteristics of their products in preparation for exporting. Our results suggest that the literature could benefit from shifting its focus from "learning from exporting" to "learning to export."

The final research area we seek to inform is the emerging body of work on multi-product firms. Our findings support the notion that products are heterogeneous within a firm (as modelled by Arkolakis and Muendler (2009), Bernard, Redding, and Schott (2006), Bernard, Redding, and Schott (2009), Eckel and Neary (2009) and Mayer, Melitz, and Ottaviano (2009)), and that there are product-specific costs of entry into export markets. We also contribute to the recent empirical literature showing that firms respond to changing market conditions, including trade barriers, by changing their product mix (see Baldwin and Gu (2009), Bernard, Redding, and Schott (2009), Goldberg, Khandelwal, Pavcnik, and Topalova (2009) and Iacovone and Javorcik (2010)). This literature takes the characteristics of varieties produced by a specific firm as given (i.e., determined by a productivity draw or a firm-specific competency). However, our results indicate that product quality is not predetermined – it responds to market conditions. We believe that incorporating these dynamic effects in theoretical models would be a natural extension of the existing theories.

Our paper has a policy implication: If self-selection into export markets is a conscious decision and requires preparation in terms of additional investment, the policies that reduce the costs of entry into foreign markets are likely to spur the emergence of new exporters, provided access to the necessary financing is available.

This paper is structured as follows. In the next section, we briefly sketch how our empirical analysis is informed by the existing theoretical models. In section 3, we describe the data used. Section 4 discusses our methodology and findings. The last section presents concluding remarks.

[7] For a survey of the literature see Greenaway and Kneller (2007).

2 Related theoretical literature

Studies documenting the superior performance of exporters (Clerides, Lach, and Tybout 1998, Bernard and Jensen 1999) inspired a new literature on the response of heterogeneous firms to globalization. This literature originated with the contribution of Melitz (2003) who models firms as heterogeneous in terms of their marginal costs. As a fixed cost is required for accessing export markets, only high productivity firms find it profitable to export. While the model does not explicitly deal with quality, high productivity firms can be viewed as firms producing a higher quality variety at equal cost. Baldwin and Harrigan (2007) extend the work by Melitz (2003) to explicitly incorporate product quality. In their model, firms compete based on heterogeneous quality as well as unit costs. The model predicts that more productive firms manufacture higher quality products whose costs and corresponding prices are higher than those of lower quality goods. Nevertheless, because high-quality products appeal to consumers, high-quality/high-price products are more competitive than low-quality/low-price goods. Hallak and Sivadasan (2008) develop a model of international trade with two sources of firm heterogeneity: productivity and "caliber", the latter being the ability to produce quality using fewer fixed inputs. Although there is no quality restriction to sell domestically, exporting requires attaining minimum quality levels. The model explains the empirical fact that firm size is not monotonically related to export status. The model predicts that, conditional on size, exporters sell products of higher quality and at higher prices and use capital more intensively.

The theoretical predictions most closely related to our work come from the literature explicitly modelling quality upgrading undertaken in preparation for exporting. In the theoretical framework developed by Verhoogen (2008), plants are heterogeneous in productivity and there is a fixed cost to entering the export market, such that only the most productive plants within each industry export. Goods are differentiated in quality and consumers differ across countries in terms of income and hence willingness to pay for product quality. Southern plants that export produce higher quality goods for export than for the domestic market. An increase in the incentive to export in a Southern country generates quality upgrading.[8] Another contribution in this literature comes from Constantini and Melitz (2007) who develop a model which incorporates a joint decision to upgrade product quality and enter export markets. Their model shows that the anticipation of future liberalization induces firms to innovate ahead of liberalization and thus also ahead of their anticipated, but yet unrealized, entry into export market.

Other studies relating technology choices to exporting include Yeaple (2005), Bustos (2007) and Ederington and McCalman (2008). In the model developed by Yeaple (2005), firms competing in a monopolistically competitive industry are identical when born but are free to choose between alternative technologies, which differ in their productivity and

[8]The impact varies by plant type. Initially more productive plants increase exports and produce a greater share of higher quality goods relative to initially less productive plants in the same industry.

costs. Firms hire workers, who vary in their skill, on a perfectly competitive labor market. Firm heterogeneity arises because firms endogenously choose to employ different technologies and then systematically hire different types of workers. A reduction in trade costs increases the incentive for firms to adopt the new, lower unit cost technology. Bustos (2007) expands Melitz's (2003) model by allowing firms to pay an extra fixed cost to introduce a new technology that reduces their marginal cost. Only the most productive firms find it profitable to do so. The model predicts that a bilateral reduction in tariffs induces more firms to adopt the new technology. An empirical analysis in the context of a regional trade liberalization under MERCOSUR provides support for the model. Argentinian firms in industries facing higher reductions in Brazil's tariffs increase their investment in technology faster. Ederington and McCalman (2008) build a model with endogenous firm-level productivity that involves ex ante identical firms behaving differently in equilibrium. Heterogeneity arises in equilibrium as firms choose different dates for adoption of a new technology. Firms that choose to export will also choose to adopt new cost-saving innovations earlier on in the diffusion process while non-exporters adopt later in the process.

Our empirical analysis focuses on three predictions emerging from the theoretical literature. First, we examine whether exported product varieties have higher unit values than goods sold only on the Mexican market. Second, we search for evidence of investment in physical capital preceding the introduction of a new export product, and we check whether a similar relationship exists for introduction of new products destined solely for the domestic market. Third, we search for evidence of product upgrading taking place in anticipation of beginning to export after the introduction of NAFTA. NAFTA is a particularly interesting case to consider, as during the period under study, the US gradually lowered its tariffs on Mexican exports and did so following a schedule established in advance. This is exactly the setting considered in Constantini and Melitz's (2007) framework. Our analysis is possible thanks to a uniquely detailed data set, the topic to which we turn next.

3 Data

In our analysis, we use Mexican data from the Monthly Industrial Survey (EIM) for the period 1994-2003 merged with the Annual Industrial Survey (EIA) covering the period 1993-2002. Both data sets are collected by the *Instituto Nacional de Estadistica y Geografia* (INEGI). The former source includes information on the values and quantities of monthly production, sales and exports. As we are not interested in short-run fluctuations, we aggregate the data into annual figures. The latter source contains information on various producer characteristics, such as investment, use of intermediate inputs, plant age, etc. Both surveys include the same plants and cover about 85 percent of Mexican industrial output (excluding *maquiladoras*).[9]

[9] Neither data source includes *maquiladoras.*

Particularly valuable for our purposes is the fact that the EIM collects information at the establishment-product level. For each 6-digit code (*clase*) in the Mexican Industrial Classification System (CMAP), the EIM survey form includes a list of possible products, developed in 1993 and unchanged throughout the period under observation. The list includes 4,085 products of which 3,183 are actually produced during the period under study. For instance, the clase Uniforms (identified by the CMAP code 322006) lists 18 products: sports uniforms, school uniforms, military uniforms, uniforms for doctors and nurses, uniforms for members of other organizations, generic uniforms for workers, safety uniforms for workers, other uniforms, laboratory coats, camisoles and shirts, headgear, uniforms for chefs, aprons, jackets, other work clothing, other sports clothing, other products not elsewhere classified, other subproducts not elsewhere classified. The clase of small electrical appliances (CMAP code 383304) contains 29 products, including vacuum cleaners, coffee makers, toasters, toaster ovens, 110 volt heaters and 220 volt heaters (within each group of heaters the classification distinguishes between heaters of different sizes: less than 25 liters, 25-60 liters, 60-120 liters, more than 120 liters). These examples illustrate the narrowness of product definitions and the richness of micro-level information available in our data set.

After data cleaning, our sample includes between 6,299 and 4,626 plants in 1994 and 2003, respectively. The decrease in the number of plants is due to plant exit from the market.[10] Our sample includes 19,314 plant-product observations in 1994. This number decreases to 13,751 by 2003. A quarter of producers are exporters in 1993. During the time period considered, the number of exported varieties increases from 2,857 to 3,323 in the last year of the sample, reaching a peak of 4,269 varieties in 1998 (see Table 1). The tripling of Mexican exports during the period under study (as compared to a 75% increase in the total world exports between 1993 and 2002), and the availability of detailed micro-level data, make the Mexican case an extremely interesting one to study.

To express investment and value added per worker in real terms, we use deflators obtained from Banco de Mexico. Figures on real investment are obtained by separately deflating each component of investment (buildings and infrastructure, transport equipment, other fixed assets) using deflators specific to each investment category. The value added is measured using the difference between the sales and material inputs. It is deflated using 6-digit level producer price index. The summary statistics are presented in Table 2.

The data sources mentioned above are supplemented with information on Mexican tariffs imposed on imports from NAFTA countries (obtained from Secretaría de Economía) and US MFN and NAFTA tariffs.[11] Tariff data, available originally in the 8-digit HS

[10] INEGI does not attempt to replace plants exiting from the sample in a systematic manner.

[11] The latter set of figures was kindly provided to us by John Romalis.

classification, are matched with the Mexican product-level classification. This allows us to construct time-varying data on the tariffs faced by each product produced by a given establishment, which is particularly valuable in the context of our study. We use this information to construct our instrumental variables.[12]

4 Empirical analysis

Our empirical analysis proceeds in three steps. First, we ask whether manufacturers who export a particular product variety tend to obtain a price premium for their domestic sales of this variety and if so, whether this price premium is visible prior to the product being exported. In the second step of the analysis, we examine whether introduction of a new product into export markets is preceded by increased investment. Then we do the same for products that are introduced just on the domestic market. The final step involves investigating the link between changes in unit values and lagged investment. To identify the link between anticipated improvements in access to foreign markets and product upgrading, we instrument for investment with the anticipated changes in US tariffs specific to a given product.

Before we discuss our empirical exercise, we motivate the analysis with some anecdotal evidence.

4.1 Anecdotal evidence

During a visit to Mexico in August 2007, we interviewed an executive from a leading Mexican company producing fruit and vegetable juices. When asked what it takes for a company like his to become an exporter, the executive pointed to "quality, quality and quality." According to the executive, the first dimension of quality relevant to exporting is bringing the product up to the level which satisfies foreign sanitary and phytosanitary standards, which tend to be higher in industrialized countries (in this case the United States) than in Mexico.

The second dimension of quality is the product's appeal to the tastes of foreign consumers. Consumers in the U.S. (the major export market for this producer) demand higher-quality products than the average Mexican buyer. For instance, they prefer juices closer in taste to fresh juices than products from concentrates. The company recently invested in a new technology to produce such juices. They were first sold domestically targeting higher-end Mexican consumers and subsequently they were introduced in the export

[12]Note that the US tariff data include information on both ad valorem and specific tariffs. Specific tariffs were converted into their ad valorem equivalents by John Romalis and added to the ad valorem rates. In some cases, this adjustment produced a figure suggesting that combined tariffs were increasing (rather than decreasing) under NAFTA. We dropped these figures (pertaining to about 1% of the sample) from the analysis.

market. The decision to introduce such juices was made with the export market in mind as the company recognized that the local market for such a high-end product is quite limited.

The third dimension of quality relevant to juice producers is packaging. While Mexican consumers prefer cartons, US buyers have a preference for plastic and glass containers. In the juice industry, package attractiveness plays a very important role. To improve the quality of its packaging, the company opted for a new technology where export-destined containers are covered with sleeves on which product labels are printed, as this produces a more attractive appearance than printing directly on a container.

Finally, the executive pointed out that many of the changes mentioned required purchasing new machinery and equipment.

A similar example, the case of Volkswagen in the 1990s, is discussed in Verhoogen (2008). The article illustrates how the car manufacturer undertook substantial investment into upgrading the assembly line and started manufacturing a much more sophisticated version of the previously produced car: the "new beetle." This car was primarily destined for export markets (i.e., the US) but it also sold on the domestic market reaching high-end Mexican consumers. The appearance of the "new beetle" on the Mexican market changed the composition the Volkswagen product mix within a single product category. In fact, the price of the "new beetle" was more than double that of the "old beetle." In our data set, this change would be observed as an increase in the unit price of Volkswagen's sales of "beetles" in Mexico.

Generalizing this anecdotal evidence to other sectors raises two implications for our study. First, it suggests, in line with the theoretical predictions, that we should observe a product being upgraded before its introduction into export markets. This upgrading can take the form of switching from a low unit value variety to a high unit value variety. Alternatively, it may mean that a high unit value variety is introduced and sold alongside the old low unit value variety within the same product category. In the case of the juice producer, the premium juice was introduced to the high-end Mexican market before its exports began. This change should be visible as an increase in unit values of juices sold domestically in the years prior to the juice being exported.

Second, the anecdotal evidence suggests that entry or expansion into export markets requires additional investment. Thus we should observe increased investment outlays prior to the introduction of a new product into export markets.

4.2 Evidence from unit value premiums

If Mexican producers modify products that will be introduced into foreign markets in the future, this change in product attributes should be reflected in the unit values of the product sold in the domestic market.[13] While unit values are often used as a measure of quality (see for instance Schott (2004) and Hallak (2006)), they may also capture other dimensions of product characteristics more loosely linked to quality (e.g., improved packaging keeping the product fresh for a longer period of time, new small snack-size packets targeting school children, etc.). Therefore, an increase in the domestic unit value of a given product in our data is consistent with a combination of (i) upgrading of the product quality, (ii) other changes in product characteristics that make the product more desirable, (iii) a compositional change within the product category towards higher quality or more desirable products.[14,15]

To examine differences between products destined for the foreign versus the domestic markets and to search for evidence of changes in product attributes prior to exporting, we estimate a simple model where the dependent variable is the logarithm of the unit value of product p sold in Mexico by producer i at time t (see equation 1). Unit values are obtained by dividing the value of domestic sales of product p by producer i at time t by the quantity sold.

$$log\left(Domestic\ unit\ value_{pit}\right) = \beta_1\ Before\ Exporting_{pit} + \beta_2\ Exported_{pit} + \alpha_{pt} + \epsilon_{pit} \quad (1)$$

To take into account changes in the average domestic unit value of product p the equation includes product-year fixed effects. These fixed effects control for differences between average prices of different products. They also take into account differences between the two products in terms of price inflation.

To compare the unit values of products that are or will be exported by their manufacturers to the unit values of the same product sold by manufacturers that do not export, the model includes two indicator variables. The first one ($Exported_{pit}$) takes on the value of one if producer i exports product p at time t, and zero otherwise. The second one ($Before\ Exporting_{pit}$) takes on the value of one if producer i will exports product p at

[13] This will be true only to the extent the varieties intended for future export markets are sold domestically. If a new production line is introduced just to serve the needs of foreign customers, no change will be observed. This possibility should work against us finding an effect in the data. Though as mentioned earlier, the vast majority of new export products were sold in Mexico prior to being exported.

[14] For instance, a juice producer may be increase the quality of the juice produced (e.g., by using higher quality ingredients or better technology), may introduce a new type of packaging or may simply expand the production volume of higher quality juices while maintaining the production volume of lower quality juices unchanged.

[15] Unit value may also reflect the market power of a producer. We will address this possibility later in this section.

time $t+1$ or $t+2$, and zero otherwise.[16] Note that because of the presence of product-year fixed effects, the indicator variables capture a premium associated with current (or future) export products. In other words, the variables indicate how the prices of current or future export products differ from the average price in the same product category sold in Mexico in the same year.

To take into account potential correlation between standard errors, we present four specifications of the model with clustering of standard errors either on plant-product, plant, product or no clustering at all.

The results presented in Table 3 indicate that products that are both sold domestically and exported by their manufacturers have on average an 11% higher unit value than the same products sold by manufacturers that do not export. This is in line with the theoretical prediction that higher quality products are destined for export markets. What's even more interesting is that this price premium is observed already before the manufacturer starts exporting. Products that will enter export markets have a 7% higher unit value in the two years preceding exports. The difference between pre- and post-exporting premium is statistically significant in all specifications.

A more careful look at the timing of the changes (see the lower panel of Table 3) suggests that the increase in the premium is gradual: from 6% two years prior to exporting to 8% one year before and 11% during the exporting period. The difference between the premium two years and one year before is statistically significant in two of the four specifications presented. The difference between the premium two years before exporting and the premium in the exporting period is statistically significant in all cases.

Extending the analysis to three years before the product's introduction into export markets suggests that changes to the domestic unit values take place only during the two years prior to exporting, and not earlier. As illustrated in Table 4, there is no evidence of a domestic unit value premium three years before the product's introduction into export markets. The coefficient on the dummy variable is not significantly different from zero in three of four regressions (the coefficient is statistically significant only in the case without clustering of standard errors). The coefficients on the other dummy variables suggest that a positive and statistically significant unit value premium appears two years before exports take place and gradually increases over time. This is an important point because it eliminates the possibility that the products manufactured by future exporters exhibit some intrinsic initial differences. It is also consistent with the theoretical prediction that in response to a decline in trade costs (taking place in this case due to NAFTA coming into effect), future exporters change the attributes of their products before entry into export

[16] For instance, if producer i starts exporting widgets in 2000, the dummy will be equal to 1 in 1998 and 1999 and to 0 in all other years.

markets.

Given that the observed unit values may be capturing not only product attributes (either real or perceived by consumers), but may also reflect the market power of a producer, we next add proxies intended to capture the latter effect. We control for the producer's market power in several ways. First, we include the lagged value of sales of product p by producer i, which given the presence of product-year fixed effects, should approximate producer i's market share in product p. Second, we use the lagged total sales at the plant level (expressed in real terms) allowing for the possibility that the relevant market power is at the plant rather than the product level. Finally, we add plant-level markup, calculated as the difference between total sales and total costs, divided by total sales.[17] As illustrated in Table 5, adding these controls does not change our conclusions, though we confirm that unit values may partially reflect producer's market power.[18]

As our data constitute an unbalanced panel, one may be concerned that plant exit could be influencing our results. To confirm that this is not a substantial issue we modify the model by adding a dummy for plant exiting in the future. The dummy takes on the value of one if the plant will be exiting the sample in the following year, and zero otherwise. While the results (not reported to save space) indicate that plants exiting next period exhibit a negative unit value premium (of about 2.5%), our conclusions with respect to future export products remain unchanged.

Not all products that enter export markets continue being exported in the subsequent years. To check whether this phenomenon could be influencing our results, we include in the model a dummy taking on the value of one if product p produced by manufacturer i at time t will exit the export market at time $t+1$, and zero otherwise. We also include a dummy for exiting plants, mentioned above, as some of the exits from the export market will be due to plants ceasing to operate. The results (available upon request) indicate that products that will cease to be exported in the future tend to sell at a discount, even after controlling for plant exit in the future. In the case of recently introduced export products, our interpretation is that these are low-price/low-quality products whose producers received a trial export contract but were unable to fulfill the expectations of foreign customers. In the case of "older" export products this may suggest that Mexican produc-

[17] In this way, we implicitly approximate marginal costs with average costs.

[18] In an additional exercise not reported here, we checked whether future export products registered changes in their sales volume prior to entry into export markets. If the preparation for exporting increases unit costs, it could be that the increase in unit value is a consequence of these increased costs rather than a reflection of product upgrading. If it were the case, we would observe a dip in the sales volume in the years before entering the export market. We checked this possibility by changing the dependent variable in equation 1 to the sales of product p produced by establishment i at time t. Our results show no sign of a dip in product sales, on the contrary, there appears to be a slight increase in the sales in the period preceding entry into export markets, which is consistent with our hypothesis about product upgrading.

ers of low quality goods competing mainly on price are unable to withstand increased competition on international markets. As before, we find that future exiting plants tend to have lower domestic unit values. Our other results are unchanged by this additional control. Finally, we also confirm that our results are robust to restricting our attention to a balanced sample where we exclude all exiting plants.

In another robustness check (not reported to save space), we express the dependent variable in terms of first differences rather than levels. The explanatory variables remain the same. As before, we include a full set of product-year fixed effects to allow for differences in unit value fluctuations across products. The results indicate that products that are both sold in Mexico and exported by their manufacturers experience higher increases in unit values relative to the same products sold by domestically-oriented producers. The results also demonstrate an increase in unit values taking place prior to the introduction of the product into export markets.

In the above regressions, we aggregate together varieties sold domestically, with varieties entering export markets, and varieties that are exported throughout the period.[19] In yet another robustness check, we restrict our sample to domestic varieties and those entering export markets for the first time during the period under analysis. This change has no effect on the estimated coefficients.

To summarize, we find that future export products carry no domestic price premium three years before entry into export markets and then acquire it gradually. This finding is very suggestive of conscious preparation for exporting, a behavior particularly likely in the light of NAFTA creating new export opportunities in the US market.

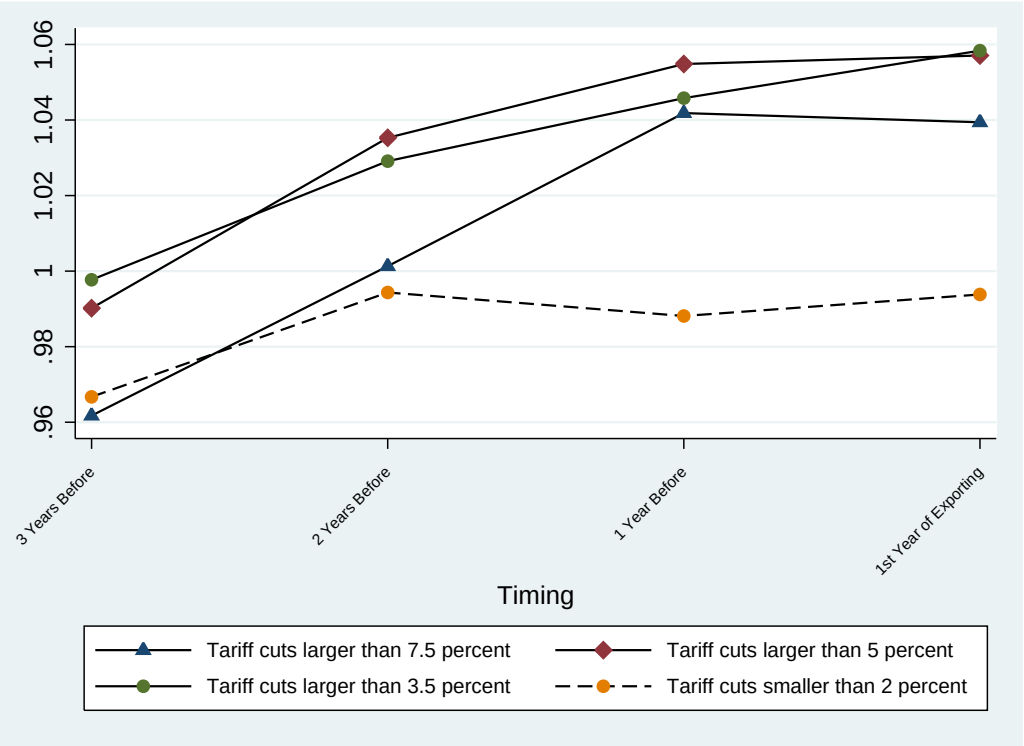
If NAFTA is responsible for the patterns we find, we should observe the evidence consistent with conscious preparation for exporting to be more pronounced in products with larger reductions in the US tariffs. To explore this hypothesis, in Figure 1 we plot the relative unit values for products entering exports markets for the first time. More specifically, for each product p produced by producer i at time t, we calculate the relative unit value, defined as the domestic unit value normalized by the average domestic unit value of product p observed at time t:

$$Relative\ unit\ value_{pit} = \frac{Domestic\ unit\ value_{pit}}{\frac{1}{N} * \sum_{i=1}^{N} Domestic\ unit\ value_{ipt}} \tag{2}$$

We then restrict our attention to products newly introduced into export markets and plot their average relative unit values observed at $t-3$ (i.e., three years before entry into export markets), at $t-2$, at $t-1$ and in the year they start being exported. We do this separately for products for which the US tariff declined during the period 1994-2003 by

[19] Note that all of the varieties considered are sold in Mexico because our dependent variable is the unit value of local sales.

Figure 1: Evolution of domestic unit value premium when entering export markets



at least 7.5% points, at least 5% points, at least 3.5% points and less than 2% points. As expected, in the first three categories we observe an increase in the relative unit value from below 1 (recall that 1 corresponds to the average unit value of product p observed in a given time period) to between 1.04 and 1.06. The increase is the most dramatic for the products enjoying a tariff cut of at least 7.5% points. These patterns suggests that the impetus for product upgrading was the largest for products experiencing the greatest improvement in their access to the US market. In contrast, for products where the change in tariffs was very small (less than 2% points) the relative unit value goes up from 0.97 to 0.99, thus they never command a price premium in Mexico.[20]

4.3 Evidence on upgrading before exporting

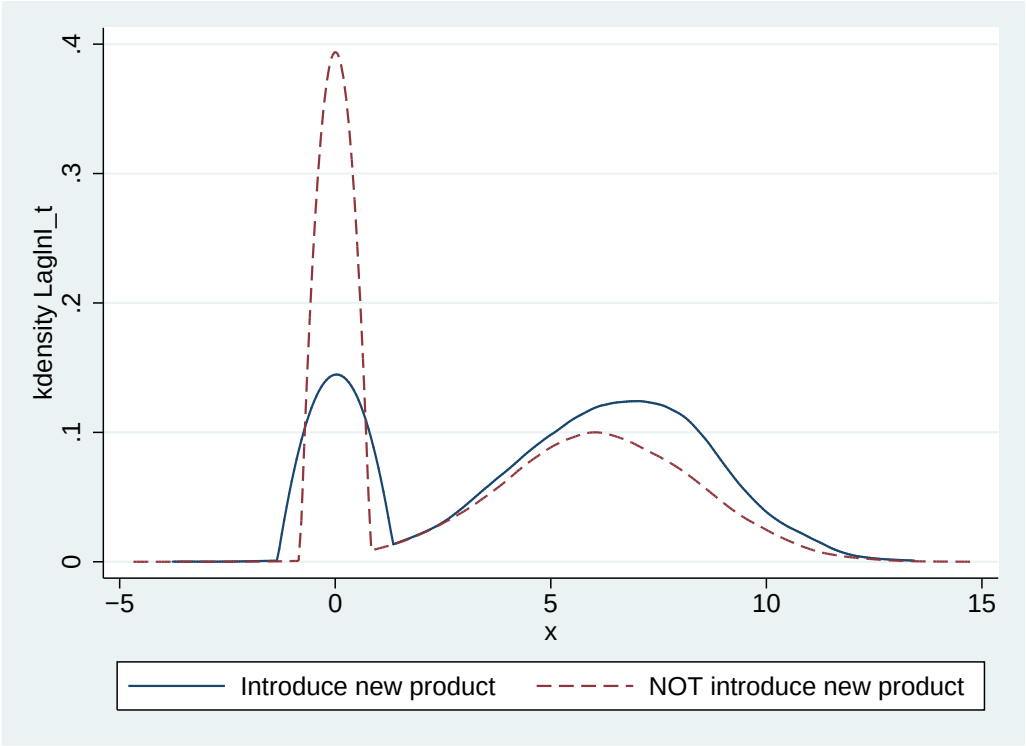
Having documented the patterns in unit values premiums which are suggestive of conscious preparation for exporting, the next logical step in our analysis is to look for changes in producers' investment behavior preceding the introduction of a product into the export

[20]One may wonder how these 'run of the mill' (presumably average quality) products were able to enter export markets. Two explanations are likely. The first one is that they were destined for Latin American countries rather than for the US. (Unfortunately, our data set does not allow us to observe the direction of exports.) The other possibility is that the peso crisis made these products so cheap that US importers were willing to give them a chance despite their mediocre quality. In regressions mentioned earlier (though not reported to save space), we found that products that were dropped from the export markets were sold domestically in the previous period at a discount of about 3%.

markets.

We start by plotting the distribution of real investment (in log) for (i) producers that will introduce a new export variety in the next period, and (ii) producers that will not do so (see Figure 2). We find that while a large share of producers in the latter group do not invest at all, the vast majority of producers introducing a new export product do so. Moreover, the producers introducing a new export product tend to invest a larger amount than those in the other group.

Figure 2: Investment and introduction of new export products



As the patterns observed in Figure 2 could be capturing differences between industries (if, for instance, more exporters were found in capital-intensive industries) or differences in plant sizes (if, for instance, larger manufacturers were more likely to become exporters), next we examine the link between the decision to introduce a new export product and past investment in a more formal manner. We do so in two ways. First, we estimate a probit model, with the dependent variable equal to one if manufacturer i introduces at least one new export product at time t, and zero otherwise. As the standard probit model does not lend itself to inclusion of fixed effects and the random-effect probit requires that the plant effects be uncorrelated with the regressors (which is unlikely to be true in this case), our second specification takes the form of a linear probability model with plant fixed effects.[21]

[21] Such a specification was used by, for instance, Bernard and Jensen (2004). As a robustness check, we also estimated a conditional logit model with plant fixed effects and our conclusions were not affected.

The variable of interest is the log of investment in physical capital at time $t-1$. This variable encompasses acquisition of machinery and equipment, buildings and infrastructure, transport equipment and other fixed assets whose productive existence is longer than one year. Investment is expressed in 1994 pesos. Each component of investment is deflated separately using deflators specific to each investment category provided by Banco de Mexico.

Additionally, we control for a number of plant characteristics. We proxy for the plant's size with the log of employment and the log of the number of products sold. We include the log of the plant's age. We control for skill intensity (i.e., the share of white collar workers in total employment) and the ratio of the plant's exports to its total production. In the expanded specification, the latter variable also enters as a square and a cube. The expanded specification also controls for labor productivity, defined as the log of the real value added per worker. The value added is measured using the difference between the sales and material inputs. It is deflated using a 6-digit level producer price index provided by Banco de Mexico. All of the explanatory variables, except for the age, enter the model as one period lags.

We also control for changes in the trade policy relevant to a particular producer. We include the change in the US tariffs imposed on imports from Mexico and the change in the US MFN tariffs. Controlling for both allows us to capture the preference margin enjoyed by Mexican exporters. We also control for the change in Mexican tariffs imposed on imports from NAFTA to proxy for access to imported inputs. Changes in tariffs specific to a given product are weighted by the share of the product in total domestic sales of producer i at time $t-1$. Thus these tariff changes vary by producer and time. Both models include year fixed effects which will absorb shocks across the whole economy. The probit specification additionally includes region and industry (2-digit) fixed effects.[22]

The regression results, reported in Table 6, suggest that the introduction of a new export variety is preceded by increased investment in physical assets. This effect is positive and statistically significant in both the probit and the linear probability model, in the baseline and the expanded specification. An increase in investment prior to the introduction of a product into export markets is in line with the theoretical predictions of product upgrading taking place before anticipated improvements in access to export markets.

As for the other control variables, all models indicate that a decline in the US tariffs applied to Mexican exports is associated with a larger probability of a new product being introduced to export markets. Changes in the US MFN tariff and the Mexican tariff do not appear to be statistically significant. Larger firms are more likely to export, though

[22]The summary statistics are presented in Table 2.

this effect is significant only in the probit, because in the linear probability model plant fixed effects are likely to be capturing the size effect. The coefficient on age is not statistically significant. The share of white collar workers (i.e., skill intensity) is positive and statistically significant only in one specification. Past exporting experience and labor productivity matter, although the effects differ between the probit and the linear probability models. This difference is understable because the probit model captures medium-term effects, while the linear probability model captures annual changes. We consider the probit results to be more meaningful because we believe that the decisions about introduction of new export products are influenced by the medium-term productivity and export intensity. These medium-term effects are absorbed by plant fixed effects in the linear probability model.

One may wonder whether increased investment also precedes the introduction of a new product destined solely for the domestic market. To explore this question, we estimate a model analogous to the one just discussed with the dependent variable equal to one if producer i introduces a new product just into the domestic market at time t, and zero otherwise. We find no statistically significant correlation between lagged investment and the introduction of a new product into the domestic market (see Table 7). The coefficient on lagged investment is either negative or very close to zero. This is suggestive of export products being different from goods introduced solely for the benefit of domestic consumers. As for the other controls, we find that younger firms are more likely to add new products to their range. For other variables, the results appear to be mixed.[23]

Finally, to check the plausibility of our findings we compare the values of investment and subsequent exports of a product newly introduced into foreign markets. We find that on average the export revenue obtained in the first year of exporting is about four times as large an the value of investment made in the year prior to product introduction into exports markets. In the case of export revenue obtained during the first three years, this ratio increases to 15.5 (see Table 8).

4.4 Instrumental Variable Approach

To pin down the causal relationship between NAFTA and product upgrading, in this section we adopt an instrumental variable approach. We examine the link between increased investment and changes in product unit values, instrumenting for the investment outlays using the anticipated changes in the US tariff mandated by NAFTA.

[23] As discussed earlier, the vast majority of new export products were sold in Mexico before. There are, however, some cases of a product being introduced simultaneously into the Mexican and the export market. In Table 7, the dependent variable is equal to 0 for such products as it is intended to capture products destined solely for the domestic market. In an alternative specification, we dropped these cases from the sample and the results were not affected.

NAFTA, a trilateral treaty between Canada, Mexico and US, was enacted on the 1st of January 1994. The agreement was signed on the 8th of December 1993 after a very close vote of the US Congress (with 234 votes in favor and 200 opposed). The negotiations were very quick, they formally started in April 1991 and were completed by August 1992.[24] Products were classified into five groups which were subject to specific schedules: (1) category A: duty free trade from 1994, (2) category B: tariffs to be reduced over five years and duty free trade from 1998, (3) category C: tariffs to be reduced over ten years and duty free trade from 2004, (4) category C+: tariffs to be reduced over fifteen years and duty free from 2008, (5) category D to be maintained duty free. The majority of tariffs were to be eliminated within ten years, and most tariffs fell within categories specifying equal-sized annual reductions over either five, seven or ten years (Kowalczyk and Davis (1996)).

The fact that the negotiations were completed quickly and that there was uncertainty surrounding the approval of NAFTA by the US Congress is very convenient for our study. It means that Mexican producers were unlikely to react to improvements in their access to the US market before 1994, which is the first year for which unit value data are available in our sample. The fact that Mexico was the weakest party at the negotiation table means that the schedule of cuts in the US tariffs mandated by NAFTA can be plausibly considered exogenous for the purposes of our exercise. Finally, the fact that tariffs were phased out over time provides us with variation needed to identify the effects we are interested in.

In the second stage of our estimation, we regress the change in the log of the relative domestic unit value of product p manufactured by producer i taking place between time $t-1$ and t on the investment outlays of producer i at time $t-1$. The relative unit value is defined as in equation 2. Thus the dependent variable captures the change in the unit value relative to the average change in the unit value of the same product occurring in Mexico during the same period. We are interested in how this change in the price premium responds to lagged investment. We also control for year fixed effects in the specification.

To pinpoint the link between the change in the price premium and the investment driven by the expected tariff changes, we instrument for investment outlays at time $t-1$. Our instrument is the anticipated change in the access of Mexican exporters to the US market mandated by NAFTA. Depending on the specification, we use: (i) change in the US tariff applied to Mexican exports of product p between $t+2$ and $t+4$, (ii) change in the preference margin enjoyed by Mexican exporters in the US market between $t+2$ and $t+4$, where the preference margin is defined as the difference between the US MFN tariff applied to non-NAFTA imports and the tariff applied to imports from Mexico under NAFTA, (iii) change in the US tariff applied to imports from Mexico between 1993 and

[24] An agreement in principle was signed by the three heads of state and negotiations continued only on labor and environmental issues, these took longer and were concluded by September 1993.

2003. The rationale for focusing on the cut between $t+2$ and $t+4$ is that we expect future tariff cuts to drive product upgrading at time t thanks to investment at $t-1$, but not to affect the decision to divert products from the domestic market to a foreign market at time t.[25] Tariff cuts used are specific to a given product, and are time-varying in the first two cases.

We also employ other instruments. Our second instrument is the interaction of a tariff cut with the advertising intensity of a given 4-digit industry, measured using the sales, general and administrative expenditure (which is the standard proxy used in the literature). The information on advertising intensity comes from Worldscope, a commercial database which includes information on thousands of companies from all countries in the world.[26] The industry average was calculated based on the figures reported for 1993 by all companies listed in the data base, thus it represents the world average. The link between advertising intensity and product ugrading is ambiguous. On the one hand, the scope for product differentiation may be greater in advertising-intensive industries. On the other hand, the importance of brand name/reputation may create larger barriers to entry for new products of lesser known producers.

Another instrument we use is the interaction of a tariff cut with the advertising intensity and the market share of product p of producer i in 1994 – the first year of our unit value data. We expect that products that have proven popular in Mexico may have a higher chance of entering foreign markets.[27] We also include the interaction of the advertising intensity with the initial product market share. As additional instruments, we use a set of interactions where advertising intensity is replaced with a proxy for the industry dependence on external financing taken from Rajan and Zingales (1998). Given the underdevelopment of the Mexican banking system, it might be more difficult to upgrade products in industries requiring large amounts of external financing.

As illustrated in Tables 9 and 10, our instruments perform well in predicting the variation in investment. F statistics pertaining to the test of excluded instruments range from 94 to 227 and the Anderson underidentification tests suggest that our regressions do not suffer from a weak instrument problem, nor does the Sargan cast doubt on the validity of our instruments. Starting with the first specification, the first stage results suggest that a decline in US tariffs has a positive effect on investment in the case of products with a high initial market share and high advertising intensity. There is also a positive link between the initial market share, advertising intensity, and the amount of investment.

[25] If such diversion took place, it would lead to lower domestic sales which could in turn affect the product price on the domestic market.

[26] While the 1997 release of the data base, which we use, included major companies from all countries, the coverage was heavily skewed towards firms operating in OECD economies.

[27] Javorcik, Keller, and Tybout (2008) mention Mexican diaspora in the US as an important source of demand for exports of Mexican consumer goods.

Similar conclusions can be reached based on the next two specifications. We find a negative relationship between the dependence on external financing and the amount invested, which may be linked to the underdevelopment of the financial sector and difficulties with obtaining credit in the aftermath of the peso crisis.[28]

Moving on to the second stage, we find a positive and statistically significant relationship between lagged investment and the change in unit values. The effect is significant at the 1% level in four specifications and at the 10% level in two specifications. Based on these regressions we conclude that, as predicted by the theory, anticipated improvements in access to the US market have led to increased investment and product upgrading in Mexico.

5 Concluding Remarks

Motivated by the theoretical literature, this study uses Mexican plant-product level data for the 1994-2003 period and compares unit values of current and future export products to those of their domestically sold counterparts. Our findings are in line with the predictions of the theoretical literature. First, we find that the producers who export a particular product variety tend to obtain a price premium for their domestic sales of this variety. This finding provides support for Alchian and Allen's (1964) "shipping the good apples out" hypothesis, which has not been tested before by explicitly comparing the quality of goods sold at home and abroad.

Second, we show that manufacturers who will export a particular product in the future experience an increase in the product's price premium two years before exporting starts. Three years before exporting takes place, their product is indistinguishable in terms of price premium from varieties sold by other producers. This is very suggestive of a close link between changes in product attributes and exporting, especially as we find that increases in the price premium coincide with increased investment in physical capital. Finally, our results establish a causal link between changes in the price premium and the variation in past investment outlays taking place in anticipation of the improved access to the US market. Our findings support the predictions of Constantini and Melitz's (2007) model that the anticipation of future liberalization induces firms to innovate ahead of liberalization and thus ahead of their anticipated, but yet unrealized, entry into export markets.

Our findings confirm the patterns of behavior mentioned during the interviews we conducted with Mexican entrepreneurs. The main message was that product quality and investment are the key determinants of entry into export markets.

[28] Note that when we calculated the direction of the effects, we used information of the distribution of the interacted terms rather than each individual variable entering an interaction term.

Finally, our results suggest that by focusing solely on "learning from exporting," researchers may have missed profound changes taking place at the producer and product level as part of their "learning to export."

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A Appendix: Tables

Table 1: Number of plants and products

Year	No of plants		No of products	
	All	Exporting	Sold	Exported
1994	6299	1586	19314	2857
1995	6070	1880	19284	3526
1996	5786	2061	18229	3989
1997	5572	2161	17325	4186
1998	5400	2106	16761	4269
1999	5255	1967	16226	3962
2000	5118	1914	15522	3796
2001	4952	1780	14924	3555
2002	4782	1696	14404	3357
2003	4626	1691	13751	3323

Table 2: Summary statistics

	Mean	**No. of obs.**
Number of workers	207.95	57414
Investment	1666.11	47169
(in thousands of 1994 pesos)		
Value added per worker	206.63	56576
(in thousands of 1994 pesos)		
Skill intensity (in %)	31.63	55865
Export Ratio (all plants, in%)	6.90	67980
Export Ratio (only exporters, in%)	25.12	18842
Age	25.49	43253
Number of varieties sold	2.96	52962
Log domestic unit value	1.81	147451
in thousands of pesos)		
Product market share in 1994	0.15	147161
Advertising intensity	20.54	177380
Dependence on external financing	0.33	180277

Tariffs	**1994**	**2003**
Average US-NAFTA Tariff, in %	1.9%	.5%
Top percentile US-NAFTA Tariff, in %	15%	5.4%
Average US-NAFTA Tariff Margin, in %	-3%	-2.7%
Top percentile US-NAFTA Tariff Margin, in %	-20%	-26%
Average Mexico-NAFTA Tariff, in %	9.7 %	.08%
Top percentile Mexico-NAFTA Tariff, in %	41%	2.5%

Table 3: Unit value premium and exporting

	(1)	**(2)**	**(3)**	**(4)**
Before Export	0.071***	0.071***	0.071***	0.071**
(1 or 2 years)	(0.012)	(0.017)	(0.015)	(0.022)
Exported	0.106***	0.106***	0.106***	0.106***
	(0.005)	(0.011)	(0.007)	(0.016)
R2	.9	.9	.9	.9
N	130170	130170	130170	130170
Test $b_1 = b_2$	.003	.03	.02	.07

	(1A)	**(2A)**	**(3A)**	**(4A)**
2 Years Before Export	0.063***	0.063***	0.063**	0.063**
	(0.016)	(0.018)	(0.020)	(0.022)
1 Year Before Export	0.080***	0.080***	0.080***	0.080***
	(0.016)	(0.018)	(0.021)	(0.022)
Exported	0.106***	0.106***	0.106***	0.106***
	(0.005)	(0.011)	(0.007)	(0.016)
R2	.9	.9	.9	.9
N	130170	130170	130170	130170
Test $b_1 = b_2$	.43	.04	.52	.05
Test $b_1 = b_3$	.01	.01	.03	.03
Test $b_2 = b_3$	.11	.12	.20	.19
Clustered SE	*No*	*plant-product*	*plant-year*	*product*
Product-Year FE	*Yes*	*Yes*	*Yes*	*Yes*

Notes:
The dependent variable is the log of unit value of product p sold by producer i at time t.
Standard errors are listed in parentheses.
*** denotes significant at 1%, ** at 5%, * at 10%.
For the tests we report the p-values. b_n corresponds to the coefficient of the nth variable as listed in the table.

Table 4: Unit value premium and exporting: Annual premiums

	(1)	**(2)**	**(3)**	**(4)**
3 Years Before Export	0.036*	0.036	0.036	0.036
	(0.020)	(0.023)	(0.026)	(0.028)
2 Years Before Export	0.063***	0.063***	0.063**	0.063**
	(0.016)	(0.018)	(0.020)	(0.022)
1 Year Before Export	0.082***	0.082***	0.082***	0.082***
	(0.017)	(0.019)	(0.022)	(0.024)
Exported	0.107***	0.107***	0.107***	0.107***
	(0.005)	(0.011)	(0.007)	(0.016)
r2	.9	.9	.9	.9
N	120849	120849	120849	120849
Clustered SE	*No*	*plant-product*	*plant-year*	*product*
Product-Year FE	*Yes*	*Yes*	*Yes*	*Yes*
Test equality of coefficients				
test b_1=b_2	.29	.08	.4	.08
test b_1=b_3	.08	.01	.17	.01
test b_1=b_4	.001	.002	.01	.01
test b_2=b_3	.42	.08	.5	.07
test b_2=b_4	.01	.01	.03	.03
test b_3=b_4	.15	.16	.25	.22

Notes:
The dependent variable is the log of unit value of product p sold by producer i at time t.
Standard errors are listed in parentheses.
*** denotes significant at 1%, ** at 5%, * at 10%.
For the tests we report the p-values. b_n corresponds to the coefficient of the nth variable as listed in the table.

Table 5: Unit value premium and exporting: Controlling for market power

	(1)	**(2)**	**(3)**	**(4)**
Before Export (1 or 2 years)	0.071**	0.055**	0.063**	0.084***
	(0.022)	(0.023)	(0.023)	(0.024)
Exported	0.106***	0.085***	0.095***	0.126***
	(0.016)	(0.015)	(0.016)	(0.020)
Log Product Sales (lagged)		0.025***		
		(0.004)		
Log Real Plant Sales (lagged)			0.027***	
			(0.005)	
Markup (lagged)				0.001***
				(0.000)
r2	.9	.91	.909	.909
N	130170	105171	102610	89800
Test $b_1 = b_2$	0.07	0.13	0.11	0.04
Clustered SE	*product*	*product*	*product*	*product*
Product-Year FE	*Yes*	*Yes*	*Yes*	*Yes*

Notes:
The dependent variable is the log of unit value of product p sold by producer i at time t.
Standard errors are listed in parentheses.
*** denotes significant at 1%, ** at 5%, * at 10%.
For the tests we report the p-values. b_n corresponds to the coefficient of the nth variable as listed in the table.

Table 6: Introduction of new export products and investment behavior

	(1) Probit	(2) Lin-Prob FE	(3) Probit	(4) Lin-Prob FE
Log Investment (lagged)	0.017***	0.001*	0.013***	0.002**
	(0.00)	(0.00)	(0.00)	(0.00)
Log Labor Productivity (lagged)			0.040***	-0.012***
			(0.01)	(0.00)
Export ratio (lagged)	0.002***	-0.004***	0.017***	-0.011***
	(0.00)	(0.00)	(0.00)	(0.00)
Export ratio sq (lagged)			-0.000***	0.000***
			(0.00)	(0.00)
Export ratio cubed (lagged)			0.000***	-0.000***
			(0.00)	(0.00)
Log number of products (lagged)	0.374***	-0.022*	0.366***	-0.019*
	(0.02)	(0.01)	(0.02)	(0.01)
Skill intensity (lagged)	0.071	0.049*	-0.004	0.041
	(0.06)	(0.03)	(0.06)	(0.03)
Log no. of employees (lagged)	0.078***	-0.006	0.075***	-0.004
	(0.01)	(0.01)	(0.01)	(0.01)
Log age	0.007	-0.020	0.009	-0.022
	(0.02)	(0.02)	(0.02)	(0.02)
Δ Mex Nafta Tariff	0.004	-0.001	0.004	-0.001
	(0.01)	(0.00)	(0.01)	(0.00)
Δ US Nafta Tariff	-4.350***	-0.767***	-4.271***	-0.800***
	(0.74)	(0.20)	(0.75)	(0.20)
Δ US MFN Tariff	0.083	-0.015	0.082	-0.015
	(0.16)	(0.02)	(0.17)	(0.02)
N	32295	32295	31738	31738

Notes: Coefficients reported as zero are $< |.001|$
The dependent variable is equal to 1 if manufacturer i introduced at least one new export product at time t, and zero otherwise
Standard errors are listed in parentheses
*** denotes significant at 1%, ** at 5%, * at 10%.

Table 7: New domestic products and investment behavior

	(1) Probit	(2) Lin-Prob FE	(3) Probit	(4) Lin-Prob FE
Log Investment (lagged)	-0.005	0.000	-0.002	0.000
	(0.00)	(0.00)	(0.00)	(0.00)
Log Labor Productivity (lagged)			-0.032**	0.008**
			(0.01)	(0.00)
Export ratio (lagged)	-0.000	0.000*	-0.014***	0.001***
	(0.00)	(0.00)	(0.00)	(0.00)
Export ratio sq (lagged)			0.000***	-0.000***
			(0.00)	(0.00)
Export ratio cubed (lagged)			-0.000**	0.000**
			(0.00)	(0.00)
Log number of products (lagged)	0.520***	-0.060***	0.519***	-0.060***
	(0.02)	(0.01)	(0.02)	(0.01)
Skill intensity (lagged)	-0.193***	0.005	-0.141**	0.004
	(0.06)	(0.03)	(0.06)	(0.03)
Log no. of employees (lagged)	-0.057***	0.001	-0.051***	0.003
	(0.01)	(0.00)	(0.01)	(0.01)
Log age	-0.058***	-0.031	-0.056***	-0.031
	(0.02)	(0.02)	(0.02)	(0.02)
Δ US Nafta Tariff	-0.552	-0.018	-0.513	0.001
	(0.84)	(0.16)	(0.87)	(0.16)
Δ Mex Nafta Tariff	0.001	0.001	0.000	0.000
	(0.01)	(0.00)	(0.01)	(0.00)
Δ US MFN Tariff	-0.293*	-0.055**	-0.269	-0.052**
	(0.18)	(0.03)	(0.18)	(0.03)
N	32295	32295	31738	31738

Notes: Coefficients reported as zero are $< |.001|$
The dependent variable is equal to 1 if manufacturer i introduced at least one new product into the domestic market at time t, and zero otherwise
Standard errors are listed in parentheses
*** denotes significant at 1%, ** at 5%, * at 10%.

Table 8: Relative magnitudes of investment and export revenue from new products

	Exports value in year 1 divided by investments 1 year before	**Exports value in years 1 and 2 divided by investments 1 year before**	**Exports value in years 1 and 2 and 3 divided by investments 1 year before**
median	2.3	4.3	6.4
mean	3.9	7.6	15.5

Table 9: Change in unit values and lagged investment - IV results

	(1)	(1-first stage)	(2)	(2-first stage)	(3)	(3-first stage)
Log Investment (t-1)	0.004*		0.006***		0.005***	
	(0.00)		(0.00)		(0.00)	
Advertising intensity x Tot Δ US Tariff		-0.494***				
		(0.08)				
Tot Δ US Tariff		13.699***				
		(1.59)				
Advertising intensity x Tot Δ US Tariff x Initial Prod Mkt Share		-0.933***				
		(0.09)				
Advertising intensity x Initial Prod Mkt Share		0.040***		0.059***		0.065***
		(0.00)		(0.00)		(0.00)
Advertising intensity x Δ US Tariff between t+2 and t+4				-1.177***		
				(0.41)		
Δ US Tariff between t+2 and t+4				43.092***		
				(8.23)		
Δ US Tariff between t+2 and t+4 x Advertising intensity x Initial Prod Mkt Share				-4.074***		
				(0.36)		
Advertising intensity x Δ US Tariff Margin between t+2 and t+4						-1.017***
						(0.22)
Δ US Tariff Margin between t+2 and t+4						23.913***
						(4.86)
Δ US Tariff Margin between t+2 and t+4 x Advertising intensity x Initial Prod Mkt Share						-0.123
						(0.17)
N	64821	64821	45301	45301	45301	45301
Sargan Test (p-value)	.78		.95		.25	
Underidentification Test (p-value)		0.00		0.00		0.00
F-Test of excluded instruments		187.64		227.48		188.39

Notes: Standard errors are listed in parentheses. Coefficients reported as 0.00 are $< |.001|$.
*** denotes significant at 1%, ** at 5%, * at 10%. Year and location fixed effects are included
In the second stage, the dependent variable is the change in the relative unit value of product i manufactured by producer p between time t and $t-1$. In the first stage, the dependent variable is the log of investment undertaken by producer p at time $t-1$

Table 10: Change in unit values and lagged investment - IV results continued

	(4)	(4-first stage)	(2)	(5-first stage)	(6)	(6-first stage)
Log Investment (t-1)	0.003*		0.006***		0.006***	
	(0.00)		(0.00)		(0.00)	
Advertising intensity x Tot Δ US Tariff		-1.258***				
		(0.10)				
External Financing x Tot Δ US Tariff		-18.862***				
		(1.65)				
Tot Δ US Tariff		32.393***				
		(2.02)				
Advertising intensity x Tot Δ US Tariff x Initial Prod Mkt Share		3.319***				
		(0.35)				
External Financing x Tot Δ US Tariff x Initial Prod Mkt Share		32.637***				
		(5.86)				
Advertising Intensity x Initial Prod Mkt Share		0.039***		0.051***		0.053***
		(0.00)		(0.00)		(0.00)
External Financing x Initial Prod Mkt Share		-88.483***		-13.269***		-15.130***
		(6.82)		(2.26)		(1.68)
Advertising intensity x Δ US Tariff between t+2 and t+4				-1.716***		
				(0.47)		
External Financing x Δ US Tariff between t+2 and t+4				-0.637		
				(2.90)		
Δ US Tariff between t+2 and t+4				51.137***		
				(9.42)		
Δ US Tariff between t+2 and t+4 x Advertising intensity x Initial Prod Mkt Share				-1.716***		
				(0.51)		
External Financing x Δ US Tariff between t+2 and t+4 x Initial Prod Mkt Share				-48.716**		
				(24.20)		
Advertising intensity x Δ US Tariff Margin between t+2 and t+4						-0.832***
						(0.24)
External Financing x Δ US Tariff Margin between t+2 and t+4						-10.874**
						(4.85)
Δ US Tariff Margin between t+2 and t+4						20.657***
						(5.40)
Δ US Tariff Margin between t+2 and t+4 x Advertising intensity x Initial Prod Mkt Share						-0.001
						(0.24)
External Financing x Δ US Tariff Margin between t+2 and t+4 x Initial Prod Mkt Share						20.766
						(19.87)
N	62759	62759	39798	39798	39798	39798
Sargan Test (p-value)	.66		.72		.66	
Underidentification Test (p-value)		0.00		0.00		0.00
F-Test of excluded instruments		145.73		105.53		94.045

Notes: Standard errors are listed in parentheses. Coefficients reported as 0.00 are $< |.001|$.
*** denotes significant at 1%, ** at 5%, * at 10%. Year and location fixed effects are included